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POLISH NURSING

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Szanowni Czytelnicy,

w imieniu Komitetu Naukowego mamy przyjemność zarekomendować Państwu kolejny numer „Pielęgniarstwa Polskiego".

Treści zawarte w tym tomie mają bardzo zróżnicowany charakter, odzwierciedlają obszary zainteresowań poznawczych i klinicznych zarówno personelu pielęgniarskiego, jak i kadr nauki uniwersytetów medycznych. Wśród prezentowanych prac polecamy cykl dotyczący oceny osiągnięć studentów położnictwa przeprowadzonej przez Zakład Dydaktyki i Efektów Kształcenia Warszawskiego Uniwersytetu Medycznego.

Wśród prac poglądowych polecamy artykuły poświęcone m.in.: modelowi struktury wiedzy pielęgniarskiej dla badań naukowych i praktyki zawodowej, inteligencji emocjonalnej dla liderów pielęgniarstwa oraz sposobom zapobiegania upadkom pacjentów z chorobą Parkinsona.

W numerze tym znalazły się również dwa artykuły, w których przedstawiono możliwości zastosowania klasyfikacji ICNP® w opiece nad pacjentem z chorobą Leśniowskiego-Crohna oraz psychologiczne aspekty funkcjonowania osób z chorobami zapalnymi jelit – chorobą Leśniowskiego-Crohna i wrzodziejącym zapaleniem jelita grubego.

Oprócz życzeń owocnej lektury składamy Państwu najserdeczniejsze życzenia z okazji Świąt Bożego Narodzenia. Natomiast na nowy 2017 rok życzymy tej odrobiny szczęścia, która sprawi, że wszystkie podjęte działania zakończą się sukcesem.

Dr hab. Maria Danuta Głowacka
Redaktor Naczelny

Dr inż. Renata Rasińska
Sekretarz Naukowy

EDITOR'S NOTE

Dear Readers,

on behalf of the Scientific Committee, we have a pleasure to recommend you the current issue of the 'Polish Nursing'. The contents of this issue are very diverse, however, they reflect the areas of cognitive and clinical interest of nursing staff and medical universities' researchers. From among presented papers we recommend a series of works on the assessment of obstetrics students' achievements conducted by the Department of Teaching and Learning Outcomes, Medical University of Warsaw.

Among the review papers we recommend articles on, among others, the structure model of nursing knowledge for research and professional practice, emotional intelligence for leaders in nursing and initiatives to prevent falls in patients with Parkinson's disease.

This edition also includes two articles, which describe the possibility of using the ICNP® Classification in the care of patients with Crohn's disease, and psychological aspects of functioning of people with inflammatory bowel disease - Crohn's disease and ulcerative colitis.

Wishing you fruitful reading, we as well would like to wish you merry Christmas and a happy New Year. May all the actions taken by you in 2017 be successful.

Assoc. Prof. Maria Danuta Głowacka, PhD
Editor in Chief

Renata Rasińska, PhD (Eng)
Scientific Secretary

EDUCATIONAL ACHIEVEMENTS OF THE FIRST YEAR STUDENTS OF MIDWIFERY: EIGHT-YEAR OF ADMISSION VALIDITY STUDY FOR STUDIES OF THE 1ST DEGREE

OSIĄGNIĘCIA EDUKACYJNE STUDENTÓW POŁOŻNICTWA NA PIERWSZYM ROKU STUDIÓW: OŚMIOLETNIE BADANIE TRAFNOŚCI ZASAD KWALIFIKACJI NA STUDIA I STOPNIA

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ABSTRACT

Aim. Assessment of predictive validity of the selected socio-demographic factors and admission criteria for the candidates of full-time studies of the 1st degree at the department of Midwifery at the Medical University of Warsaw (MUW) between the years 2005/06 and 2012/13.

Material and methods. Data of 708 students of Midwifery concerning grades achieved in the subjects completed with an exam in the first year of studies. The evaluated socio-demographic variables: age, place of completing high school, type of maturity exam. Admission criteria based on the results of the maturity exam in Polish language, foreign language and an additional subject. Predictive validity was assessed using the model of logistic regression and multiple function. Calculations: STATISTICA 12.5, $\alpha = 0.05$.

Results. For the model of logistic regression, no socio-demographic factor or admission criterion was of significant importance considering the probability of not completing studies. In the model, the function of multiple regression, among many socio-demographic variables, both age and the place of completing high school were of significance considering the grade point average of a student. All three admission criteria were relevant predictors, however, the strongest one being a candidate's score in an additional subject ($\beta_{stand.} = 0.348$), followed by a foreign language and Polish language ($\beta_{stand.}$ 0.190 and 0.178, respectively).

Conclusions. Admission criteria applied so far, present an appropriate level of prognostic validity. However, it is still necessary to adjust the admission policy so as to increase the attractiveness of Midwifery studies among the candidates.

KEYWORDS: midwifery, educational measurement, graduate education, school admission criteria.

STRESZCZENIE

Cel. Ocena trafności prognostycznej wybranych czynników socjo-demograficznych oraz kryteriów kwalifikacji kandydatów na studia stacjonarne pierwszego stopnia na kierunku położnictwo na Warszawskim Uniwersytecie Medycznym (WUM) w okresie między rokiem 2005/06 a 2012/13.

Materiał i metody. Dane 708 studentów kierunku położnictwo dotyczące uzyskanych ocen z przedmiotów kończących się egzaminem w pierwszym roku studiów. Oceniane zmienne socjo-demograficzne: wiek, miejscowość ukończenia szkoły średniej, rodzaj egzaminu maturalnego. Kryteria kwalifikacyjne oparte na wynikach egzaminu maturalnego z języka polskiego, języka obcego oraz przedmiotu dodatkowego. Trafność prognostyczną oszacowano z wykorzystaniem modelu funkcji regresji logistycznej oraz regresji wielorakiej. Obliczenia STATISTICA 12.5, $\alpha = 0{,}05$.

Wyniki. Dla modelu regresji logistycznej żaden czynnik socjo-demograficzny ani kryterium kwalifikacyjne nie wpływały w istotny sposób na prawdopodobieństwo nieukończenia studiów. W modelu funkcja regresji wielorakiej spośród zmiennych socjo-demograficznych zarówno wiek jak i miejscowość ukończenia szkoły średniej wpływały istotnie na średnią ocen studenta. Wszystkie trzy kryteria kwalifikacyjne były istotnymi predyktorami, przy czym najsilniejszy wpływ na osiągnięcia studenta miała punktacja kandydata za przedmiot dodatkowy ($\beta_{stand.} = 0{,}348$), a dalej język obcy i język polski ($\beta_{stand.}$ odpowiednio 0,190 i 0,178).

Wnioski. Stosowane dotychczas kryteria kwalifikacyjne wykazują dostateczny poziom trafności prognostycznej. Nadal jednak aktualna jest konieczność dostosowania polityki rekrutacyjnej, tak aby zwiększyć atrakcyjność studiów położniczych wśród kandydatów na studia.

SŁOWA KLUCZOWE: położnictwo, ocena wiadomości, szkolnictwo wyższe, kryteria przyjęć do szkoły.

Introduction

One of the key issues that contemporary midwifery and nursing must face is the growing shortage of personnel. In 2011, the index of midwives in Poland per 100 patients was 1.14 and was below the European average [1, 2]. Moreover, the Supreme Chamber of Nurses and Midwives forecasts that this index will lower further to the value of 1.01 in 2035 [1]. One of the important initiatives that is undertaken in various countries and connected with the growing shortage of professional-

ly active nurses and midwives is introducing a strategy based on increasing the number of students learning these professions [3-5]. In Poland there are in total 18 universities, including 11 medical universities that are accredited to carry out full-time studies of the 1st degree at the Midwifery faculty. The number of candidates admitted to full-time and part-time studies of the 1st degree at this faculty between 2010/11 and 2013/14 lowered from 1289 to 1041, according to the data from the Department of Nurses and Midwives at the Ministry of Health, with the annual average of 1138 people [1]. At the same time, in the years 2010/11 – 2012/13, the number of graduates reached 2922 (974 people annually on average). Additionally, based on data from the National Registry of Nurses and Midwives, it may be concluded that since 2006 there has been a systematic decrease in the number of people applying for the right to perform the profession [1]. The above data are a worrying signal that is also the evidence of low interest of the young people in learning and performing the profession of a midwife in the future.

Considering the above data concerning the age of midwives currently working in health care (72.8% of the employed is over 40) and the number of newly registered people who have the right to perform this profession, it is necessary to undertake urgent actions of the national range that would minimize the outcome of the growing shortage of well-qualified personnel [1]. One of the possible moves would be to increase the number of people studying Midwifery. An initiative has been introduced so as to enlist obstetrics among the ordered majors, which should have some influence on the increased interest of the young people in these directions [6]. However, it should be noted that the efficiency of such activities is limited because the existing academic resources are not able to ensure sufficient education for a much greater number of students than nowadays. Moreover, the increase in the number of students significantly increases the risk of attrition during the process of studies, which is connected with admitting people of insufficient academic background. The growing pressure towards increasing the number of places when there is a demographic decline, results in lowering validity of selection of candidates who might have required features and predispositions, which results in a high ratio of students who do not complete their studies in time or are removed from the list of students. A high risk of attrition results in measurable financial losses and waste of university's resources, which worsens the quality of all learning students [7]. Research into quality of selection of candidates taking part in the admission process and the predictive evaluation concerning the results of learning and attrition during the course of studies are necessary in assessing the long-term results of increasing the number of students who begin their studies at the Midwifery department. Moreover, identification of factors that influence the progress and educational achievements as well as shaping the professional skills that eventually lead to a positive completion of studies are an important tool in rational planning and developing curricula [8].

Aim

Evaluation of predictive validity of selected socio-demographic factors and candidates' qualification criteria for full-time studies of the 1st degree at the Midwifery department at Medical University of Warsaw (MUW) between the years 2005/06 and 2012/13.

Material and methods

Data of 708 students who undertook full-time studies of the 1st degree at the Department of Health Sciences at MUW in the academic year of 2005/06 at the Midwifery Department were positively verified for the retrospective study. Data concerning variables such as age, place of completing high school, type of the matura exam (secondary school certificate) were obtained on the basis of information provided in the application forms that were completed by the candidates. The age mean at the time of beginning their studies was 19.5 ± 1.83 (median: 19.0; CV: 9.4%). Over 90% of the studied group took the so-called "new" matura exam, whereas almost ⅔ of the students completed their high school in Warsaw. Between 2005/06 and 2012/13, the total ratio of attrition due to the unsatisfactory learning results was 12.1%. A detailed characteristic of the studied group of students is presented in **Table 1**.

Table 1. Characteristics of a group of students who began their full-time studies of the 1st degree at the Midwifery department at the Medical University of Warsaw between the years 2005/06–2012/13

Admission year	N	Status of the completion of the 1st year		Secondary school certificate		Place of completing high school	
		completed	incomplete	new	old	Warsaw	other
2005/06	57	50	7	45	12	27	30
2006/07	118	97	21	102	16	66	52
2007/08	98	74	24	92	6	58	40
2008/09	84	80	4	80	4	51	33
2009/10	88	87	1	84	4	56	32
2010/11	91	83	8	87	4	56	35
2011/12	89	77	12	87	2	66	23
2012/13	83	74	9	81	2	52	31
Total:	708	622	86	658	50	432	276

Source: author's own analysis

The results of qualification to the studies of the 1st degree were collected from the University Admission System and included a scoring in three criteria: Polish language, foreign language and a selected additional subject. Moreover, also data concerning additional points were included as well as preferred subjects. Also, for each student, data concerning grades obtained in subjects ending in an exam in the first year of studies were collected. The above data were collected in the Central Students Database that supports administrative service of students and the course of studies.

According to the standpoint of the MUW Bioethical Committee, retrospective survey studies and other non-invasive activities do not require the above Committee's consent.* The authors of this work obtained the consent of the Local Administrator of the Sensitive Data Protection Office to process the personal data of students learning at MUW.

In order to evaluate the prognostic validity of the selected socio-demographic factors and qualification criteria of university candidates, two analytical approaches were applied:

- potential risk of failing to complete the first year of studies was evaluated using the model of non-linear estimation for the logistic regression function;
- prediction in the model of multiple regression with estimation of parametres using the least squares method for the result variable was evaluated: a grade point average (GPA) after the first year of studies.

In the suggested logistic model, three predictors were applied belonging to the group of socio-demographic factors: age, place of completing high school and the type of matura exam (old or new). Moreover, the model also included three criterial variables used during the admission process: result of the matura exam in the Polish language, foreign language and an additional subject. Additionally, information referring to the selection of preferred subjects were included as well as additionally scored points.

Dichotomous dependent variable of the studied model was the fact of not completing the first year of studies (a variable coded 0 and 1, respectively). Rosenbrock and quasi-Newton method of estimation was applied, appointing asymptotic standard errors. Accuracy of data adjustment to the suggested logit was checked using Hosmer-Lemeshow test. For each predictor, the odds ratio (OR) was determined together a with 95% confidence interval in order to establish the risk of not completing studies.

In the model of multiple regression, the same set of socio-demographic predictors was applied and the same three criterial variables referring to the score, and two variables concerning the preferred subjects and additional points. The dependent variable (outcome variable) was a GPA obtained by students in all exam subjects included in the first year of studies. Parametres of regression function together with the assessment of standard errors were determined and the standardised β coefficient was established so as to determine the power of influence of the predictors on the outcome variable. A model of regression obtained in this manner was then tested with reference to the accuracy of function form and the stability of the model (RESET Ramsey and Chow tests), and the presence of redundancy (VIF statistics).

For calculations, a statistical set STATISTICA in 12.5 version was applied with the additional module "PLUS set" (StatSoft, Inc.) used according to the MUW licence. For all analyses, the relevance level of $\alpha = 0.05$ was used *a priori*.

Results

The suggested model of logistic regression used to evaluate the risk of attrition was statistically irrelevant (total loss: 167.082; $chi^2 = 13.866$; $p = 0.085$), however, the suggested form of the logit was accurate (Hosmer-Lemeshow test: 11.5728, $p = 0.171$). Estimation of parametres of the function shows that none of the three socio-demographic factors influenced significantly the probability of not completing studies. Among the predictors connected with the criteria of qualification for university, only the score based on the results for an additional subject was on the border of statistical significance (OR = 1.017; Wald chi^2 test = 3.755, $p = 0.053$). A detailed summary of the results for the tested model of logistic regression are presented in **Table 2**.

Table 2. Logistic regression model for assessing the risk of attrition in the first year of full-time studies at the faculty of Midwifery at MUW

Independent variable	OR	95% CI		Wald statistic	P-value
		lower	upper		
Intercept term	0,002	0,000	0,337	5,691	0,017
Matriculation exam* 0: New type 1: Old type	0,343	0,023	5,211	0,595	0,441
Place of school completion* 0: Other 1: Warsaw	1,688	0,955	2,983	3,245	0,072
Premium subject* 0: No 1: Yes	0,989	0,478	2,046	0,001	0,977
Additional scores* 0: No 1: Yes	0,625	0,326	1,199	1,999	0,157
Age on entry	1,208	0,947	1,540	2,306	0,129
Polish language	0,986	0,960	1,012	1,145	0,285
Foreign language	0,995	0,977	1,013	0,317	0,574
Additional subject	1,017	1,000	1,035	3,755	0,053

* binary variable (dichotomous variable)

OR – odds ratio; 95% CI – confidence interval

Source: author's own analysis

* More detailed information and sample of documents of the Bioethics Committee of the Medical University of Warsaw are accessible on: https://komisja-bioetyczna.wum.edu.pl/content/szczegółowe-informacje-oraz-wzory-dokumentów (access: 04 Oct 2015).

The tested model of multiple regression was stable (Chow test: F = 1.560; p = 0.125), and the analysis of redundancy showed meeting the assumptions of that predictive method (VIF > 10.0). Moreover, the suggested form of the regression function was properly adjusted to the variables of the model (Ramsey RESET test: F = 2.802; p = 0.062), and the predictors explained over 25% of the GPA after the first year of studies (adjusted R^2 = 0.253).

The only predictor for which there was no relevant influence on the students' results after the first year of studies, was the type of the matura exam. Among the socio-demographic variables, both gender and the place of completing high school influenced the GPA of a student. For older students, the predicted level of educational achievements was significantly higher than in case of younger students ($\beta_{stand.}$ = 0.154). Students who completed high school in Warsaw had significantly lower GPA after the first year than those whose high school was out of Warsaw ($\beta_{stand.}$ = -0.111).

As far as prognostic ability of the admission for university studies criteria are concerned, for each of them statistical relevance was noted, however, the greatest influence on achievements in the first year of studies had a candidate's score in the additional subject ($\beta_{stand.}$ = 0.348), followed by a foreign language and Polish language ($\beta_{stand.}$ 0.190 and 0.178, respectively). The fact of selecting a preferred subject by a candidate and achieving additional score points during the recruitment process had a negative predictive ability ($\beta_{stand.}$ -0.110 and -0.143, respectively). Data concerning individual values of standardised regression β coefficients for each predictor of the tested model are presented in **Table 3.**

Table 3. Multiple regression model for the outcome variable – GPA after the first year of studies and socio-demographic factors and criterial variables connected with admission for the Midwifery faculty of the 1st degree (F(8.467) = 21.078; p < 0.0001, standard error of estimation = 0.310)

Independent variable	b	$\beta_{stand.}$	95% CI		t statistic	P-value
			lower	upper		
Intercept term	1,384	----	----	----	4,139	< 0,001
Age on entry	0,031	0,154	0,020	0,289	2,250	0,025
Matriculation exam* 0: New type 1: Old type	0,097	0,092	-0,043	0,226	1,338	0,182
Place of school completion* 0: Other 1: Warsaw	-0,041	-0,111	-0,189	-0,033	-2,787	0,006
Polish language	0,006	0,178	0,096	0,260	4,281	< 0,001
Foreign language	0,004	0,190	0,110	0,270	4,668	< 0,001
Additional subject	0,007	0,348	0,258	0,439	7,577	< 0,001
Premium subject* 0: No 1: Yes	-0,043	-0,110	-0,202	-0,018	-2,348	0,019
Additional scores* 0: No 1: Yes	-0,053	-0,143	-0,224	-0,061	-3,438	0,001

* binary variable (dichotomous variable)
b – regression coefficient; β –standardized regression coefficient; t – value of statistics; 95% CI – 95% confidence interval

Source: author's own analysis

Discussion

A significant element of validation of the assumption of the admission policy at a given university is to identify predictive factors that would accurately evaluate the probability of achieving success throughout the course of studies and also those that would contribute to the increase in the risk of attrition during the time of studies. The results of predictive studies presented by the authors show that each of the three admission criteria for the candidates to the Midwifery faculty fulfilled the assumptions of validity and the measurement of candidates' competences on entry. None of the studied socio-demographic variables or the selective factors applied in the admission process had no relevant impact on the risk of attrition during the first year of studies at the Midwifery faculty.

A candidate's age during admittance, a place of completing high school or the result of the matura exam in Polish or foreign language, and the additional subject, influence significantly any student's achievements during the first year of their studies at the Midwifery faculty. The above predictors may serve well during the process of early verification of students for whom it is less probable to succeed during the first two semesters of education, which may minimize attrition among the students.

In literature we may find several works undertaking the issue of impact of various socio-demographic variables on educational achievements of students at the Nursing faculty. As can be seen from the predictive studies, a variable age is positively correlated with the students' achievement [9-17]. By and large, in case of older students, significantly better results are observed in comparison with students who began their studies under 26 years of age, regardless of any additional qualifications on entry [10, 11]. In the studies on the reasons of attrition, it is young age that is pointed at as a negative predictor [12, 14, 15]. As reported by Pryjmachuk et al. [12], age is of moderate significance on timely completion of studies. Despite the fact that the above findings concern learning at the faculty of Nursing, it seems possible to apply them also to the Midwifery faculty. The quoted results of predictive studies confirm the findings presented in this work, which show that age is a relevant predictor of success measured by the GPA after the first year of studies ($\beta_{stand.}$ = 0.154). Presenting additional qualifications by a candidate that provided additional points during the admission process influenced the results of learning negatively ($\beta_{stand.}$ = -0.053).

Another significant socio-demographic variable that was of noticeable importance on the predicted results achieved by students throughout the course of learning during the first year, was the place of completing high school. In the multiple regression analysis it was noted that students who completed high school in Warsaw

had significantly worse results during their studies than those from outside Warsaw ($\beta_{stand.}$ = -0.041). This observation may be explained by the fact that in the group of "non-resident" students are people whose choice of university was well thought-through due to the fact that they needed to organize their stay away from their current place of residence. Thus, this group ought to be characterised by a greater motivation, determination and engagement in their studying process. However, on the other hand, in case of "non-resident" students, one could expect a greater risk of attrition due to economic factors, a higher cost of studying away from their current place of residence. Moreover, the "non-resident" students may have greater problems with adaptation and social integration, especially in case of people who came to Warsaw from little towns and villages. These assumptions are not confirmed in the attrition analysis using the logistic regression model (OR = 1.688, p = 0.072). Thus, a clear resolution of the impact of this variable on the course of study requires additional studies that would expand the list of the analysed criteria from the group of economic and environmental factors.

If we wish to carry out a good selection of candidates, we apply the principle that we choose those who meet a certain minimum of knowledge and skills required and possess certain predispositions desired in this profession. As can be seen from the results of analysis of multiple regression on predictors from the group of admission criteria, each one of them (Polish language, a foreign language and an additional subject) was an important factor conditioning achieving success during studies at the faculty of Midwifery. None of the three selection criteria was a relevant predictor of attrition. A relatively good validity of the selection criteria used at MUW means that in most cases the results achieved by candidates during the admission process reflect their actual features and properties of the exam takers. However, despite the positive results in the field of predictive validity, in the studied group of students over 12% of attrition was noted during the first year of studies. Data from such countries as Australia [18], Canada [19], UK [20, 21] or the USA [22] can be an evidence of how serious the problem of the loss of students could be. As reported by Waters [23] and Sabin et al. [24], the ratio of attrition among those studying nursing in Scotland is around 28-30%. Losing close to a third of students who were positively verified in the selection process is connected with a financial loss of about 17 000£ annually per each student [23, 24], which every year accumulates to around 99 million pounds [25]. In Poland, according to the data from the Department of Nurses and Midwives of the Ministry of Health, the national ratio of attrition at the Midwifery studies of the 1st degree for the academic year of 2010/11 accumulated to as much as 34.9% [1]. That is why, achieving high precision in assessing candidates for whom the score is around the cut-off point is such an important element of the admission process, because this group of candidates bears the highest risk of attrition during studies [17].

It needs to be remembered that the aim of appropriately selected university admission criteria is not to verify the learning outcomes achieved at high school (that is the role of the matura exam), but to assess whether the candidate has sufficient competences on entry to undertake studies at all. The specificity of a given assessment tool is its ability to select a candidate who should not be admitted (negative selection). Looking at selecting the best candidates, criteria that are more favourable are those that are characterised by a greater specificity, so as to avoid a situation in which among people beginning studies would be such individuals who represent insufficient level of competences on entry. An admission system proves insufficient if a certain group of students is not able to meet the requirements due to the lack of appropriate features and predispositions that were not evaluated and verified properly during the admission process.

Conclusions

The results obtained during the predictive analysis allow to conclude and recommend the following:

1. Admission criteria applied so far show the satisfactory level of prognostic validity.
2. It is necessary to adjust the admission policy to the changing demographic conditions connected with the lowering number of university candidates.
3. Such actions must be undertaken that would contribute to the increase of attractiveness of Midwifery studies among high school graduates who apply to universities.
4. In order to maintain a high ratio of success throughout the course of studies, it may be necessary to introduce a support system for the newly accepted candidates to enable them to adapt to the academic learning conditions.
5. Further collection and analysis of data is recommended concerning the future of graduates of the Midwifery faculty so as to evaluate the influence of learning outcomes and individual socio-demographic factors, economic and environmental ones on their professional success achieved in the future.

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BASIC SCIENCES AS A SOURCE OF SUCCESS IN TEACHING MIDWIVES TO PROVIDE SPECIALISED CARE – A SINGLE-CENTRE STUDY

NAUKI PODSTAWOWE JAKO ŹRÓDŁO SUKCESU W KSZTAŁCENIU POŁOŻNYCH Z ZAKRESU OPIEKI SPECJALISTYCZNEJ – BADANIE JEDNOOŚRODKOWE

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ABSTRACT

Aim. Assessment of the impact of admission criteria and students' educational achievements in basic sciences on learning outcomes with regard to specialised care among Midwifery students.
Material and methods. Admission data and learning outcomes of 622 Midwifery students who graduated from a full-time Bachelor's degree programme between 2007-08 and 2014-15. Mean age of 19.5 ± 1.86 years; 92% of the study participants passed a "new matura exam"; 33% of all students graduated from a secondary school in Warsaw. Statistical methods: multiple stepwise regression model and analysis of covariance. Calculated in STATISTICA version 12.5; assumed alpha of 0.05.
Results. The best-fitted regression model considered five independent variables ($F = 60.846$; $P < 0.001$; $R_{2adjusted} = 0.351$). None of the socio-demographic factors was included in the regression model. Rank scores calculated during the admission process for the additional subject ($\beta_{stand.} = 0.298$) was the strongest predictor of students' achievements regarding specialised care, followed by exam scores for the "Anatomy" ($\beta_{stand.} = 0.253$) and "Parasitology" ($\beta_{stand.} = 0.214$) courses. Analysis of covariance demonstrated a lack of significant differences in mean scores regarding specialised care between students who had passed biology in the matura exam and those who had chosen another additional subject ($F = 0.005$; $P = 0.942$).
Conclusions. Good preparation of students in basic sciences is crucial for their future educational achievements as far as courses associated with specialised care are concerned. Caring about high quality of teaching midwives in the area of biological sciences is essential for providing efficient professional education in this major.

KEYWORDS: biological science disciplines, obstetrics, educational measurement, clinical competence.

STRESZCZENIE

Cel. Ocena wpływu kryteriów kwalifikacji na studia oraz osiągnięć edukacyjnych studentów z obszaru nauk podstawowych na uzyskane wyniki kształcenia w zakresie opieki specjalistycznej w grupie studentów położnictwa.
Materiał i metody. Dane kwalifikacji na studia oraz wyniki kształcenia 622 studentów kierunku położnictwo, którzy ukończyli studia stacjonarne pierwszego stopnia w okresie między rokiem 2007/08 a 2014/15. Średnia wieku 19,5 ± 1,86 lat; 92% badanych zdawało „nową maturę"; 33% studiujących ukończyło szkołę średnią w Warszawie. Metody statystyczne: model krokowej regresji wielorakiej oraz analiza kowariancji. Obliczenia w programie STATISTICA wersja 12.5; zakładana wartość α na poziomie 0,05.
Wyniki. Najlepiej dopasowany model regresji uwzględniał pięć zmiennych niezależnych ($F = 60,846$; $p < 0,001$; R2skoryg. = 0,351). Żaden z ocenianych czynników socjo-demograficznych nie został włączony do modelu regresji. Najsilniejszym predyktorem osiągnięć studentów z zakresu opieki specjalistycznej była punktacja rankingowa, wyliczona podczas kwalifikacji na studia dla przedmiotu dodatkowego ($\beta_{stand.} = 0,298$), a następnie oceny egzaminacyjne z „Anatomii" ($\beta_{stand.} = 0,253$) i „Parazytologii" ($\beta_{stand.} = 0,214$). Analiza kowariancji wskazuje na brak istotnych różnic między średnimi ocenami z zakresu opieki specjalistycznej w grupie studentów zdających biologię na egzaminie maturalnym a tymi, którzy wybrali inny przedmiot dodatkowy ($F = 0,005$; $p = 0,942$).
Wnioski. Dobre przygotowanie studentów z zakresu nauk podstawowych ma znaczący wpływ na ich późniejsze osiągnięcia edukacyjne w grupie przedmiotów związanych z opieką specjalistyczną. Dbanie o wysoką jakość kształcenia położnych z obszaru nauk biologicznych jest niezbędne dla zapewnienia efektywnej edukacji zawodowej na tym kierunku studiów.

SŁOWA KLUCZOWE: nauki biologiczne, położnictwo, ocena wiadomości, kompetencje kliniczne.

Introduction

A Midwifery Curriculum for Bachelor students at Medical University of Warsaw (MUW) covers all principles defined in standards relating to the major studies and regulated by the applicable Regulation of the Minister of Science and Higher Education [1]. The Bachelor's degree curriculum includes a total of 40 courses (2420 hours), 20 of which end up with a final test equivalent to an

exam. According to the ministerial standards, all educational outcomes have been divided into four categories where Group A comprises basic science courses and Group D comprises courses associated with training in specialised care [1].

It should be assumed that effective learning during the first semesters (Group A) will make students well prepared for learning at further stages of vocational training in specialised care (Group D). Moreover, it may be expected that the level of preparation of students at the very beginning of the programme also has a great impact on vocational training of midwives. Therefore, an appropriate range of initial competence that needs to be properly assessed during the admission process is an important prerequisite of future educational achievements of a student.

Each medical university handles recruitment to a Bachelor's degree programme in Midwifery according to their own principles. They usually focus on one or two criteria based on grades obtained for particular subjects at the matura exam. A review of the admission criteria that are currently in force at Polish universities (figures for the academic year 2016-17) demonstrated that results for the biology matura exam were compulsorily required by four universities and the remaining universities gave the opportunity to choose an additional subject (biology included). Due to the lack of uniform rules for performing the admission procedure for Midwifery programmes in Poland, there are difficulties in assessing efficiency of the admission rules that would be nationwide. However, currently published data on admission to Nursing programmes suggest that certain single-centre study findings may also be of value for other academic centres [2-4].

Aim

Assessment of the impact of admission criteria and students' educational achievements in basic science on learning outcomes with regard to specialised care among Bachelor's degree students in Midwifery.

Material and methods

A retrospective study involved data concerning a total of 622 Midwifery students who had graduated from a full-time Bachelor's degree programme at the Faculty of Health Science between 2007-08 and 2014-15. Data concerning socio-demographic factors such as age, city of secondary school graduation, and type of the matura exam were collected on the basis of information provided in the application forms filled in by candidates. Mean age of students at the beginning of studies amounted to 19.5 ± 1.86 years (median: 19.0; CV: 9.5%). Over 92% of the study participants passed the so called "new matura exam". One third of all students graduated from a secondary school in Warsaw. See **Table 1** for detailed characteristics of the study group of students.

Table 1. Characteristics of group of students who graduated from a full-time Bachelor's degree programme at Medical University of Warsaw between 2007-08 and 2014-15

Admission year	N	Mean age ± SD	Mature exam		City of secondary school graduation	
			new	old	Warsaw	other
2007/08	50	19.4 ± 1.60	35	15	19	31
2008/09	97	19.6 ± 2.60	87	10	41	56
2009/10	74	19.1 ± 0.46	70	4	28	46
2010/11	80	19.4 ± 1.76	77	3	30	50
2011/12	87	19.6 ± 2.15	81	6	37	50
2012/13	83	19.6 ± 1.88	80	3	30	53
2013/14	77	19.2 ± 0.75	75	2	20	57
2014/15	74	19.4 ± 1.95	72	2	25	49
Total	622	19.5 ± 1.86	577	45	230	392

SD – standard deviation

Source: author's own analysis

The results of admission procedure for a Bachelor's degree programme were taken from the University Admission System and comprised rank scores estimated for the additional subject, taking into consideration whether it was biology or another subject. Data on grades obtained for courses in basic science that ended up with a final test equivalent to an exam were also collected for each student. Moreover, grade point average achieved by students for exams for courses in specialised care were also calculated. The above data were collected in the Central Database of Students designed to support administrative management of students and mode of studies. See **Table 2** for a detailed list of courses.

Table 2. List of particular subjects included in Groups A and D according to teaching standards for Bachelor's degree programme in Midwifery

Group of learning outcomes	Subject	Exam
Basic sciences	Anatomy	•
	Physiology	•
	Pathology	
	Embryology and Genetics	
	Biochemistry and Biophysics	
	Microbiology	•
	Parasitology	•
	Pharmacology	•
	Radiology	

Sciences in the field of specialist care	Obstetric training and Care in birth assistance	•
	Obstetrics and Maternity Care	•
	Gynecology and Gynecological Care	•
	Neonatology and Clinical Consumables	•
	Pediatrics and Pediatric Nursing	•
	Internal medicine	•
	Surgery	
	Psychiatry	•
	Anesthesiology	
	Rehabilitation in obstetrics, neonatology and gynecology	•
	Basics emergency medical services	

Source: author's own analysis

In line with the position of the Ethical Review Board, MUW, the approval of the Board is not necessary to conduct retrospective studies, surveys, and other non-invasive activities.* The present authors obtained the consent of the Local Controller of the Personal Data for processing of personal data of MUW students.

The analysis of multiple linear regression model with forward stepwise introduction of independent variables was used to assess the impact of educational achievements of students in basic sciences on learning outcomes in specialised care. The following predictors were assessed in the regression model: three socio-demographic factors (age, city of secondary school graduation, and type of the matura exam), a rank score for the additional subject obtained in the admission process, and students' grades for five exams for courses in basic sciences (Anatomy, Physiology, Microbiology, Parasitology, and Pharmacology). The grade point average obtained by students for all exam courses in specialised care constituted a dependant (outcome) variable.

The regression model was adjusted to the empirical data using the method of the least squares. The *a priori* threshold value of F-test statistics was established at 1.0 and tolerance was set at over 0.1 in order to assess the significance of variables. As part of the testing of assumptions for the multiple linear regression model, the level of correlation of predictors was assessed using the multicollinearity test (VIF, Variance Inflation Factor), assuming the impassable value at 10 [5]. An analysis of residuals was also performed by testing homoscedasticity (the White test), normal distribution (Shapiro-Wilk test), and level of residual correlation (Durbin-Watson test) [6]. The regression model thus obtained was tested for the functional misspecification and stability of the model (the RESET Ramsey and Chow tests). The direction and force of significant correlations were interpreted by identifying standardised β regression coefficients. Values of the adjusted R^2 statistics were established to evaluate the level of variance clarification for each regression model.

The analysis of covariance (ANCOVA) was conducted to assess potential differences in students' achievements in specialised care by a chosen additional subject in the matura exam (biology or another additional subject). A rank score based on the matura results in biology or other additional subjects was used as a covariate.

STATISTICA statistical package version 12.5 with an additional "Set PLUS" module (StatSoft, Inc.) licensed to MUW was used in the analysis. The *a priori* significance level was established for all analyses at $\alpha = 0.05$.

Results

The stepwise regression analysis produced the best predictive model ($F = 60.846$; $P < 0.0001$; standard error of estimation = 0.270; $R^2_{adjusted} = 0.351$). The regression model tested in the present study was correct and stable and the analysis of residuals and redundancy demonstrated that the assumptions for this method had been met. All results referring to the diagnostics of the regression function tested here were attached as an additional data file (Supplementary data).

The best suited regression model included five independent variables. None of the socio-demographic factors studied here was included in the regression model and only "Physiology" out of all examination subjects in basic sciences turned out to be an unimportant predictor. Rank scores calculated during the admission process for the additional subject ($\beta_{stand.} = 0.298$) had the strongest impact on students' educational achievements in specialised care. Grades for "Anatomy" ($\beta_{stand.} = 0.253$) were the second strongest predictor of educational success, followed by those for "Parasitology" ($\beta_{stand.} = 0.214$). See **Table 3** for a detailed list of results of the stepwise regression analysis.

* Detailed information and model documents of the Ethical Review Board of Medical University of Warsaw are available at: https://komisja-bioetyczna.wum.edu.pl/content/szczegółowe-informacje-oraz-wzory-dokumentów (date of access: December 16th, 2015).

Table 3. Stepwise regression model of a group of students who graduated from a full-time Bachelor's degree programme at Medical University of Warsaw between 2007-08 and 2014-15. Assessment of regression function parameters for outcome variable: grade point average for examination courses in specialised care

Independent variable	b	$\beta_{stand.}$	95% CI		t-statistic	P-value
			low	upper		
Intercept	2.035	----	----	----	20.496	< 0.001
Anatomy	0.123	0.253	0.183	0.322	7.151	< 0.001
Microbiology	0.094	0.176	0.103	0.248	4.760	< 0.001
Parasitology	0.110	0.214	0.145	0.284	6.024	< 0.001
Pharmacology	0.045	0.098	0.028	0.167	2.771	0.006
Rank score for the additional subject	0.005	0.298	0.229	0.368	8.464	< 0.001

95% CI – 95% confidence interval, b – unstandardized regression coefficient, $\beta_{stand.}$ – standardized regression coefficient

Source: author's own analysis

Due to the fact that the regression coefficients describing linear correlations between the rank scores for additional subjects and the grade point average for the specialised course among students taking biology and another additional subject in the matura exam were not significantly different (F = 0.466; P = 0.495; **Figure 1**), a co-variance model for uniform gradients was used to assess the differences. The covariate analysis (a rank score for the additional subject) showed a lack of significant differences in mean scores regarding specialised care between students who had passed Biology in the matura exam and those who had chosen another additional subject (F = 0.005; P = 0.942).

Discussion

The available world literature has given a lot of attention to the predictive analysis of the assessment of the influence of various variables on educational success in Nursing/Midwifery programmes. The influence of the following issues was assessed: (I) preparation courses for studies [7, 8], (II) university entrance exams [7-10], (III) secondary school learning outcomes [11, 12], and (IV) achievements in basic science in the course of studies [12-14]. From among those listed above, factors referring to the predictive analysis of learning outcomes in basic sciences were of particular interest in the context of the present analysis.

An in-depth knowledge of biological functioning of the human body in health and in sickness is the framework of understanding the reasons why particular clinical management is considered to be safe and effective. Therefore, strong emphasis in teaching midwives is put on basic sciences, such as anatomy, physiology, and pathology [15]. Students themselves indicate the importance of this field in their vocational education [16]. Prowse observed that good preparation in biological sciences is the key to success in teaching clinical competence [17]. The formal requirements set forth in the respective European Union Directives (77/452/EEC, 77/453/EEC, 2005/36/EC) that say that at least 1/3 from among a minimum of 4600 teaching hours are supposed to be devoted to theoretical and technical training, covering the issues from basic and social sciences, as

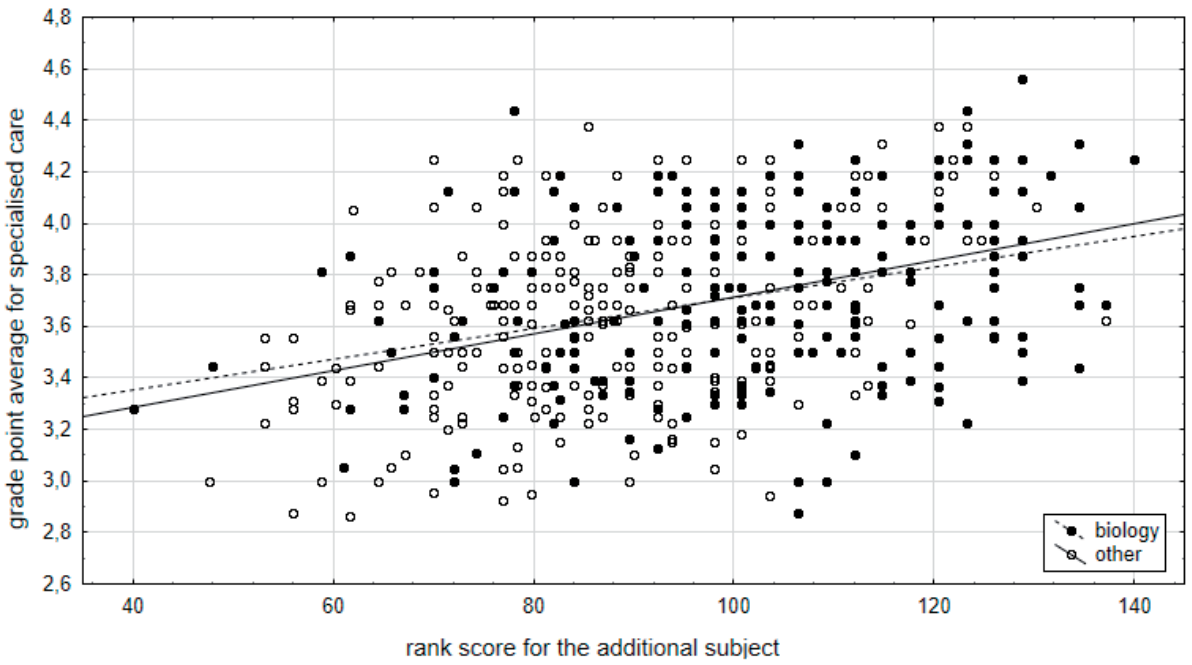

Figure 1. Regression line describing linear correlation between the rank score for the additional subject and grade point average for specialised care among two groups of students divided by a chosen additional subject in the mature exam

Source: author's own analysis

well as basics of care also confirm this thesis [18-20]. Directive 2005/36/EC states that during their education process midwives and nurses are provided with "*adequate knowledge of the sciences on which general nursing is based, including sufficient understanding of the structure, physiological functions and behaviour of healthy and sick persons* (…)" [20].

The regression analysis showed that grades for "Physiology" were the only ones from among all basic science courses that did not have an important impact on future achievements in specialised care. Conversely, rank scores for additional subjects proved to have a very high predictive power. These results confirmed the assumptions presented earlier in the study which suggested that students with a strong academic background in biological sciences and a high level of initial competencies shall perform well in specialised care. These presumptions resulted from the fact that without thorough knowledge and understanding of anatomy or pathology a midwife cannot understand the importance of particular clinical symptoms and signs and thus, cannot take proper measures in specialised care [15, 17].

The analysis of potential influence of the predictors in question on educational outcomes of Midwifery students demonstrated the lack of important correlations between students' grades for physiology and the grade point average for specialised care. This unexpected result contradicts the assumptions presented above and the findings by other authors [15, 17]. One of the reasons justifying such a discrepancy could be found in unsatisfactory accuracy of the measurement of learning outcomes used during the examination in "Physiology". It is important to recognize that the adequacy of the examination tools is of key importance for the credibility of the system for assessing students' performance [1, 21]. Sufficient validity of the methods of educational measurement is one of the most important points of a proper planning and management of the educational process. A proper assessment of students' learning outcomes may be a measurement of the quality of teaching, yet it requires the use of standardised examination tools. However, while examination methods such as OSCE (Objective Structured Clinical Examination) or Mini-CEX (Clinical Evaluation Exercise) are being introduced to evaluate skills, non-standardised written tests are still widely used with respect to knowledge assessment. A lack of examination tests of proper quality that usually are not even evaluated leads to a decrease in the credibility of assessment, which is probably the case of "Physiology" mentioned above. Therefore, the present authors recommend a review of the methods used for measurement of learning outcomes in the "Physiology" course in order to identify potential reasons of the lack of predictive value of grades for this subject.

Difficulties reported by students and associated with educational problems at classes in biological sciences may be caused by inadequate preparation of candidates for university studies [15, 22]. A study by Gresty showed that students who were well prepared in biology from their secondary school achieved better results in biological sciences in e-learning in the Nursing major [22]. Although an earlier correlation study by Ofori [23] on potential predictors of success in learning basic sciences contradicts the results obtained by Gresty [22], this issue needs further analysis. The present study results did not demonstrate a significant influence of the subject chosen by students in their matura exams on the learning outcomes in specialised care in the Midwifery major. Thus, these results did not prove the hypothesis that students who had chosen biology in their matura exam performed significantly better during clinical classes compared to the remaining students. The ANCOVA that additionally took into consideration the rank scores calculated during the admission procedure did not show the existence of such a correlation. Therefore, it seems that a mandatory requirement for using the results for the biology matura exam during the admission procedure is not empirically justified. This conclusion was also confirmed by the regression analysis which indicated that regardless of the subject chosen in the matura exam, the admission score for the selected subject was a strong predictor of educational success in specialised care.

Many researchers who deal with the issue of vocational training of nurses and midwives suggest that most countries have difficulties with teaching students basic sciences and putting it into practice in clinical activity [24]. It is emphasised that an adjustment of the curriculum to the initial competencies of students is necessary for proper management of the educational process in the first year of studies, particularly in the case of an expected increase in the number of candidates for Nursing and Midwifery. A reduction in the pressure of the admission procedure decreases certainty as to the quality of preparation of candidates for university studies. This may lead to an increase in the number of students who will have problems with mastering the basics of anatomy, physiology, or pharmacology. A lot of countries have introduced various methods of supporting students at the first stage of studies either by online or traditional contacts, e.g. with tutors. Another matter is the quality of classes that, to a large extent, should be problem-solving oriented and focused on developing critical thinking. Only such an approach guaran-

tees that the theory discussed, e.g. on microbiology or pharmacology, will have a practical dimension, which is necessary for the proper understanding of clinical management students will come into contact with during their specialised care classes [15, 24]. In support of the thesis stated above, Clarke concludes that we cannot talk about a holistic dimension of Nursing / Midwifery practice if we do not put emphasis in the education process on good education in basic sciences [25].

Conclusions

1. The level of preparation of students in basic science is crucial for their future educational achievements associated with specialised care.
2. Caring about high quality of teaching midwives in the area of biological sciences is essential for providing efficient professional education in this major.
3. A mandatory requirement for using the results for the biology matura exam during the admission procedure for Midwifery probably does not improve the selection process of candidates for this major.
4. Improvement of quality of teaching of basic sciences should include an introduction of modern teaching methods (e-learning, problem-based learning, critical thinking learning models) on the one hand, and conversely, the use of standardised and adequate methods for measuring learning outcomes.

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PREDICTORS OF WILLINGNESS TO PARTICIPATE IN PHYSICAL EDUCATION (PE) IN POLISH HIGH SCHOOLS

WYBRANE CZYNNIKI REZYGNACJI Z ZAJĘĆ WYCHOWANIA FIZYCZNEGO W POLSKICH SZKOŁACH ŚREDNICH

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ABSTRACT

Introduction. 14% of students in Polish High Schools declare unwillingness to participate in obligatory physical education. Above 50% of European pupils more than 15 years old do not take physical activity at all.

Aim. The aim of this study was to examine the opinions of High School students about participation in PE and the effects of this kind of activity on their self-esteem, BMI and health status.

Material and methods. 318 students 16-19 years old accepted the invitation and participated in the study. The average students' age was 17.9. The group filled in the original questionnaire on PE. After that, health information and self-esteem was obtained. Variables distribution was checked. Chi-square, Spearman test and logistic regression were used for data analysis. Answers response rate was 84.1%.

Results and conclusion. Men (20.65%) were significantly more willing to participate in PE than women (9.70%). Women over 18 years old more frequently (27.7%) rated their health as average, bad and very bad than women up to 18 years of age (14%). Multivariate logistic regression analysis (CI:95%) showed that self-assessed health status (SAH), attractiveness of PE, physical fitness level significantly ($p<0.05$) affect participation in PE, while the degree of difficulty of exercises and participants' BMI had a highly significant ($p<0.001$) impact on participation in PE. 77.8% of participants rated the assessment system as unfair. Individual predispositions should be taken into consideration. The study suggests that the studied phenomenon is multifactorial. Self esteem and health assessment influence participation in PE.

KEYWORDS: physical education, self esteem, health status assessment.

STRESZCZENIE

Wstęp. 14% uczniów w polskich szkołach średnich deklaruje niechęć do uczestniczenia w zajęciach wychowania fizycznego (WF). W Europie ponad 50% uczniów nie uczestniczy w zajęciach wychowania fizycznego w ogóle.

Cel. Celem badania było zebranie opinii na temat przyczyn rezygnacji z zajęć WF wśród uczniów polskich szkół średnich oraz ocena wpływu ich decyzji na poczucie pewności siebie, BMI i stan zdrowia.

Materiał i metody. 318 uczniów w wieku 16–19 lat wzięło udział w badaniu. Średni wiek uczniów wynosił 17,9 lat. Respondentów poproszono najpierw o wypełnienie kwestionariusza ankiety dotyczącej opinii na temat prowadzenia zajęć WF, przyczyn rezygnacji. Następnie uczniowie podali informacje dotyczące ich zdrowia i zachowań prozdrowotnych. Rozkład zmiennych został sprawdzony, a testy Chi-kw., Spearmana oraz regresja logistyczna zostały wykorzystane do analizy. Wskaźnik odpowiedzi response rate wyniósł 84,1%.

Wyniki i podsumowanie. Chłopcy istotnie chętniej (20,65%) brali udział w zajęciach WF niż dziewczęta (9,70%). Kobiety powyżej 18. roku życia częściej (27,7%) oceniały swój stan zdrowia jako średni, zły i bardzo zły niż dziewczęta do 18. roku życia (14%). Wieloczynnikowa analiza regresji logistycznej (CI: 95%) wykazała, że takie czynniki, jak ocena stanu zdrowia (SAH), atrakcyjność zajęć WF, poziom sprawności fizycznej istotnie ($p < 0,05$) wpływają na uczestnictwo w WF. Natomiast stopień trudności ćwiczeń i BMI respondentów były wysoce istotne ($p < 0,001$) i miały wpływ na uczestnictwo w zajęciach WF. 77,8% uczniów oceniło system oceny za nieuczciwy, a indywidualne predyspozycje powinny być brane pod uwagę. Wyniki badań sugerują, że badane zjawisko jest wieloczynnikowe. Poczucie własnej wartości i subiektywny stan zdrowia wpływają na decyzję o uczestnictwie w zajęciach WF.

SŁOWA KLUCZOWE: wychowanie fizyczne, samoocena, ocena stanu zdrowia.

Introduction

According to a recent definition formulated by Caspersen, Powell and Christenson, physical activity can be defined as any body movement triggered by the muscles, which causes any energy expenditure [1]. In the sixteenth century the effect of physical activity on the correct BMI (body mass index) and better health was of interest. Unfortunately, the rapid development of science, technology and transportation has revealed many negative health effects in children

and adolescents in recent years. These adverse health effects are primarily a significant unwillingness to undertake physical activity and a sedentary lifestyle. All these things lead to a number of serious adverse physiological changes in a young human body [2, 3, 4].

The international cross-sectional study involving 144 countries shows that 43 million children in the world are either overweight or obese and 92 million are at risk of being overweight. Prevalence of childhood overweight and obesity increased from 4.2% in 1990 to 6.7% in 2010. It is estimated that this trend will reach 9.1% in 2020 [5]. The mass PE resignation in Polish schools has been observed for several years. Increasingly, instead of active participation and development of the young man, a short and long term resignation from this kind of activities at schools has been reported. It is estimated that about 5.5 million people with physical activity reduced to a minimum needed about 3.1 million additional days of sick leave [6]. More than half of Europeans over 15 do not take physical activity in general. The National Institute for Health and Welfare in Finland indicates that about 10% of children aged 12 - 14 years reveal too low physical activity to maintain their normal development. One-third of young people between 16 and 18 years old exercise a little over 1.5 hours a week beyond school hours [7]. As a result of US studies analysis, a significant decrease in physical activity over the years has been found. Adults' activity ⩾ 3 METS decreased from 48% in 1960 to 20% in 2008, and the load was reduced from 2 to 2.9 METS. In contrast, the activity of less than 2 METS increased from 37% to 55% [8].

In the study of 1054 Warsaw's pupils aged 11 - 15 years, 30% of boys and 25% of girls spend more than 5 hours on activities that do not require physical activity, for example watching TV. Interestingly, 92.8% of boys and 91.7% of girls evaluated subjectively their degree of activity as high or average and only 15.6% of the researched group said that their activity was too small [9].

The impact of physical inactivity in children and youth on their health and adulthood has been considered over the last decade [10, 11, 12, 13]. Often, parents or teachers are respondents in studies. However, most of the reports have not shown the impact of several factors on reasons for PE exemption from the students perspective and their opinions on it. It is important to reflect on the causes of the studied phenomenon. Why do so many young Polish people resign from PE?

Methods

Study design

The written consent was sought from both the principal and the school director of each school before participants in 1 – 3 grade of high school classes were recruited. Then, information was sent to students' home and the participants were eligible to participate if they returned the parent's consent and child assent forms signed. The parents consent was required from students under 18 years of age.

The youth were also asked to complete the anonymous questionnaire about their opinion on the reasons for the exemption of healthy young people from Physical Education (PE) classes. The original questionnaire includes questions about the frequency of days of exempting, physical activity out of school and type of physical activity. Respondents were asked about team games, their frequency and whether they believed they were good at them. They were also asked about the variety of activities, what kind of sport they were interested in and if obesity/overweight could lead to PE resignation. The level of knowledge of the health consequences of overweight/obesity was examined.

Baseline sample

The sample for the baseline survey covered the students in the government schools in the southern Poland. Three schools comprising 22 school classes with various profiles were selected. 6 first grade classes, 7 second grade and 9 third grade (including 6 sciences classes and 3 humanistic classes) were selected. All students from 16 to 19 years old in the chosen school classes were selected for the study sample. 557 pupils were recruited for participation but only 318 pupils accepted the invitation and participated in the study.

Statistical analysis

The data were collected from September 2014 to September 2015. Analysis of the results was performed using the statistical package PQStat ver. 1.4.2.324. All variables will be checked for normality of distribution before analyses and transformations are applied where necessary. Test Chi^2 was used to compare the distributions of qualitative variables in sex groups. Spearman correlation was used for univariate analysis and multivariate logistic regression analysis (confidence interval 95%) was performed. In order to implement multivariate logistic regression analysis, the main dependent variables have been transformed into a dichotomous nominal scale and the independent variables into a dummy variables.

Exclusion criteria

To reduce disruption, middle school students and pupils in sports classes were excluded from the study. Students suffering from health problems that pre-

vent them to attend physical education throughout the year (medical certificates) were excluded from the study as well.

Results

Group characteristics

3 schools participated in the baseline survey and a response rate of 60%. Out of 557 pupils who were selected to participate in the survey, 318 were interviewed thereby a response rate of 57.1% (**Table 1**). Of the 239 nonparticipants, in 98 cases parents did not return a written consent for their children (below 18 years old) to participate and in 141 cases pupils (over 18 years old) did not want to participate.

Table 1. Response Rates

Parameter	Response
Number of schools sampled	5
Number of schools that participated	3
School response rate	60%
Number of pupils enrolled	557
Number of pupils participated	318
Pupil response rate	57.1%

Source: author's own analysis

A little more than half of the study (57.8%) group were men. The majority (54.08%) of the participants were in the age group above18, while 45.92% were in the age group up to 18 years. The mean value of the age was 17.6. All study participants had physical education classes twice a week according to the timetable.

Table 2. The whole group characteristics

Parameter	first grade of high school	second grade of high school	third grade of high school
sex: M	65	52	67
K	45	48	41
age [mean (SD)]	16.6 (0.8)	17.4 (0.6)	18.7 (0.4)
< 18 years old	110	36	0
⩾ 18 years old	0	64	108
the number of PE hours	2/week	2/week	2/week

Source: author's own analysis

Chi-square analysis revealed statistically significant correlation of the two components, that is self esteem and willingness to participate in PE classes in two sex groups. Significant differences in self-esteem among men and women were observed. Women have a lower self-esteem than men (**Table 3**). The effect of the statistical test between self-esteem and sex was weak (Fi = 0.11). The study showed a significant difference in willingness to participate in PE in men and women. Men (20.65%) were significantly more willing to participate in physical education classes than women (9.70%) (**Table 4**). The effect of the statistical test between willingness to participate in PE classes and sex was strong (Fi = 0.73).

Table 3. The relationship between self-esteem and sex

Self-esteem level	men		women		p
	n	%	n	%	
Low	40	21.67	86	64.39	
Average	55	29.71	29	21.61	p < 0.05
High	89	48.62	19	14.00	

Source: author's own analysis

Table 4. The relationship between willingness to participate in PE classes and sex

Willingness to participate in PE lessons	men		women		p
	n	%	n	%	
very willingly	38	20.65	13	9.70	
willingly	71	38.59	16	11.94	
average	54	29.34	56	41.79	p < 0.05
reluctantly	11	5.98	37	27.61	
very reluctantly	10	5.44	12	8.96	

Source: author's own analysis

The majority of men quite well assessed their health. As many as 86.3% of men up to 18 years of age and 80.2% over 18 years indicated a good or very good health (**Figure 1**). Interestingly, boys better assessed their health condition than girls. Noteworthy is the fact that girls often rated their health as average, bad and very bad (especially after 18 years). Most of the surveyed women assessed their health as good or very good. What is interesting, women over the age of 18 more frequently (27.7%) rated their health as average, bad and very bad than women up to 18 years of age (14%) (**Figure 2**).

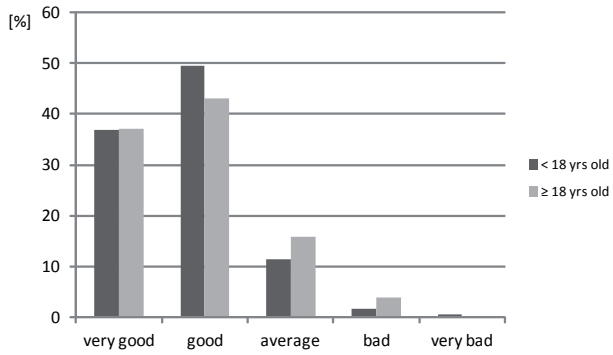

Figure 1. The relationship between the self-assessed health status (SAH) and age among men

Source: author's own analysis

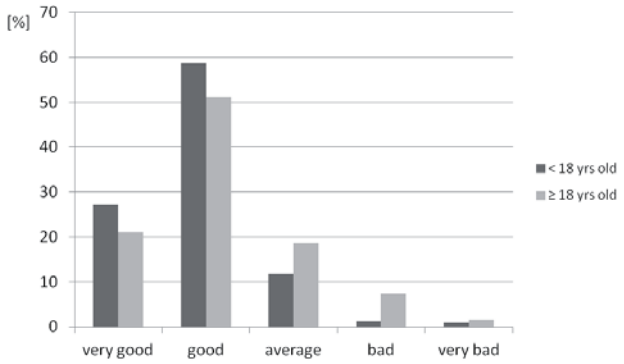

Figure 2. The relationship between the self-assessed health status (SAH) and age among women

Source: author's own analysis

Highly significant positive correlations were observed between participation in PE and the attractiveness of PE in both sex groups. Significant negative correlations were observed between participation in PE and a degree of difficulty of PE exercises in all participants. Involvement of the PE teacher level assessed by respondents was not related to participation in PE among men ($p = 0.082$) in contrast to women ($p < 0.05$) (**Table 5**).

Table 5. Spearman correlation coefficient with quantitative variables of the author's questionnaire on the opinion about PE

Corellation	Men			Women		
	n	*r*	*p*	n	*r*	*p*
willingness to participate in PE x involvement of PE teacher level	179	0.149	p = 0.082	126	0.366	p < 0.05
willingness to participate in PE x the attractiveness of PE	181	0.624	p < 0.01	134	0.661	p < 0.01
willingness to participate in PE x the degree of difficulty of exercises	184	-0.421	p < 0.05	134	-0.498	p < 0.05

Source: author's own analysis

Some aspects of health were taken into consideration. Significant positive correlations were observed between participation in PE, the physical fitness level ($p < 0.01$) and SAH ($p < 0.05$) of both men or in women. Significant negative correlations were observed between participation in PE and BMI in both groups ($p < 0.01$).

After examining simple associations, the data set was analyzed controlling for SAH, the attractiveness of PE, the degree of exercise difficulty and the physical fitness level. Results of the two logistic regression models are shown in **Table 7**.

Table 6. Spearman correlation coefficient with quantitative variables of the author's questionnaire on the self-esteem health status

Corellation	Men			Women		
	n	*r*	*p*	n	*r*	*p*
willingness to participate in PE x BMI participants	184	-0.482	p<0.01	130	-0.561	p < 0.01
willingness to participate in PE x physical fitness level	184	0.302	p < 0.01	134	0.417	p < 0.01
willingness to participate in PE x self-assessed health (SAH)	184	0.331	p < 0.05	133	0.429	p < 0.05

Source: author's own analysis

The willingness to participate in PE was significantly higher in men reporting good (OR: 1.88, 95% confidence interval (CI): 0.98 – 4.48) and average (OR: 1.26, 95% CI: 0.73–2.17) than in those who reported bad self-assessed health status. Women reporting high degree of exercise difficulty were highly significant (less than 87%) as compared with those in the low degree of exercise difficulty (OR: 0.13, 95% CI: 0.09–0.31). 86% of respondents said that physical education classes were not suitable for overweight and obese people in their school. This fact may be related to their participation in PE classes. Girls with obesity were less likely to participate in PE than those in the normal BMI group (OR: 0.11, 95% CI: 0.07 – 0.25). This predictor had a stronger impact on women compared to men. The age was not a significant predictor in men and women (**Table 7**).

Table 7. Factors associated with willingness to participate in PE in two sex groups 17–19 years old measured by logistic regression

Factors	Men			Women		
	OR	95% CI	p	OR	95%CI	p
Age:						
Young (<18y-old)	1.00			1.00		
Older (≥18y-old)	0.83	0.49 – 0.99	0.472	0.71	0.52 – 0.97	0.472
Self-assessed health status (SAH):						
Good	1.88	1.48 – 4.48	0.024	1.74	0.98 – 4.48	0.030
Average	1.26	1.13 – 2.17	0.014	1.58	0.73 – 2.17	0.022
Bad	1.00			1.00		
Attractiveness of PE:						
High	2.30	1.74 – 2.44	0.031	1.89	1.79 – 1.92	0.026
Average	1.23	1.12 – 1.56	0.027	1.24	1.18 – 1.43	0.028
Low	1.00			1.00		
The degree of difficulty of exercises						
High	0.16	0.10 – 0.22	<0.001	0.13	0.09 – 0.31	<0.015
Average	0.49	0.32 – 0.57	<0.001	0.56	0.44 – 0.67	<0.011
Low	1.00			1.00		
Physical fitness level						
High	3.99			3.86		
Average	1.44	2.87 – 4.81	0.003	0.82	2.69 – 4.92	0.013
Low	1.00	0.82 – 1.62	0.010	1.00	0.23 – 1.52	0.007
BMI						
Normal	1.00			1.00		
Overweight	0.42	0.13 – 0.48	<0.001	0.32	0.17 – 0.49	<0.001
Obese	0.27	0.16 – 0.37	<0.001	0.11	0.07 – 0.25	<0.001

Source: author's own analysis

The survey shows that 70.2% of girls in the study group said that the time of PE during the day had an impact on their participation in PE classes. Interestingly, only 31.4% of boys agree with girls. Due to the different abilities of pupils, we asked about the fairness of the assessment system and 77.8% participants rated the system as unfair. At the end we asked about the practice of physical activity outside school. We should be heartened by the fact that 48% girls and 71% boys said that they practiced outside school. The most common sports among high school students was a bicycle (80.7% of responses), swimming (49.8%), soccer (48.7%), running (42.1%) and yoga/zumba/fitness/gym (38.2%). However, it would be necessary to check how often they practiced those sports.

Discussion

PE classes at school have a significant impact on the health behavior of young people in their adulthood. Therefore, the importance of the interdisciplinary team in the early prevention of civilization diseases should be emphasized [14, 15, 16, 17].

Another study indicates that sedentary behavior which is separated from physical activity, is independently connected with metabolic health in adults and children [18, 19, 20]. It is important to know the causes of the negative attitude of young Polish people to physical activity at school. This study aimed to assess this issue by analyzing the association between physical inactivity at schools and several indicators which were easily applied. The present study shows that a significant number of respondents who do not participate in PE, practice some forms of sport outside school, even in the regular training form. Would it not be fair to consider a psychological factor associated with school environment? It seems that lack of special exercises prepared for pupils with overweight and obesity is one of the exemption reasons and it is associated with psychological factors, such as: self-assessed health status, mood, a sense of satisfaction, interpersonal and interpersonal relations (in school and home).

According to the Cracow study, 27.31% of Cracow boys and 16.09% of Cracow girls were overweight, while 7.78% of boys and 3.44% of girls suffered from obesity. The study showed differences between urban and rural boys and girls. The age group from the study was 6–13 years old [21]. One of the reasons of exemption from PE was students' obesity and being overweight as it is shown in presented study. The feeling of shame as a barrier to be active and both the shame of being less efficient than others and ridiculed can have much influence. It should be remembered that the problem is very complex. The students are overweight and obese because they do not train or they are less active due to being overweight/obese. It is connected with environmental and genetic factors, too. These data are completed by the literature on different health and psychological-related physical fitness gained at school.

It should be noted that controlled physical activity, which young people organize for themselves in their spare time is limited. In this case, mainly parents and guardians have an obligation to enforce of certain safety standards. It seems that the proper guidance of proceedings appears to be more dissemination of information, creation of educational programs in schools about the prevention of obesity, diabetes, cancer and cardiovascular diseases.

Some increase in physical activity is associated with health benefits. In children and adolescents, physical activity can reduce symptoms of depression and stress, improve cardiopulmonary functions, muscle fitness and bone health and reduce body fat levels, which are the main risk factors for the onset of metabolic diseases.

Outcomes from this study will help inform health professionals to make an impact on the deteriorating health condition of our children not only due to inappropriate behaviors of the closest environment but also schools' decisions related to the form and time of physical education. This research will facilitate larger scale studies, focusing on potential nations, ethnic differences,

Conclusions

Our results have significant implications for school authorities, the Ministry of Education and primary care services. The high proportion of participants connect their decision to participate in PE with time and kind of exercises. Most of them do not have a motivation to participate in PE at schools. The involvement of the PE teacher level, the degree of exercise difficulty and the physical activity level have highly significant influence on youth's participation in PE. Unfortunately, nonparticipation in High School PE is a multifactorial problem. Psychological factors, such as self-esteem or self-assessed health status (SAH) affected the decision of Polish High School students.

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SENIOR FITNESS TEST TO EVALUATE MUSCLE STRENGTH OF WOMEN AGED 50-80 IN KUJAWSKO-POMORSKIE VOIVODESHIP, POLAND

OCENA SIŁY MIĘŚNIOWEJ KOBIET W WIEKU OD 50 DO 80 LAT W WOJEWÓDZTWIE KUJAWSKO-POMORSKIM TESTEM SPRAWNOŚCI FIZYCZNEJ SENIORÓW

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ABSTRACT

Introduction. It is commonly known that the process of aging causes numerous barriers as far as social activity routines are concerned.
Aim. The purpose of this study is to evaluate muscle strength on a sample of a chosen group of women above 50 years of age in Kujawsko-Pomorskie Voivodeship.
Material and methods. 3413 women, aged 50-80 years participated and were analyzed. They were divided into six age groups.
Results and conclusions. All women were subjected to three muscle strength tests. The results of the "30-second Chair Stand", "Arm Curl" and "8-foot Up and Go" tests showed the decrease of muscle strength in women, depending on age from 18.3 repetitions to 15.3 repetitions ("30-second Chair Stand") and from 21.6 repetitions to 17.1 repetitions ("Arm Curl"). In the "8-foot Up and Go", which is a complicated test evaluating both explosive muscle strength and coordination, the time necessary for performing it elongates from 5.3 seconds in the youngest group to 6.3 seconds in the oldest group. Test results indicate unmistakably that muscle strength diminishes with age. Secondly, muscle strength reduction is equally related to both upper and lower limbs. 8-foot Up and Go test, which may also be used to evaluate the risk of falling, shows that it is of great importance to shape this ability since it declines in the quickest way.

KEYWORDS: muscle power, physical activity, Senior Fitness Test, elderly women.

STRESZCZENIE

Wstęp. Powszechnie wiadomo, że proces starzenia jest przyczyną wielu barier w aktywności społecznej i budzi on zainteresowanie badaczy.
Cel. Celem tego badania była ocena siły mięśniowej grupy kobiet powyżej 50. roku życia w województwie kujawsko-pomorskim.
Materiał i metody. Badaniu zostało poddane 3413 kobiet między 50 a 80 rokiem życia, które podzielono na sześć grup wiekowych.
Wyniki i wnioski. Wyniki trzech przeprowadzonych testów: „30-sekundowy test wstawania z krzesła", „test zginania stawu łokciowego z obciążeniem" i test „wstań i idź 2,5 m" pokazują spadek siły mięśniowej kobiet zależny od wieku. W „30-sekundowym teście wstawania z krzesła" średnia ilość powtórzeń zmniejszyła się z 18,3 w najmłodszej grupie wiekowej do 15,3 w najstarszej wiekowo grupie. Spadek ilości wykonywanych powtórzeń wystąpił również w teście „zginania w stawie łokciowym" z 21,6 powtórzeń do 17,1 powtórzeń. W teście „wstań i idź 2,5 m", który jest złożonym testem oceniającym siłę eksplozywną kończyn dolnych i koordynację, czas potrzebny na wykonanie tego zadania wydłużył się między najmłodszą a najstarszą grupą wiekową z 5,3 sekundy do 6,3 sekundy. Przeprowadzone badania wyraźnie pokazują, że pogorszenie się wyników testów jest skorelowane z wiekiem i w jednakowym stopniu dotyczy grupy mięśni kończyn górnych jak i dolnych. Test „wstań i idź 2,5 m", który może być również wykorzystywany do oceny ryzyka upadków pokazuje, że bardzo ważne jest kształtowanie tej zdolności, gdyż zanika ona najszybciej.

SŁOWA KLUCZOWE: siła mięśniowa, aktywność fizyczna, test sprawności seniorów, kobiety w wieku starszym.

Introduction

Aging of any society, either Polish or from any European country, draws our attention to physical limitations derived from this process. Due to this fact, it is crucial to determine the physical efficiency level since it is the primary indicator of elderly people's independent functioning level. According to the statistics forecasts, the number of people at post-productive age in Poland will increase from currently 6.5 million in 2011 to 9.5 million in 2030, and to 11.5 million in 2050 [1]. Supposedly, the lifespan in the simulation made by the Central Statistical Office [2] will elongate between 2010 and 2035 for men

from currently 71.4 years to 77.1 years and for women from currently 79.8 years to 82.9 years. The tatistically longer women's lifespan arouses the general interest in the problem of physical fitness of this sex [2, 3]. The process of aging is inevitable. Involution changes occurring within each individual frequently concur with diseases leading to even more limitations, therefore familiarizing with elderly people's physical fitness levels seems so vital. Knowledge gained while conducting the research will allow for a longer time to appropriately predict the most frequently appearing problems concerning general functioning and it will be a beneficial assistance while counteracting the ongoing disability. Research indicates that muscle strength is one of the most paramount elements affecting the elderly people's functioning efficiency [4, 5], and for this reason it is the subject matter of this study. Thanks to proper muscle strength maintenance, we are increasing our independence and we are decreasing the risk of falling [6, 7, 8].

Material and method

The subject population consisted of the Senior Physical Activity Regional Program participants. Testing was conducted in thirty four towns of Kujawsko-Pomorskie Voivodeship: Aleksandrów, Barcin, Brodnica, Brzoza, Bydgoszcz, Dąbrowa, Gąsawa, Gniewkowo, Grudziądz, Inowrocław, Kcynia, Koronowo, Lisewo, Lubicz, Łabiszyn, Mrocza, Nakło, Nowa Wieś Wielka, Nowe, Radzyń, Rogowo, Rynarzewo, Rypin, Sławęcinek, Służewo, Szubin, Świecie upon Osa, Tłuchów, Tupadły, Unisław, Włocławek, Zamość and Żnin. The sample of participants was chosen from a population of women aged 50-80. All people taking part in the study were obliged to provide the informed consent prior to participation as well as undergoing qualification tests conducted by a medical practitioner accompanied by the Master of Nursing. The purpose of the medical examination was to evaluate the subject's general health condition and also to eliminate those who, due to health problems, were not able to participate in physical exercises not typical for rehabilitation ones. The examination included an interview; blood pressure and heart rate measurement; ECG; lung auscultation; reflex, balance and color vision examining, followed by measurement of height, body mass, waist and hips. On this surface, the factor most specifically taken into consideration was the circulatory system and musculoskeletal efficiency. Chronic circulatory, respiratory and skeletal system diseases as well as neurological diseases were the criterion for exclusion from the physical fitness examination. Having consulted the specialists, women with pharmacologically settled hypertension and diabetes were allowed to participate in the study. After functional fitness levels were assessed for all subjects, they were required to attend testing sessions conducted by the Master of Physical Therapy in order to measure their physical fitness. Each functional testing was performed in the afternoon, in the same order for every individual subject. Prior to testing, each subject was given instructions and shown how each exercise should be performed by a tester. Testing was conducted in rooms which were up to safety standards, with temperature 18-22°C, with a nurse present in the room. Three tests were used to evaluate the muscle strength of women participating in the study. These tests originate from the Fullerton test battery created by Roberta Rikli and Jessie Jones [9]. They included: 30-second Chair Stand, Up and Go for 2.5m as well as elbow joint bend with weight which was modified in comparison to the American version by introducing 2 kg dumbbell.

The subject population consisted of 3413 women, tested in 2007-2011. The whole group was divided into six age groups: 50-54, 55-59, 60-64, 65-69, 70-74 and 74-79 years. The average age in all age groups was 52.05 ± 1.59 in the first age group; 57.1 ± 1.39 in the second; 61.72 ± 1.39 in the third; 66.65 ± 1.42 in the fourth; 71.58 ± 1.37 in the fifth and 76.58 ± 1.44 in the last one (**Table 1**).

Table 1. Characteristics of the subjects

	Age Group	Number of subjects	Age (year)		Body height (cm)		Body weight (kg)		BMI	
			Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	50-54	853	52.0	±1.6	162.1	±5.6	73.6	±13.5	28.0	±4.9
2	55-59	1131	57.1	±1.4	160.6	±6.1	73.2	±12.6	28.4	±4.6
3	60-64	884	61.7	±1.4	160.4	±5.4	73.0	±12.8	28.4	±4.7
4	65-69	350	66.6	±1.4	159.4	±5.9	74.0	±12.7	29.1	±4.9
5	70-74	145	71.6	±1.4	159.2	±5.7	72.2	±11.2	28.3	±3.9
6	75-79	50	76.6	±1.4	157.6	±7.0	69.6	±9.2	28.1	±3.8

Source: author's own analysis

Results

All participants of the study performed all three tests. In 30-second Chair Stand test, which evaluates lower limbs global muscle strength and specifically one related to quadriceps, the most repetitions 18.3 ± 3.9 were performed by women from the youngest group (50-54 years). In the second age group (55-59 years) the result was 17.8 ± 3.7 repetitions. In the next age group, 60-64 years, the result was only a little worse: 17.6 ± 3.7. The result of the fourth age group (65-69 years) was also a little worse than in the third age group and it was 17.2 ± 3.6 repetitions. In the last two age groups the results

were also weaker than in the previous ones and were, respectively, for a 7-74 years group 16.2 ± 3.6 repetitions and for a 75-79 years group 15.3 ± 3.8 repetitions.

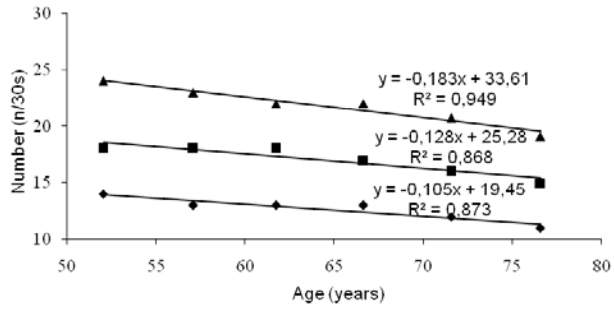

Figure 1. The data show the level of muscle power in six age groups with division into: ◆ -10 percentage, ▲ - 50 percentage, ■ - 90 percentage. The trend line shows decreased muscle power with the following age groups, occurring one after another

Source: author's own analysis

The percentile ranks for the "30-second Chair Stand" test for the subjects can be seen in **Table 2**.

Table 2. Percentile Ranks for the "30-second Chair Stand"

	30-second Chair Stand					
% Rank	50-54	55-59	60-64	65-69	70-74	75-79
90	24	23	22	22	20,7	19,1
80	22	21	20	20	19	18
70	20	20	20	19	18	17
60	19	19	19	18	17	15,4
50	18	18	18	17	16	15
40	17	17	16	16	15	14
30	16	16	15	15	14	13
20	15	14	14	14	13	12,8
10	14	13	13	13	12	11
$\bar{x}$	18,3	17,8	17,6	17,2	16,2	15,3
SD	3,9	3,7	3,7	3,6	3,6	3,8
n	853	1131	884	350	145	50

Source: author's own analysis

In the Arm Curl test, which evaluates the upper limb muscle strength and especially one of the biceps of the arm and brachioradialis, the results were as follows. In the first age group (50-54 years) the outcome was the best, namely 21.6 ± 3.6 repetitions. In the second age group (60-64 years) the result was a little worse, giving 20.4 ± 3.4 repetitions. For women in a 65-69 years group the average result was also a little worse than in the previous group, namely 20.1 ± 3.7 repetitions. In the penultimate age group (70-74 years) the result was worse by on average 1 repetition and was 19.2 ± 3.8. In the oldest age group (75-79 years) the result was on average worse by 2 repetitions in comparison to the previous age group, giving 17.1 ± 4.3 repetitions.

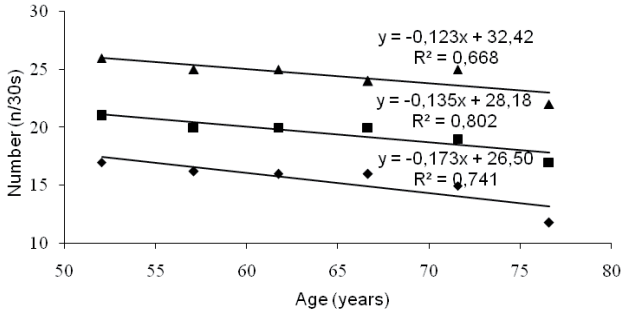

Figure 2. The data show the level of muscle power in six age groups with division into: ◆ -10 percentage, ▲ - 50 percentage, ■ - 90 percentage. The trend line shows decrease muscle power with the following age groups, occurring one after another

Source: author's own analysis

The percentile ranks for the "Arm Curl" test for the subjects can be seen in **Table 3**.

Table 3. Percentile Ranks for the "Arm Curl"

	Arm Curl (2 kg)					
% Rank	50-54	55-59	60-64	65-69	70-74	75-79
90	26	25	25	24	25	22
80	24	24	23	23	22	20
70	23	22	22	22	21	19
60	22	21	21	21	20	18
50	21	20	20	20	19	17
40	20,6	20	20	19	18	16
30	20	19	19	18	17	16
20	19	18	18	17	16	14,6
10	17	16,2	16	16	15	11,8
$\bar{x}$	21,6	20,8	20,4	20,1	19,2	17,1
SD	3,6	3,5	3,4	3,7	3,8	4,3
N	853	1131	884	350	145	50

Source: author's own analysis

In the last test of this study – 8-foot Up and Go – the following data were obtained. The best result was achieved by women from the first group (50-54 years): 5.3 ± 3.7 seconds. The weakest result, although worse only by a second in comparison to the best result, was achieved by women from the oldest group (75-79 years), namely 6.3 ± 1.4s. The other results were, respectively, for the second group (55-59 years) 5.5 ± 2.2s; for the third group of women (60-64 years) 5.6 ± 0.7s. For women in a 65-69 years age group the result was 5.9 ± 0.9s and for women aged 70-74 years 6 ± 1.8s.

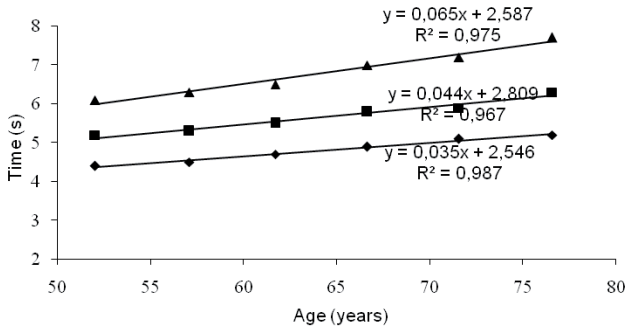

Figure 3. The data show the level of coordination in six age groups with division into: ◆ -10 percentage, ▲ - 50 percentage, ■ - 90 percentage. The trend line shows decrease coordination with the following age groups, occurring one after another

Source: author's own analysis

The percentile ranks for the "8-Foot Up and Go" test for the subjects can be seen in **Table 4**.

Table 4. Percentile Ranks for the "8-Foot Up and Go"

	8-Foot Up and Go					
% Rank	50-54	55-59	60-64	65-69	70-74	75-79
90	6,1	6,3	6,5	7	7,2	7,7
80	5,8	6	6,1	6,5	6,6	7,3
70	5,5	5,8	5,9	6,3	6,4	6,8
60	5,4	5,5	5,7	6,1	6,1	6,6
50	5,2	5,3	5,5	5,9	5,9	6,3
40	5	5,2	5,3	5,7	5,8	5,9
30	4,9	5	5,2	5,4	5,5	5,6
20	4,7	4,8	5	5,2	5,3	5,4
10	4,4	4,5	4,7	4,9	5,1	5,2
$\bar{x}$	5,3	5,5	5,6	5,9	6	6,3
SD	1,6	2,2	0,7	0,9	1,8	1,4
n	853	1131	884	350	145	50

Source: author's own analysis

Discussion

Elderly people's physical fitness deterioration is facilitated mainly by changes occurring in the muscular system. The most crucial factor for functional limitations development is sarcopenia [10], i.e. muscle mass atrophy happening with passing time and affecting, at the same time, generated muscle strength diminishing. These degenerative changes, which happen within motoneurons together with lowering of their number and lowering neurotransmitters activity, contribute to elderly people's fitness limitation [11, 12]. The outcome of involution changes of the muscular system, which is additionally empowered by the lack of activity, is a loss of the possibility to generate by muscles the strength big enough to control posture and keep balance. This is directly linked to everyday fitness. It is demonstrated by slowing down movements, difficulties while walking and going down the stairs, a problem while getting up from a chair, difficulties with lifting objects off the floor; the feeling of weakness, balance disorders and falling while walking. Numerous studies confirm a connection between lower physical fitness and occurring of everyday functioning limitations [13]. The results of two vast studies, one European and the other American [14, 15] indicate that low muscle strength directly influencing the correct walking pattern disturbance as well as having an impact on limiting activities, such as moving heavy objects, kneeling, squatting, bending are the most crucial factors causing the very functional disability to happen. Along this line, it is of paramount importance to take action to improve fitness, which will result in everyday functioning improvement [16, 17].

In the study conducted by our team, a very big group of women aged 50-80 years was evaluated. The whole group was divided into 5-year intervals, which makes it possible to compare two out of three tests with Rikli and Jones's American findings. In our Arm Curl test the results in age groups 60-64 years, 65-69 years, 70-74 years and 75-79 years fall within the upper ranges of American norms created by Jones and Rikli [18]. The results obtained in 8-foot Up and Go from the same four groups also fall within the upper ranges of American norm. In relation to a comparable group of women examined in the studies conducted by Jones & Rikli and our team, fitness of both these populations seems to be on a similar level as far as this parameter is concerned. It means that both populations are faced with similar challenges to improve these parameters and find possibilities to put into action the same program aiming at improving these parameters in order to make life better.

In a 30-second Chair Stand test it is easy to notice that in a population of women with the best results there is a clear downslide tendency with passing age. In the population of women with the weakest results a downslide tendency is also noticeable. It proves that together with passing age the difference between women with best results and those with the weakest ones is getting smaller. There is a probability that this situation is partly caused by women getting less active with age, which is generated by them being less willing to exercise – both in the stronger group and, the more, in the case of the weaker one – as well as by limitations concerning each individual's age-generated ailments.

In the Arm Curl test the outcome indicates that in the group of women with the weakest results the downslide tendency is big with passing age, whereas in the group of women with the best results the downslide of values is not so big anymore. Supposedly, women who achieve

good test results in the younger age groups, continue this activity while getting older through everyday activities, such as carrying shopping or lifting objects off the floor. It is also alleged that women who in the youngest groups had already achieved the weakest results, with passing time probably took advantage of other people's assistance more and more often as far as activities demanding more strength than the necessary functional minimum is concerned. Consequently, they continued on making their muscle strength deteriorate. The submitted assumptions coincide with the interview with the participants during the test.

In the 8-foot Up and Go test the findings show that, both in groups of women obtaining the best results and in groups of women obtaining the weakest results in comparison to the whole studied population, there was a deterioration of results with progressive age of the studied groups. The differences in results in successive age groups were not big, which demonstrates that diminishing of explosive strength within lower limbs muscles as well as movements coordination occurs at an early stage of aging of all studied individuals. It also demonstrates that special emphasis should be placed upon this element of fitness, which was under scrutiny in this sophisticated coordination test, while creating preventive programs.

Grześkowiak and Weliński [19] in their study compared both calibrated tests: 8-foot Up and Go and Tinetti test, creating a measuring scale for them and evaluating them statistically. It turned out that there was a strong dependence between them, which allowed for using the 8-foot Up an Go test to evaluate the risk of falling for women after 65 years of age.

In Europe there were several studies on fitness using Fullerton test, but none of them embraced such a big group of women divided into age groups. One of those studies was performed on a sample of elderly people, whose average age was 74 years, in the capital of Portugal. 405 persons participated, out of whom 70% were women. Tests applied to evaluate lower limbs strength were performed: 30-second Chair Stand, in which the average result was 15.55 repetitions and 8-foot Up and Go, in which the average obtained time was 6.22s [20]. Another study was conducted in Serbia by Kostić on 694 women in two age groups. The first age group was 60-69 years where average age was 64 years and the test results were, respectively, for the Arm Curl 13.67 repetitions, for the 30-second Chair Stand 13.75 repetitions and for the 8-foot Up and Go 6.67s. In the second age group: 70-80 years, in which the average age was 74 years, the test results were as follows: for the Arm Curl 15.76 repetitions, for the 30-second Chair Stand 12.51 repetitions and for the 8-foot Up and Go 7.46s [21].

In Poland, during the last ten years not many studies on elderly people's fitness were conducted with the use of the Fullerton test. Usually, there are studies conducted by the same study groups on small samples of people. Strength of populations examined in these studies shows quite a significant diversity of them in comparison with American created by Rikli and Jones. In one of the studies by Ignasiak and the team in 2011 on a population of 31 women with the average age of 67 years, the results were definitely better for the population of Polish women as compared to American women in the case of both upper and lower limbs [22]. Other studies by Ignasiak and the team in 2011 on a group of 134 women between 55 and 70 years of age, with the average of 62.54 years, show the average results for this group: for the Arm Curl test 21.24 repetitions and for the 30-second Chair Stand test 17.47 repetitions [23]. In turn, the study by Ignasiak and the team in 2013 conducted on a group of 37 women between 55 and 64 years of age, with the average age 59.46 years for this population, staying at that time in the sanatorium, also demonstrated the results for the Arm Curl test: 17.46 repetitions, for the 30-second Chair Stand 14.32 repetitions and for the 8-foot Up and Go 7.33s [24].

Studies conducted by Zdrodowska in 2012 on a population of 40 women in two age groups 60-64 and 65-70 years, in which the average age was for the first group 62 years and for the second one 68, also showed better results of Polish participants in comparison to American ones [25]. The findings of Dziubek and the team in 2014 studies, conducted on a group of 53 women divided into two groups with the average age 69.5, showed the difference between these study groups in which the procedure was performed in accordance with the Fullerton test in the aspect of lower limbs muscle strength. This study demonstrated that the results of both groups were within American norms [26].

There were also a few studies conducted on a bigger population of people. However, there was no division into age groups in five-year intervals. The researchers from Wrocław conducted a study on a group of 216 women between 50 and 84 years of age, with the average 65.2 years and presented the following results: for the Arm Curl 16.8 repetitions, for 30-second the Chair Stand 20.43 repetitions and for the 8-foot Up and Go 5.46s [37].

However, the study conducted by Król and the team in 2006 on a sample of 125 women, with the average age of 74 years, comparing Polish results with American ones indicated that in the tested groups of 60-69 years and above 80, Polish women achieved better results than American ones within upper and lower limbs strength. But in the age group 70-79 years the results

were more beneficial for Americans, the differences in both studies being on average one repetition per test, however, a 30 times smaller Polish study group did not allow to certify whether the differences between the results would be similar, as in the case of this study with a bigger population of participants [28].

In 2009 there was a study in Żoliborz and Bielany, Warsaw on a sample of 236 women aged 65, also with the assistance of the Fullerton test and the results were as follows: for the 30-second Chair Stand 14.29, for the Arm Curl 17.89 repetitions and for the 8-foot Up and Go 6.26s [29].

The biggest study was conducted by Zieliński in 2002-2005 on a group of 1017 women living in the whole of Poland, in which the average age was 73.2 years. They performed tests: 30-second Chair Stand and 8-foot Up and Go and they were compared with an American group from the study by Rikli and Jones with a division into age groups between 65 and 94 years of age in 5-year intervals. It turned out that the population of Polish women was worse in both tests than the American one, out of which in the standing test this difference was smaller – 2 repetitions on average [30].

Szczepaniak's team conducted an interesting study depicting how the disease process and structural disorders influence the elderly people's fitness. He examined 30 women suffering from osteoporosis, with the average age 69.9 years and he demonstrated that the muscle strength test resulted in comparison to other Polish researchers' studies performed on the healthy people population as well as American norms, were worse by half [31]. This study showed how any physiological processes disorders were reflected in the physical tests. Nevertheless, it also presented another important aspect, namely, a big utility of upper and lower limbs muscle strength tests. Those tests may also be performed on patients apart from everyday activity tests, such as ADL or IADL, for people who undergo the process of rehabilitation [32].

In numerous studies on physiology of exertion and gerontology focusing on organism aging processes [33] and limitations resulting from them, the role of physical activity is being accentuated, especially the role of strength training in the longer run of functional independence upkeeping [34, 35].

Thanks to our study as well as other researchers' work, we can get familiarized with elderly people's fitness, especially their abilities to generate muscle strength as an ability of a muscle to overcome a certain resistance. It depends on numerous factors: physiological muscle section surface, quantitative relation of fast twitch muscle cells to slow twitch, intermuscular and intramuscular coordination and neuromuscular coordination [36, 37]. Therefore, it is of great importance to create activity programs for this age group so that this will not cause injuries and complications due to activity being taken up. One needs to remember that elderly people's movement possibilities are smaller than those of middle-aged people. However, health training must become an inevitable element of this population's life. For this reason, it is crucial to adjust the appropriate method of increasing which will be at the same time applicable to those people's possibilities. This kind of training will not only ensure mobility which allows to do a lot of sophisticated everyday life activities and, thus, will avert the time of the need for other people's assistance, but it will also at the same time influence other health factors improvement, which is demonstrated by many studies [38]. In relation to that, elderly people's programmed activity must be introduced into preventive programs which are destined for this age group in order to make this phase of life a functionally safer and more satisfactory one.

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THE INFLUENCE OF SELECTED SOCIODEMOGRAPHIC FACTORS ON THE QUALITY OF LIFE OF PATIENTS WITH MULTIPLE SCLEROSIS

WPŁYW WYBRANYCH CZYNNIKÓW SOCJODEMOGRAFICZNYCH NA JAKOŚĆ ŻYCIA CHORYCH NA STWARDNIENIE ROZSIANE

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ABSTRACT

Introduction. Multiple sclerosis (MS) is a chronic demyelinising disease with numerous clinical signs, such as: balance and coordination disorders, visual disturbances, muscle weakness, paresis, feeling of chronic fatigue, mood disorders, genitourinary dysfunction, spasticity and paresthesias.
Aim. Analysis of the influence of sociodemographic factors on the quality of life of patients with multiple sclerosis.
Material and methods. The research covered 105 patients and was conducted at St. Luke´s Regional Hospital and in the Multiple Sclerosis Association in Tarnow in 2015. The criterion for inclusion was medical diagnosis of multiple sclerosis and the voluntary consent of the patient to participate in the research. The study used: the EQ-5D (Health related quality of life questionnaire), the EQ-VAS (EuroQol-visual analogue scale), the EDSS (Kurtzke Expanded Disability Status Scale) and the authors' original questionnaire.
Results. High self-esteem regarding their own health condition and higher quality of life in all dimensions were shown more often by people with full functional efficiency ($p < 0.0001$). The research analysis showed that 65.7% of the people reported no problems in terms of self-care. Younger people significantly more frequently had no problems with mobility ($p = 0.0006$), self-care ($p = 0.0328$). Also, anxiety or depression were less frequent among them ($p = 0.0022$). People with higher education were less likely to feel pain / discomfort (60.9%).
Conclusions. Self-assessment of the quality of life of the respondents depends significantly on age, marital status, education and the source of livelihood.

KEYWORDS: multiple sclerosis, quality of life.

STRESZCZENIE

Wstęp. Stwardnienie rozsiane (*sclerosis multiplex* – SM) jest przewlekłą chorobą demielinizacyjną o licznych objawach klinicznych, takich jak: zaburzenia koordynacji i równowagi, zaburzenia widzenia, niedowłady, nasilone zmęczenie, zaburzenia nastroju, spastyczność czy parestezje.
Cel. Analiza wpływu czynników socjodemograficznych na jakość życia chorych na stwardnienie rozsiane.
Materiał i metody. Badanie przeprowadzono wśród 105 pacjentów Szpitala Wojewódzkiego im. św. Łukasza oraz członków Stowarzyszenia Stwardnienia Rozsianego w Tarnowie w 2015 roku. Kryterium włączenia było rozpoznanie SM oraz dobrowolna zgoda chorego na udział w badaniu. W badaniu posłużono się Skalą EQ-5D (Health related quality of life questionnaire), Skalą EQ-VAS (EuroQol-visual analogue scales), Rozszerzoną Skalą Niewydolności Ruchowej Kurtzkego (EDSS) oraz kwestionariuszem ankiety własnego autorstwa.
Wyniki. Wysoką samoocenę własnego stanu zdrowia oraz wyższą jakość życia we wszystkich wymiarach miały częściej osoby w pełni wydolne funkcjonalnie ($p < 0,0001$). Analiza badań wykazała, że 65,7% osób nie zgłaszało problemów w zakresie samoopieki. Osoby młodsze istotnie częściej nie miały problemów z mobilnością ($p = 0,0006$), samoopieką ($p = 0,0328$). Rzadziej występował u nich również niepokój czy przygnębienie ($p = 0,0022$). Osoby z wykształceniem wyższym rzadziej odczuwały ból/dyskomfort (60,9%).
Wnioski. Samoocena jakości życia badanych zależy istotnie od wieku badanych, stanu cywilnego, wykształcenia oraz źródła utrzymania.

SŁOWA KLUCZOWE: stwardnienie rozsiane, jakość życia.

Introduction

Multiple sclerosis (MS) is a chronic demyelinising disease with numerous clinical signs, such as: balance and coordination disorder, visual disturbances, muscle weakness, paresis, the feeling of chronic fatigue, mood disorders, genitourinary dysfunction, spasticity and

paresthesias which negatively affect the quality of patients' life. The intensification of the symptoms of the disease, motor disability in particular, causes limitations in social contacts, decreases professional activity, and in consequence, influences the lowering of the quality of such patients' life. MS affects not only the patient, but also his/her family, friends and the environment in which he or she lives [1, 2, 3].

What is characteristic for MS is the progressive character of the disease, which brings about gradual degradation of physical fitness with critical thinking ability usually fully maintained. It is a serious problem worldwide, and in the countries with high morbidity rate, including Poland, it is one of the most frequent reasons of disability of young people between 20 and 40 years old. The disease affects women twice as often as men. In Poland it is assumed that around 40 thousand people suffer from multiple sclerosis [1, 4, 5].

The aim of the paper is to assess the impact of sociodemographic factors on the quality of life of patients with multiple sclerosis.

Material and methods

The study was conducted from March to May 2015 among patients of the neurology ward and the neurological centre of St. Luke's Regional Hospital, and among members of the Multiple Sclerosis Association in Tarnow. The criterion for inclusion was the clinical diagnosis of multiple sclerosis and the patient's voluntary consent to participate in the research. The study used the diagnostic pool method, a questionnaire technique. Moreover, the following were used: the EQ-5D (Health related quality of life questionnaire) for self-rating of the quality of patients' life, the EQ-VAS (EuroQol-visual analogue scale) for the overall assessment of the respondents' health state, and the EDSS (Kurtzke Expanded Disability Status Scale) to assess the clinical condition of the participants. Also the authors' original questionnaire was applied. The differences among variables were verified with the use of the chi-square independence test, the Mann-Whitney U test and the Kruskal-Wallis test. The significance level $p<0.05$ was adopted. The calculations were made with the IBM programme SPSS Statistics 20.

The group of the respondents consisted of 105 people (41% were men, 59% were women). The most numerous group were people aged 31–40 (33.3%). The participants aged 41 to 50 and above 50 constituted two groups of 25.7%. There were 14.3% of patients aged 20 to 30, and individuals below 20 years old made up only 1% of the respondents. For 50.5% of the respondents the place of residence was the country, and the remaining patients (49.5%) indicated the city. There were 63.8% of married people, whereas single people made up 16.3% of the studied group. Divorced people made up 12.4% of the respondents, and widows/widowers were 7.6% of the respondents. The majority of the study participants had secondary education (47.6%), then vocational education (29.5%), higher education (21.9%) and primary education (1%). Among the respondents, 73.3% had children, 46.7% of the overall number were employed, 53.3% were not. In 42.9% patients MS was diagnosed when they were 21-30. Less than one-fourth of the respondents (24.8%) had the disease diagnosed when they were 31-40, in 12.4% it was diagnosed when they were below 20, in 12.4% – when they were 41-50, and for 7.6% the diagnosis took place when they were above 50 years old. Among the respondents, people suffering from MS for up to 10 years prevailed (from 6 to 10 years – 33.3%; from 1 to 5 years – 28.6%). One-fifth of the survey participants (20%) were ill for 11 to 15 years, whereas 8.6% of the respondents – for more than 20 years.

Results

The quantification of motor disability conducted in accordance with the Kurtzke Expanded Disability Status Scale proved that 23.8% of patients had symptoms of minimal disability (they obtained 2 points in the EDSS). No disability, with minimal neurological signs present was indicated by 15.2% of the respondents (1.5 points), whereas 14.3% of the patients showed moderate disability (**Figure 1**).

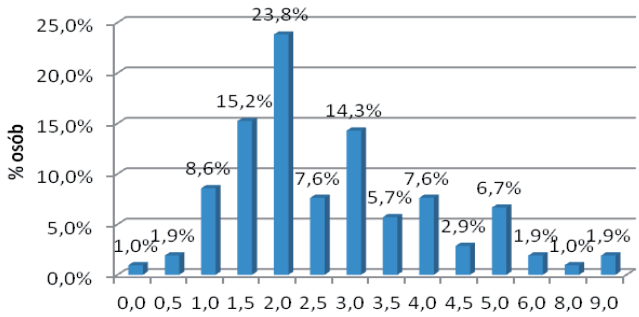

Figure 1. Results of the Kurtzke EDSS

Source: author's own analysis

45.7% of patients needed assistance with some everyday activities, 7.6% of the respondents were totally unable to care for themselves. Almost everybody (94.3%) could count on the support from the family and friends. The influence of the family support was appreciated by 81.9% of the respondents. The expectations of the study participants towards family and friends concerned the need for mental support (70.5%), more understanding (48.6%), assistance in everyday activi-

ties (43.8%), as well as attention and care (21.0%). To a lesser extent they expected financial support (8.6%).

In the case of 58.1% of responding patients, the disease did not change their contacts with other people. According to 20% of the respondents, as a result of the disease, the contacts worsened significantly. The participation in meetings with friends a few times a week was declared by 25.7% of the respondents. Occasional contacts with friends were indicated by 32.4% of patients, whereas 12.4% of the respondents did not take part in such meetings. More than one-fifth of the participants (21.9%) reported the feeling of loneliness. Frequent contacts with other people suffering from MS were only declared by 18.1% of the respondents, occasional – by 43.8% of people. The respondents who did not keep such contacts constituted 38.1% of the total number.

In the opinion of 80% of patients, help from state institutions in our country is insufficient for people suffering from MS and the disabled. Less than a half of the respondents (47.6%) claimed that it is absolutely insufficient, 7.6% did not use this kind of help in the past. On the other hand, 12.4% considered such help sufficient. Taking advantage of the MS treatment programme refunded by the National Health Fund was declared by 74.3% of the respondents. Other patients (25.7%) did not use the programme.

The respondents assessed their own health differently. 19% of the patients assessed it high, 64.8% thought it was moderate, and 16.2% of the respondents regarded it low. The research analysis proved that 65.7% of patients did not report any problems with self-care. 36.2% of the study participants did not have any problems with pain/discomfort, and 34.3% with mobility. 28.6% of the respondents did not signal anxiety and depression. On the other hand, as many as 66.7% patients declared that they felt anxious and depressed, had problems with mobility (61.9%), felt pain/discomfort (61%) and had difficulties with undertaking activities (52.4%) and self-care (29.5%). An extreme problem, according to respondents, was undertaking everyday activities (5.7%), self-care (4.8%), anxiety and depression (4.8%), mobility (3.8%), and, to the least extent, pain/discomfort (2.9%) (**Figure 2**).

An analysis of the collected data enabled to find out that younger people significantly more frequently had no problems with mobility (p=0.0006), self-care (p=0.0328). Anxiety or depression did not occur in their case (p=0.0022), either. Lower quality of life in those dimensions was experienced more often by people above 40. The age of the patients did not influence everyday activities undertaken by them and the feeling of pain/discomfort.

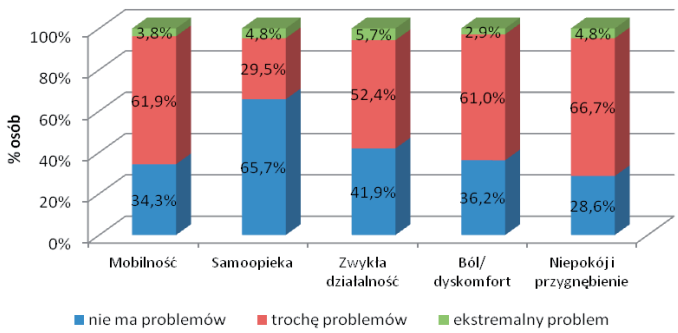

Figure 2. Life quality of the surveyed patients (the EQ-5D scale)

Source: author's own analysis

Mobilność – Mobility
Ekstremalny problem – Extreme problem
Zwykła działalność – Everyday activities
Ból/dyskomfort – Pain/Discomfort
Niepokój i przygnębienie – Anxiety and depression
Nie ma problemów – No problem
Trochę problemów – Some problems
Samoopieka – Self-care

The study results indicated that women (62.9%) more often than men (58.1%) had problems with undertaking everyday activities. They experienced pain and discomfort more often (69.4%) than men (51.2%). Anxiety and depression were also experienced more often by women (74.2%) than by men (41.9%) (**Table 1**).

Table 1. Sex of the surveyed patients and their life quality

Category of life quality		Sex				p
		Female		Male		
		N	%	N	%	
Mobility	no problems	16	25.8	20	46.5	0.0840
	some problems	43	69.4	22	51.2	
	extreme problems	3	4.8	1	2.3	
Self-care	no problems	39	62.9	30	69.8	0.5615
	some problem	19	30.6	12	27.9	
	extreme problems	4	6.5	1	2.3	
Routine activity	no problems	19	30.6	25	58.1	**0.0190**
	some problems	39	62.9	16	37.2	
	extreme problems	4	6.5	2	4.7	
Pain/discomfort	no problems	16	25.8	22	51.2	**0.0154**
	some problems	43	69.4	21	48.8	
	extreme problems	3	4.8	0	0.0	
Anxiety and depression	no problems	12	19.4	18	41.9	**0.0352**
	some problems	46	74.2	24	55.8	
	extreme problems	4	6.5	1	2.3	

Source: author's own analysis

The research showed that anxiety and depression at the extreme level were experienced more often by country dwellers (9.4%). City dwellers (36.5%) did not report this problem (p < 0.0253). It was also found that single people significantly more often experienced no problems with mobility, self-care, pain/discomfort or anxiety or depression. The problems occurred more often in the remaining respondents – **Table 2**.

Table 2. The quality of life and the marital status of the respondents

Category of life quality		Marital status								p
		Single		Married		Widow/ Widower		Divorced		
		N	%	N	%	N	%	N	%	
Mobility	no problems	11	64.7	23	34.3	1	12.5	1	7.7	**0.0045**
	some problems	6	35.3	43	64.2	6	75.0	10	76.9	
	extreme problems	0	0.0	1	1.5	1	12.5	2	15.4	
Self-care	no problems	15	88.2	47	70.1	3	37.5	4	30.8	**0.0140**
	some problems	2	11.8	18	26.9	4	50.0	7	53.8	
	extreme problems	0	0.0	2	3.0	1	12.5	2	15.4	
Routine activity	no problems	10	58.8	31	46.3	1	12.5	2	15.4	0.0812
	some problems	7	41.2	33	49.3	6	75.0	9	69.2	
	extreme problems	0	0.0	3	4.5	1	12.5	2	15.4	
Pain/Discomfort	no problems	10	58.8	24	35.8	1	12.5	3	23.1	**0.0235**
	some problems	7	41.2	42	62.7	7	87.5	8	61.5	
	extreme problems	0	0.0	1	1.5	0	0.0	2	15.4	
Anxiety and depression	no problems	11	64.7	16	23.9	0	0.0	3	23.1	**0.0033**
	some problems	6	35.3	49	73.1	7	87.5	8	61.5	
	extreme problems	0	0.0	2	3.0	1	12.5	2	15.4	

Source: author's own analysis

In effect of the research it was found out that people with higher education more often felt no pain/discomfort (60.9%). The problem occurred significantly more frequently in other respondents (p < 0.0375). No other statistically significant differences between the respondents' quality of life and education were found out.

The self-rating of health state (the VAS) significantly differentiated the quality of life of the study participants (p<0.0001). The people who assessed their health better had also a better quality of life in individual dimensions. With the drop of health self-assessment, also the quality of respondents' life decreased.

People with full functionality had more often higher self-assessment of their own health and higher quality of life in all dimensions (p<0.0001). The analysis of own research proved that the patients in whom the disease had the relapsing-remitting form did not have any problems with mobility, self-care, everyday activities, pain/discomfort. In the patients with the following forms of MS: primary progressive, secondary progressive and progressive relapsing, problems connected with the quality of life occurred more often – **Table 3**.

Table 3. The quality of life and the form of MS

Category of life quality		Form of SM								p
		Relapsing -remitting form		Primary progressive form		Secondary progressive form		Progressive relapsing form		
		N	%	N	%	N	%	N	%	
Mobility	no problems	31	49.2	4	20.0	0	0.0	1	7.7	**0.0002**
	some problems	30	47.6	16	80.0	7	77.8	12	92.3	
	extreme problems	2	3.2	0	0.0	2	22.2	0	0.0	
Self-care	no problems	47	74.6	13	65.0	1	11.1	8	61.5	**0.0083**
	some problems	14	22.2	6	30.0	6	66.7	5	38.5	
	extreme problems	2	3.2	1	5.0	2	22.2	0	0.0	
Routine activity	no problems	36	57.1	6	30.0	0	0.0	2	15.4	**0.0001**
	some problems	25	39.7	13	65.0	6	66.7	11	84.6	
	extreme problems	2	3.2	1	5.0	3	33.3	0	0.0	
Pain/ discomfort	no problems	30	47.6	6	30.0	0	0.0	2	15.4	**0.0007**
	some problems	32	50.8	14	70.0	7	77.8	11	84.6	
	extreme problems	1	1.6	0	0.0	2	22.2	0	0.0	
Anxiety and depression	no problems	22	34.9	3	15.0	1	11.1	4	30.8	0.0643
	some problems	38	60.3	17	85.0	6	66.7	9	69.2	
	extreme problems	3	4.8	0	0.0	2	22.2	0	0.0	

Source: author's own analysis

Patients taking advantage of the MS treatment programme refunded by the National Health Fund more often had high and moderate self-assessment of their health. The quality respondents' life in terms of mobility (p = 0.0003), self-care and everyday activities (p < 0.0001), pain/discomfort (p = 0.0021), as well as anxiety and depression (p = 0.0002) was lower in patients who did not take advantage of the MS treatment refunded by the National Health Fund.

The authors' own research proved that respondents who had MS diagnosed in older age more often experienced a few problems with mobility, everyday activities, pain/discomfort, depression and anxiety. Respondents who had MS diagnosed in younger age more often had no problems with the mentioned spheres of life or more often the intensification of the their problems was considerable – **Table 4**.

Table 4. The quality of life and the age at which MS was diagnosed

Category of life quality		Age at which MS was diagnosed		p
		Average	SD	
Mobility	no problems	27.06	8.53	**0.0003**
	some problems	35.23	10.38	
	extreme problems	27.50	12.34	
Self-care	no problems	30.80	9.67	0.1520
	some problems	35.52	11.71	
	extreme problems	29.60	11.67	
Routine activity	no problems	28.32	8.58	**0.0039**
	some problems	35.45	11.00	
	extreme problems	29.67	10.44	
Pain/ discomfort	no problems	27.37	8.66	**0.0012**
	some problems	35.09	10.46	
	extreme problems	29.33	14.43	
Anxiety and depression	no problems	29.03	11.58	**0.0074**
	some problems	33.99	9.89	
	extreme problems	24.80	4.76	
Total		32.13	10.53	

Source: author's own analysis

What results from the research is that people who rated their physical activity higher had fewer problems with mobility, self-care, everyday activities ($p < 0.0001$) and experienced less pain/discomfort ($p = 0.0004$). Problems of life quality in these areas occurred more often in people who were less physically active.

Discussion

Quality of life is a term which is very differently defined, therefore, in medicine the term Health Related Quality of Life (HRQoL) has been introduced. The problem of the quality of life is the area of interest of numerous scientists all over the world. The intractability of multiple sclerosis and a broad scope of symptoms concerning the majority of the spheres of life definitely lower the quality of those patients' functioning.

The analysis of the conducted research proved that the quality of life of patients with MS depends on many factors, such as age, the course of the disease, fitness and the applied treatment. Younger people with the relapsing-remitting form of the disease, with a lower score in the EDSS, treated immunomodulatorily, included in the programme refunded by the National Health Fund, assessed their quality of life better than older people with the progressing form of the disease, with lower functionality, with a higher score in the EDSS, and not included in the treatment. The relationship between the age, the course of the disease, fitness, the applied treatment and the assessment of the quality of life is also emphasised by the findings of the research conducted by Łabuz-Roszak and associates [6]. In the research carried out by Jabłońska and associates the relationship was not confirmed [7].

As the own research findings proved, most often patients expect mental support (70.5%), and a great majority of them (94.3%) confirm that they can count on the support from their families and friends. It helps them to survive difficult moments connected with the disease, and, in addition, it performs a therapeutic function because it gives an opportunity to express their own thoughts and describe difficulties which the disease carries. The findings are also confirmed by other authors. In her research, Kossakowska proved that patients with MS search for support among their relatives and friends, and the strategy is correlated with the sex of patients. Women expected support, asked for help, were able to talk about their problems or met in support groups more often [8].

Own research showed that men with moderate self-assessment of their own health more often claimed that support of the family considerably improved their quality of life with the disease. Such a relationship was not found in the group of women. A lot of the surveyed people (45.7%) declared a need for assistance with some everyday activities. It depended significantly on the marital status of the respondents ($p=0.0095$), the source of income ($p=0.0007$), possessing children

(p = 0.0432). The patients who were more mobile in terms of basic everyday activities assessed the quality of their life better. Similarly, Humańska and associates in their research proved that patients who were fitter assessed the quality of their life higher in the somatic, psychological, social and environmental area [10].

What arises from the conducted research is that the self-assessment of the quality of life (the EQ-5D scale), significantly influenced the overall quality of life. In the mobility dimension, some problems were experienced by 61.9% of patients, extreme problems were reported by 3.8% of the respondents. In the self-care aspect, problems were declared by 65.7% of the respondents, in the dimension of everyday activities problems were reported by 52.4%. Pain and discomfort were experienced by 61.0%. The respondents assessed their emotional state as low. More than a half said that they were sadder and more depressed (66.7%). Few respondents (4.8%) reported that they felt very intensified anxiety and depression. In the dimension of each sphere of life of the respondents, more than a half had problems which determined the overall assessment of the quality of life. The research also showed that in the group of women, self-assessment of their own health was more often moderate, and among men it was more often high. Men significantly more often indicated the lack of problems connected with everyday activities, pain/discomfort, and they experienced anxiety and depression more seldom.

Self-assessment of health (EQ-VAS scale) significantly differentiated the respondents' quality of life. People who assessed their health higher had also a better quality of life in individual dimensions. With the drop in the self-assessment of health, the respondents' quality of life also decreased. This is also confirmed by other authors, for example Jabłońska and associates proved that patients who had a positive mood, assessed their quality of life higher [7].

The analysis of own research indicated that nearly half of the patients noticed the worsening of their health in comparison with the period a year before. Similar results concerning a change in the assessment of health state was presented by Kowalik in her work [11]. The authors' own research did not prove that the duration of the disease significantly differentiates self-assessment of patients' own health. Low self-assessment of own health was declared by 16.2% of people, moderate by 64.8% and high by 19.0% of the surveyed patients. Similarly as in the case of other authors [6, 11], no relationship between the duration of the disease and the quality of life of the patients was proved.

To sum up, however, it should be emphasised that the subjective assessment of the quality of life is not a constant value and may undergo a change depending on numerous factors. The worsening of the mobility of the patient, as well as a worse emotional state can be such a factor. Therefore, it should be remembered that regardless of the level of the disease progression, patients are very sensitive and their self-esteem depends on themselves and the people in the nearest environment.

Conclusions

1. Self-assessment of the respondents' quality of life depends significantly on the age of patients, their marital state, education and the source of income.
2. The quality of respondents' life decreases with the drop of the self-assessment of the health state.
3. Younger and single people less frequently experienced problems with mobility, self-care and everyday activities. People above 40 years old had lower quality of life in those dimensions.

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ANALYSIS OF RELIABILITY AND VALIDITY OF THE PERFORMANCE ASSESSMENT SYSTEM FOR BACHELOR'S DEGREE STUDENTS IN MIDWIFERY: A SINGLE-CENTRE STUDY

ANALIZA RZETELNOŚCI I TRAFNOŚCI SYSTEMU OCENY OSIĄGNIĘĆ STUDENTÓW POŁOŻNICTWA NA STUDIACH PIERWSZEGO STOPNIA: BADANIE JEDNOOŚRODKOWE

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ABSTRACT

Introduction. The system of assessment of students' performance needs to comprise certain psychometric characteristics, including in particular reliability and validity, so that it can be a highly objective source of knowledge of students' learning outcomes.
Aim. Analysis of reliability and validity of the performance assessment system for Midwifery students who started a Bachelor's degree programme at Medical University of Warsaw between 2005-06 and 2012-13.
Material and methods. A retrospective study enrolling a group of 922 students of eight subsequent full education cycles. The authors collected detailed data on grades for twenty courses that ended with an exam throughout the course of studies, divided into four groups according to the criteria specified in the education standards. Reliability (Cronbach's alpha coefficient), as well as theoretical (factor analysis) and criterion validity (the Pearson correlation matrix) were assessed. IBM® SPSS® Statistics version 23 was used for calculation.
Results. Cronbach's alpha coefficient for each year exceeded the assumed threshold of 0.700. Total reliability of the assessment of students' performance for the period considered amounted to 0.805. The factor analysis of students' grades for 20 examination courses demonstrated a five-factor structure, which is far from the assumptions resulting from the education standards (four groups of effects). The highest level of criterion validity was observed for the D group courses ("Education in Specialist Care"), with average values of Pearson's correlation coefficient (r) amounting to 0.20.
Conclusions. A good level of reliability accompanied by a low level of validity leads to a decrease in credibility of the entire system of assessment of Midwifery students' competencies. This may, in some cases, increase the risk that there would be persons with insufficient level of initial competencies among Midwifery graduates.

KEYWORDS: midwifery, educational measurement, graduate education, reproducibility of results, professional competence.

STRESZCZENIE

Wprowadzenie. Aby system oceniania studentów był wysoce obiektywnym źródłem informacji na temat osiągniętych efektów kształcenia musi on posiadać pewne właściwości psychometryczne, do których należą przede wszystkim rzetelność i trafność.
Cel. Analiza rzetelności i trafności systemu oceny osiągnięć studentów położnictwa, którzy podjęli kształcenie na studiach pierwszego stopnia na Warszawskim Uniwersytecie Medycznym w latach 2005/06 – 2012/13.
Materiał i metody. Badanie retrospektywne obejmujące grupę 922 studentów z ośmiu kolejnych, pełnych cykli kształcenia. Zebrano szczegółowe wyniki dotyczące uzyskanych ocen z dwudziestu przedmiotów kończących się egzaminem w całym toku studiów w podziale na cztery grupy zgodnie z kryteriami zapisanymi w standardach kształcenia. Oceniono rzetelność (współczynnik alfa-Cronbacha), trafność teoretyczną (analiza czynnikowa) i kryterialną (macierz korelacji Pearsona). Obliczenia z użyciem programu IBM® SPSS® Statistics wersja 23.
Wyniki. Dla każdego rocznika osiągnięto wartość współczynnika alfa-Cronbacha większą niż zakładany próg 0,700. Łączna zgodność oceny osiągnięć studentów dla całego analizowanego okresu wyniosła 0,805. Wyniki analizy czynnikowej ocen studentów z 20 przedmiotów egzaminacyjnych wskazują na pięcioczynnikową strukturę, co odbiega od założeń wynikających ze standardów kształcenia (cztery grupy efektów). Najwyższy poziom trafności kryterialnej zaobserwowano dla przedmiotów z grupy D („Nauki w zakresie opieki specjalistycznej"), dla której średnia wartość współczynnika r-Pearsona wyniosła 0,20.
Wnioski. Dobry poziom rzetelności z równoczesną niską trafnością skutkuje obniżeniem wiarygodności całego systemu oceniania kompetencji studentów położnictwa. Może to w niektórych przypadkach zwiększać ryzyko obecności w grupie absolwentów kierunku osób o niedostatecznym poziomie kompetencji wyjściowych.

SŁOWA KLUCZOWE: położnictwo, ocena wiadomości, szkolnictwo wyższe, powtarzalność wyników, kwalifikacje zawodowe.

Introduction

A Midwifery Curriculum for Bachelor students at Warsaw Medical University (WMU) covers all principles defined in standards relating to the major studies and regulated by the applicable Regulation of the Minister of Science and Higher Education [1]. General requirements of the Regulation say that Bachelor's degree programmes last at least six semesters, the number of class hours and hours of practice amounts to at least 4720 hours and there are at least 180 ECTS credits (*European Credit Transfer and Accumulation System*) broken down into basic and specialised contents [1]. The programme has a practical profile and the major in Midwifery is a part of education in medical, health, and sports sciences [2]. Bachelor's degree graduates have specialist knowledge of midwifery and other medical sciences. They have the following skills: (1) providing health services to pregnant women, women in labour, post-partum women, and new-born infants, among others; (2) recognising pregnancy, taking care of pregnant women and monitoring pregnancy; (3) taking the necessary measures in urgent situations until a doctor arrives; (4) taking care of a mother and a new-born infant, monitoring the postnatal period and examining a new-born infant; (5) cooperating with the medical personnel; (6) carrying out educational and health activities such as preparation for family life, family planning methods, protection of motherhood and fatherhood, preparation for parenthood and childbirth [1, 2].

The Bachelor's degree curriculum includes a total of 40 courses (2420 hours), 20 of which end up with a final test equivalent to an exam. The curriculum also includes a compulsory practical training (1100 hours) and internship (1200 hours). According to the education standards, all teaching outcomes were divided into four categories (A, B, C, and D) [1]. See **Table 1** for a detailed list of courses included into the curriculum of the full-time Bachelor's degree programme in Midwifery at WMU between 2005–06 and 2012–13.

Table 1. List of courses contained in the standards of education for Bachelor's degree programme in Midwifery during the period 2005/06 - 2012/13 at the Medical University of Warsaw

Learning outcomes group	Course	Exam
A. Basic sciences	Anatomy	•
	Physiology	•
	Pathology	
	Embryology and Genetics	
	Biochemistry and Biophysics	
	Microbiology	•
	Parasitology	•
	Pharmacology	•
	Radiology	
B. Social Sciences	Psychology	•
	Sociology	
	Pedagogics	•
	Law	
	Public health	•
	Philosophy and Ethics in Midwifery	
	Foreign language	•
C. Sciences in the basics of maternity care	Basics of maternity care	•
	Health promotion	•
	Primary health care	•
	Dietetics	
	Physical examination	
	Research in obstetrics	
	Optional courses to choose from: nosocomial infections, sign language and the promotion of mental health	
D. Science in the field of specialist care	Obstetrical techniques and care during childbirth	•
	Obstetrics and Maternity care	•
	Gynecology and Gynecological care	•
	Neonatology and Neonatal Care	•
	Paediatrics and Paediatric Nursing	•
	Internal medicine	•
	Surgery	
	Psychiatry	•
	Anesthesiology and life-threatening situations	
	Rehabilitation in obstetrics, gynecology and neonatology	•
	Basics of medical emergency	

Source: author's own analysis

Assessment of students constitutes one of the most important elements of the entire system of education. On the one hand, it defines the degree to which students achieve the expected learning outcomes and on the other hand, it may also measure the quality of the education process [3]. Regardless of the purpose of the assessment, it is always, more or less, associated with a systematic collection of observational data leading to conclusions on the features and characteristics of a particular student [3]. In order to make the process a highly effective source of information on achieved learning outcomes, it has to meet certain criteria referred to as features of the educational diagnosis. Reliability and validity constitute the core features of educational measurement, allowing for its evaluation and optimisation [4–6].

Aim

Analysis of reliability and validity of the performance assessment system for Midwifery students who started a Bachelor's degree programme at Warsaw Medical University between 2005–07 and 2012–13.

Material and methods

The retrospective study involved data on the course of studies comprising a group of 922 students (women

constituted 100% of all) who started studying midwifery in a full-time Bachelor's degree programme at the Faculty of Health Science, WMU, between the academic years 2005–06 and 2012–13 (eight full training cycles). Among the study group, the total failure rate made up 16.7% and the number of delayed graduation accounted for 7.9%.

For each student, the authors collected detailed data on grades for twenty courses that ended with an exam throughout the course of studies, divided into four groups according to the criteria specified in the education standards. The data were collected from the Central Database of Students whose aim is to support administration handling of students and course of studies.

In line with the position of the Ethical Review Board, WMU, the approval of the Board is not necessary to conduct retrospective studies, surveys, and other non-invasive activities.* The present authors obtained the consent of the Local Controller of the Personal Data for processing of personal data of WMU students.

An analysis of reliability, validity, and one-dimensionality of particular groups of courses were used to assess psychometric characteristics of the performance assessment system for Bachelor's degree students of Midwifery. An analysis of internal consistency of students' achievements with the use of Cronbach's formula was used to assess reliability (see [7]). In compliance with Nunnally's criterion, Cronbach's alpha coefficient was established at $\alpha > 0{,}70$ [8]. Furthermore, a value of the discrimination index was established for each course to assess how grades for a particular course influence the total consistency of the measurement of students' performance. A threshold value for this index was established at 0.20 [9].

Validity of the students' performance assessment system was evaluated with the use of two different analytical approaches:

- Estimation of theoretical validity (also called internal validity) using exploratory factor analysis. It was assessed whether a factor structure comprised four parts, which would reflect the number of selected groups of courses. Meeting of the assumptions of factor analysis was checked, Bartlett's test of sphericity was performed, degree of variance homogeneity was estimated, correlation matrix determinant and KMO measure of sampling adequacy (Kaiser-Meyer-Olkin index) were established.
- Estimation of criterion validity which was based on the degree of correlation between selected courses and groups of courses. Values of Pearson's correlation coefficients (r) were established to verify the assumption mentioned above.

The analysis of one-dimensionality of each group of courses was conducted with principal component analysis. It was assumed that a group of courses is one-dimensional if it meets Kaiser criterion (established eigenvalues exceed the value of 1 only once) and reproducibility of variability of indicator variables with the first principle component exceeds 40% [10].

All statistical calculations were carried out using IBM® SPSS® Statistics version 23. The significance level for each analysis was established *a priori* at $\alpha = 0.05$.

Results

For each of the seven years, Cronbach's alpha coefficient exceeded the determined threshold of 0.700, with only one case of alpha less than 0.800 (year of 2007-08, alpha = 0.790). However, the total consistency of assessment of students' achievements for the entire period amounted to 0.805 after standardisation. The analysis of measurement of students' performance with regard to changes in the value of alpha coefficient after the elimination of particular courses showed that removal of two of them (*Psychiatry* and *Rehabilitation in obstetrics and gynaecology*) may slightly increase the value of this coefficient. See **Table 2** for details on the results of reliability analysis.

Table 2. Analysis results of reliability and discrimination power for courses culminating in an examination during the Bachelor's degree programme in Midwifery

Course	Learning outcomes group	Discrimination power	Cronbach's alpha when removed	Cronbach's alpha
Anatomy	A	0.410	0.795	0.532
Physiology		0.433	0.794	
Microbiology		0.439	0.794	
Parasitology		0.359	0.798	
Pharmacology		0.261	0.804	
Psychology	B	0.401	0.796	0.438
Pedagogics		0.463	0.792	
Public health		0.216	0.804	
Foreign language		0.386	0.796	
Basics of maternity care	C	0,444	0,793	0,397
Health promotion		0.304	0.801	
Primary health care		0,363	0,799	

* Detailed information and model documents of the Ethical Review Board of Warsaw Medical University are available at: https://komisja-bioetyczna.wum.edu.pl/content/szczegółowe-informacje-oraz-wzory-dokumentów (date of access: November 27, 2015).

Obstetrical techniques and care during childbirth	D	0,525	0,789	0,669
Obstetrics and Maternity care		0,562	0,786	
Gynecology and Gynecological care		0,348	0.799	
Neonatology and Neonatal Care		0,427	0,794	
Paediatrics and Paediatric Nursing		0.358	0.798	
Internal medicine		0.409	0.795	
Psychiatry		0.193*	0.808	
Rehabilitation in obstetrics, gynecology and neonatology		0.143*	0.807	

* below the minimum required

Source: author's own analysis

Meeting the assumptions of the method was checked before theoretical validity was estimated with factor analysis. Null standard deviation was not observed for any course and homoscedasticity was confirmed (Levene's test for homogeneity of variances, $p > 0.05$). The value of correlation matrix determinant was close to zero (0.023). Moreover, the criterion of sphericity was met since it was found that the correlation coefficient matrix was not an identity matrix (Bartlett's test, $p < 0.0001$). The last criterion for factor analysis was checked with the use of Kaiser-Mayer-Olkin test assessing the anticipated reduction of measurement scale. KMO index of sampling adequacy amounted to 0.839, meeting the assumptions for this criterion (KMO > 0.500).

In the exploratory factor analysis, students' grades for 16 examination courses were divided into five factors according to Kaiser criterion, which was not consistent with the division into four groups. It was found that variables grouped into five factors explained a total of 50.0% of the entire variance (**Table 3**).

Table 3. Participation of explained variance for each factor – the five-factor solution

Factor	Eigenvalue	Participation of explained variance (%)
1	4,490	22,449
2	1,687	8,435
3	1,439	7,194
4	1,260	6,301
5	1,130	5,651
Total	----	50,029

Source: author's own analysis

Varimax orthogonal rotation of raw factor loadings was carried out to facilitate interpretation of the obtained solution. Component 1 comprised 13 out of 20 courses and no clear-cut factor solution was found for another four courses. Moreover, further three courses fell beyond Component 1. Particular courses did not form structurally separate components that would be consistent with the theoretically assumed division resulting from the standards of education. See **Table 4** for a detailed breakdown of the results of factor analysis with *Varimax* rotation of loadings.

Table 4. The rotation matrix using the *Varimax* method

Course	Learning outcomes group	Component				
		1	2	3	4	5
Anatomy	A	0.518	0.098	-0.407	-0.276	-0.404
Physiology		0.542	-0.416	0.108	-0.332	-0.090
Microbiology		0.531	-0.128	0.220	-0.089	0.177
Parasitology		0.444	0.110	0.158	-0.121	0.512
Pharmacology		0.357	-0.598	0.260	0.149	-0.082
Psychology	B	0,486	0.301	0.012	0.057	-0.114
Pedagogics		0,566	-0.131	0.032	-0.199	0.064
ZdPublic health		0.280	-0.045	-0.577	-0.039	0.139
Foreign language		0.474	-0.359	0.150	0.094	0.159
Basics of maternity care	C	0.549	-0.151	0.150	-0.113	-0.125
Health promotion		0.393	-0.014	-0.391	0.191	0.565
Primary health care		0.455	-0.060	-0.257	0.471	-0.199
Obstetrical techniques and care during childbirth	D	0.618	-0.201	0.138	0.334	-0.124
Obstetrics and Maternity care		0.656	0.105	-0.185	-0.045	-0.259
Gynecology and Gynecological care		0.431	0.210	0.123	0.469	-0.212
Neonatology and Neonatal Care		0,511	0.306	-0.024	0.144	0.140
Paediatrics and Paediatric Nursing		0.448	0.077	0.130	-0.526	0.026
Internal medicine		0.492	0.372	-0.222	-0.027	0.168
Psychiatry		0.261	0.635	0.310	-0.171	-0.166
Rehabilitation in obstetrics, gynecology and neonatology		0.171	0.343	0.540	0.209	0.140

red indicates a clear solution
blue indicates an ambiguous solution

Source: author's own analysis

Criterion validity of the students' performance assessment system was checked by calculating Pearson's correlation coefficients between the grades for particular exam courses. The highest average correlation of grades was observed for *"Obstetrics and Maternity care"* ($r_{average} = 0.26$). As many as 13 courses did not reach average correlation coefficient value of over

0.20. The analysis of correlation gave particularly unfavourable results for "*Rehabilitation in obstetrics and gynaecology*" ($r_{average}$ = 0.07), "*Psychiatry*" ($r_{average}$ = 0.10), and *"Public health*" ($r_{average}$ = 0.10). The highest level of criterion validity was observed for the D-group courses ("Science in the field of specialist care"), with average values of Pearson's correlation coefficient (r) amounting to 0.20. See *Supplementary data* for a detailed breakdown of the results of the analysis of criterion validity.

Based on the course-related structure established in the standards of education, in which there are four groups of educational outcomes, evaluation of one-dimensionality of these groups was carried out to check whether each of them may be considered as one-dimensional. Principal component analysis was used to assess the eigenvalues and how a large part of variance was explained by the first component (**Table 5**). Only one eigenvalue for groups A and C was over 1, which, according to Kaiser criterion, showed one-dimensionality of each of them. But in groups B and D the first and the second variable exceeded the threshold and the percentage of the variance was below the assumed threshold of 40%.

Table 5. The share of variance explained by the first principal component

Learning outcomes group	Kaiser criterion	Participation of explained variance for the first factor (%)
A. Basic sciences	1.79	35.84
B. Social sciences	1.34; 1.09*	33.38**
C. Sciences in the basics of maternity care	1.36	45.45
D. Sciences in the field of specialist care	2.43; 1.10*	30.42**

***** *eigenvalue of factors 1 and 2 respectively*
****** *unfulfilled criteria of one-dimensionality*

Source: author's own analysis

Discussion

Measurement impartiality, i.e. independence of a measuring situation means providing all students with equal (fair) conditions for assessing their achievements. Creation of appropriate conditions during the exam and methods selection of students' achievements evaluation ensuring a comparable degree of independence concerning the measuring situation in consecutive years constitute an important element of measurement impartiality [11–13]. Impartiality of the assessment system is therefore the basis for a reliable and valid measurement of students' real achievements that allows for the evaluation of the quality of education at the faculty over subsequent years.

Reliability of measurement means reproducibility of results in specific conditions. Reliability is most frequently measured with the assessment of internal consistency of measurement results estimated on the basis of average variances of grades for all exams (*Cronbach's alpha)* [7]. The present results of reliability evaluation with Cronbach's alpha coefficient demonstrated that the students' performance assessment system had a sufficient level of reliability (Nunnally's criterion of $\alpha >$ 0.70 was met) [8]. Reliability decreased mostly due to a poor selection of examination methods and, in particular, the improper structure of test tasks that are the core of the assessment process. Students may not have an opportunity to show their achievements in a particular area if the exam significantly limits the learning content that is used to assess the outcomes of education. In addition, low reliability of the assessment system can be observed particularly in cases with a high degree of outcomes variations. This may happen both in general and specialist education where very diverse features and characteristics of students are evaluated.

The analysis of reliability for particular groups of educational outcomes demonstrated that the groups B and C represented a low level of internal consistency (alpha amounted to 0.438 and 0.397, respectively). This was largely related to a measurement scale, i.e. a small number of examination courses comprising groups B and C (four and three, respectively). This is a weakness of each measurement of reliability carried out with the use of Cronbach's alpha coefficient which is sensitive to the size of the measurement scale [9]. A large number of random errors in a particular measurement may constitute another reason for a low value of alpha coefficient. Random variations of assessment results accompany every measurement and directly affect the value of reliability coefficient [14]. At the value of $\alpha < 0.7$, random errors constitute more than 30% of the variability of results and, according to Guilford, measurement in such conditions might be used only for intergroup comparisons and not for individual differentiation [15]. In addition, it is worth noting that sole aspiration to obtain high values of alpha coefficient does not solve the problem of reliability since its large value only minimises the influence of random errors on the results. This, however, gives no certainty with respect to the presence of systematic errors (sometimes serious ones) relating to the measurement bias, which may be the case with each course or group of examination courses [15].

Apart from estimating the degree of internal consistency of the students' performance assessment system, it is important, for the evaluation of psychometric parameters of the measurement scale, to establish discrimination power for each of the examination courses. As defined by Brzeziński, discrimination power deter-

mines to what extent a result for one item in the scale (here: examination course) differentiates the students' population with respect to the feature it measures [16]. An analysis of discrimination index values for particular courses of four groups of educational outcomes led to a conclusion that the results for *Psychiatry* and *Rehabilitation in obstetrics and gynaecology* (indices of 0.193 and 0.143, respectively) fell far from general assessment of students' performance in this field of knowledge (specialist care in this case). Particularly high values of discrimination power were found for *Microbiology* (index of 0.439; group A), *Pedagogics* (index of 0.463; group B), *Basics of maternity care* (index of 0.444; group C), and *Obstetrics and Maternity care* (index of 0.562; group D). Exam results for these four courses constitute the core of the students' performance assessment system for particular groups of educational outcomes. It can be assumed that the principles of students' assessment for these courses may be treated as a model solution and should become the basis for the improvement of differentiation parameters for the remaining courses in a particular group of educational outcomes.

Apart from establishing the level of reliability of measurement, defining its validity is also important for the quality of assessment tools. Validity should be understood here as the degree of consistency to which a measurement tool measures what it is supposed to measure [16]. Therefore, we can speak of the effectiveness of a particular method for the assessment of a certain set of features and characteristics of a student [17]. There is no precise method used to measure validity; there is only its indirect assessment that may concern, among others, estimation of theoretical and criterion validity [4,6,16]. In the case of exams set out in the curriculum for Midwifery, content consistency of examination tasks with the objectives of education for particular courses is crucial for theoretical validity. In compliance with Kaiser criterion, the structure of thenstudents' performance assessment system at WUM took the 5-factor form, which is not in line with theoretical assumptions. In addition to that, the exploratory factor analysis showed that the distribution of students' grades for 20 courses within the structure of performance measurement scale explained only half of the general variability. Particular components were not homogeneous with respect to particular groups of courses. For instance, Component 1 comprised students' grades for educational outcomes from groups A, B, C, and D (13 courses in total). The analysis of one-dimensionality for each group of courses also demonstrated that in two cases the performance measurement scale was not homogeneous. This concerned courses from groups B and D. The results of estimating theoretical validity and one-dimensionality may lead to a conclusion that grades for particular courses did not reflect the division of educational outcomes into groups proposed in the standards of education for Midwifery.

Assessment of criterion consistency of students' results for particular examination courses was the other aspect of validity analysed in the present study. The correlation analysis demonstrated that, similarly to theoretical validity, assumptions for criterion validity were not met in all four groups of courses. The lowest values of correlation coefficients were found for the courses from group D, *Psychiatry* ($r_{average}$ = 0.10) and *Rehabilitation in obstetrics and gynaecology* ($r_{average}$ = 0.07) in particular. These results confirmed earlier findings on reliability and theoretical validity of the students' performance assessment system. With respect to criterion validity, students' grades for the courses from groups A and D ($r_{average}$ of 0.19 and 0.20, respectively) were the best, while grades for the courses in social sciences ($r_{average}$ of 0.16) produced the worst results.

The analysis of validity of educational measurement is supposed to prevent abuse in the interpretation of measurement results [18]. If a student gained a high grade point average, its value is important only when it reflects real student's achievements, particularly with respect to curricular requirements. Therefore, the estimation of prognostic validity relating to the assessment of to what degree the outcomes of education may serve to predict the future of students, e.g. their careers, constitutes an essential aspect of measurement quality analysis. The analysis of diagnostic features of educational measurement may give some more valuable indications as to the validity of assessment system. Thus, it is necessary to perform an external test to evaluate competence acquired by a student/graduate. If an obligation to pass a State Examination (an equivalent of the National Medical Exam) in order to obtain the right to exercise the profession is introduced for all graduates, it will be possible to verify the quality of the teaching process and diagnostic validity of the students' performance assessment system of a particular university. Analyses of the quality of teaching nurses in the US may serve as an example. American graduates need to pass the *National Council Licensure Examination for Registered Nurses* (NCLEX-RN), which constitutes an external verification of their preparation for the profession [19].

Conclusions

The reliability analysis of the achievements assessment system of Bachelor's degree students of Midwifery at Warsaw Medical University demonstrated that psychometric parameters in this respect were good. However, the analysis of validity raised serious concerns. In some cases, students' grades may not reflect their real fea-

tures and properties (vide *Psychiatry* or *Rehabilitation in obstetrics and gynaecology*). When quite good reliability goes hand in hand with insufficient validity, credibility of the entire competence assessment system decreases. This significantly influences the assessment of those students whose grade point average is near the bottom of the scale (grade point average < 3.0). Due to the fact that these are the weakest students, there is a serious risk of having a number of graduates with an insufficient level of output competencies.

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CHARACTERISTICS OF TRAUMATISM IN THE CHOSEN POPULATION OF THE ŚWIĘTOKRZYSKIE PROVINCE IN THE YEARS 2010–2012

CHARAKTERYSTYKA URAZOWOŚCI WYBRANEJ POPULACJI W WOJEWÓDZTWIE ŚWIĘTOKRZYSKIM W LATACH 2010–2012

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ABSTRACT

Introduction. A growth in the incidence of traumas in the young population becomes a current challenge for the public health sector. Etiology of traumas, in which the main role is played by a lifestyle, makes us experience more and more frequent injuries during leisure time at home or outside.
Aim of the study. To assess the traumatic phenomenon in the chosen population of the Świętokrzyskie Province by correlating traumatism with age, gender as well as summer and winter seasons.
Material and methods. The study included the chosen adult population of the Świetokrzyskie Province in the 18–89 age range who in the years 2010–2012 sustained an injury of the locomotory system and reported to the Outpatient Ambulatory Clinic Artimed in Kielce. The research method was based on a diagnostic survey as well as on the analysis of medical documentation. Detailed analysis included the selected injuries of the musculoskeletal system and injuries of the bone fragments of the chest. This selection was dictated by the possibility of a clear diagnosis and treatment of injuries under conditions of the Outpatient Ambulatory Clinic Artimed in Kielce.
Results. In the years 2010–2012, the most common traumas were related to the young people (about 37% of patients). There were no significant differences observed in injury rates between men and women. The summer season was the season with a higher rate of the studied injuries. The most commonly injured areas were ankle and knee joints as well as wrist and hand areas. The dominant type of injuries was the ankle dislocation. The lowest rate of injuries related to the bone fragments of the chest and the elbow joint.
Conclusions. The problem of the incidence of musculoskeletal injuries among the younger population requires a systematic analysis of the epidemiological situation to be able to properly plan and implement preventive measures and organize an expert traumatic assistance.

KEYWORDS: traumatism, epidemiology.

STRESZCZENIE

Wprowadzenie. Rosnąca epidemiologia urazowości młodego społeczeństwa staje się aktualnym wyzwaniem dla sektorów zdrowia publicznego. Etiologia urazowości, w której główną rolę odgrywa styl życia, sprawia, iż co raz częściej urazów doznajemy podczas spędzania czasu wolnego w domu bądź poza nim.
Cel pracy. Ocena zjawiska urazowości wybranej populacji województwa świętokrzyskiego oraz charakterystyka urazowości w poszczególnych grupach wiekowych, w populacji kobiet i mężczyzn oraz w sezonie letnim i zimowym.
Materiał i metody. Badaniem objęto wybraną populację województwa świętokrzyskiego w wieku od 18. do 89. roku życia, która w latach 2010–2012 doznała urazu narządu ruchu i zgłosiła się do Poradni Ambulatoryjnej Przychodni Artimed w Kielcach. W badaniach posłużono się metodą sondażu diagnostycznego oraz techniką analizy dokumentacji medycznej. Szczegółowa analiza obejmowała wybrane urazy narządu ruchu oraz elementów kostnych klatki piersiowej.
Wyniki. W latach 2010–2012 urazowość najczęściej dotyczyła ludzi młodych (około 37% pacjentów). Nie zaobserwowano istotnych różnic w urazowości kobiet i mężczyzn. Sezon letni był sezonem o wyższym wskaźniku badanej urazowości. Do najczęściej kontuzjowanych obszarów należały staw skokowy, staw kolanowy oraz okolica nadgarstka i ręki. Dominującym rodzajem obrażeń były zwichnięcia stawu skokowego. Najniższy wskaźnik urazowości dotyczył elementów kostnych klatki piersiowej oraz stawu łokciowego.
Wnioski. Problem urazowości narządu ruchu wśród młodego społeczeństwa wymaga podejmowania systematycznej analizy sytuacji epidemiologicznej, by móc właściwie planować oraz realizować działania prewencyjne oraz organizować specjalistyczną pomoc pourazową.

SŁOWA KLUCZOWE: urazowość, epidemiologia.

Introduction

The recent years of the 21st century are considered to be the time of a constant progress in many fields of our life. Intensified processes of urbanization, industrialization, technological development, new inventions change the nature and the way of everyday life. The reason for

a growth in the incidence of traumas is above all the change in behavior and attitudes towards health. The technological and economic progress, the lack of efficient rest, the pursuit of job or carefree behavior of drivers are only a few factors responsible for the increase in the accident rate within the society [1]. Apart from the global traumatism, mentioned above, more and more frequent injuries sustained during leisure time at home or outside are reported [2]. It is estimated that around one fifth of injuries are so called unintended or accidental injuries sustained in everyday life environment [3].

The phenomenon of growing traumatism is forcing the public health sector to undertake actions in order to provide specialized and multidirectional medical assistance in short time after trauma. Acquiring and developing the knowledge of epidemiology in terms of the accident rate seems to be the right way to plan and implement preventive measures and control the traumatism among the younger population.

The assessment of the phenomenon of traumatism in the chosen population of the Świętokrzyskie Province and the description of traumatism in the separate age groups, in the population of women and men in summer and winter seasons.

Material and methods

The research method adopted in this study was based on a diagnostic survey as well as on the analysis of medical documentation. Detailed analysis of the medical documentation of the Outpatient Ambulatory Surgical Clinic Artimed in Kielce in the years 2010–2012 was carried out. The medical documentation related to patients of both sexes in the 18–89 age range, living in the Świetokrzyskie Province, who in the years 2010 -2012 sustained an injury and reported to the Outpatient Ambulatory Surgical Clinic Artimed in Kielce. Detailed analysis included the selected injuries of the musculoskeletal system and injuries of the bone fragments of the chest. This selection was dictated by the possibility of a clear diagnosis of injuries related to the skeletal system of the chest and limbs. The injuries were rated as follows:

- Fracture of the rib (ribs) – S22
- Fracture of the shoulder and arm – S42
- Dislocation of the shoulder girdle – S43
- Fracture of the forearm – S52
- Dislocation of the elbow joint – S53
- Fracture of the wrist and hand area – S62
- Dislocation of the wrist and hand area – S63
- Fracture of the shank including ankle – S82
- Dislocation of the knee joint – S83
- Fracture of the foot – S92
- Dislocation of the ankle – S93.

Results

Demographic description of the surveyed population in the Świętokrzyskie Province is presented in **Table 1**. The traumatism over the years 2010–2012 shows a tendency for growth in every age group. The young people are most exposed to injuries. In the year 2012 injuries of the musculoskeletal system and injuries of the bone fragments of the chest were reported in almost 37% of patients in the 18–29 age range and in every fifth patient in the 30–39 age range. There is a clear downward trend in the traumatism of older age groups. In the population of people in the 80–89 age range injuries of the musculoskeletal system and chest accounted for 2% of post-traumatic notifiability.

Table 1. Injuries of the musculoskeletal system and bone fragments of the chest in the separate age ranges

Age	2010		2011		2012	
	N	%	N	%	N	%
18 – 29	884	36.0	935	36.4	1006	36.7
30 – 39	449	18.3	546	21.2	555	20.3
40 – 49	335	13.6	340	13.2	351	12.8
50 – 59	420	17.1	365	14.2	415	15.1
60 – 69	231	9.4	222	8.6	254	9.3
70 – 79	98	4.0	105	4.1	112	4.1
80 – 89	39	1.6	59	2.3	47	1.7
Total	2456	100.0	2572	100.0	2740	100.0

Source: author's own analysis

The analysis of data related to the types of injuries of the surveyed population in the Świętokrzyskie Province has shown that the most frequent post-traumatic damage in the years 2010–2012 were dislocations (**Table 2**). In over 34% of people they related to an ankle. The other reason for frequent notifiability to an outpatient clinic were dislocations of the radiocarpal joint and hand area, which in the year 2012 were reported in over 14% of the surveyed population. Fractures accounted for a lower percentage of injuries of the surveyed population. In the year 2012 fractures most frequently related to the wrist and hand area bones and were reported in 9% of ambulatory patients. The smallest percentage of injuries, a bit over 1%, were diagnosed within the bone fragments of the chest and the elbow joint (**Table 2**).

Table 2. Types of injuries of the population in the Świętokrzyskie Province

Types of injuries	2010		2011		2012	
	N	%	N	%	N	%
S22	19	0.8	35	1.4	36	1.3
S42	54	2.2	45	1.7	57	2.1
S43	66	2.7	79	3.1	75	2.7
S52	219	8.9	237	9.2	221	8.1
S53	44	1.8	55	2.1	29	1.1
S62	272	11.1	252	9.8	246	9.0
S63	307	12.5	376	14.6	391	14.3
S82	75	3.0	94	3.7	119	4.3
S83	325	13.2	310	12.1	364	13.3
S92	187	7.6	196	7.6	226	8.2
S93	888	36.2	893	34.7	976	35.6
Total	2456	100.0	2572	100.0	2740	100.0

Source: author's own analysis

Over the years of the study no significant differences in traumatism between the population of women and men in the Świętokrzyskie Province were observed. Traumatism related to 49.1% of women and 50.9 % of men. These relations are shown in **Table 3**.

Table 3. Traumatism of the population of women and men in the Świętokrzyskie Province in the years 2010–2012

Gender	2010		2011		2012	
	N	%	N	%	N	%
Female	1184	48.2	1211	47.1	1343	49.1
Male	1272	51.8	1361	52.9	1396	50.9
Total	2456	100.0	2572	100.0	2740	100.0

Source: author's own analysis

Both in the population of women and men dislocations of the ankle constituted the main problem of surveyed traumatism. However, they related more frequently to the group of women. In the year 2012 dislocations of the ankle were diagnosed in 37% of women and in over 34% of men. The second most frequently registered post-traumatic damage was dislocation of the wrist and hand area. In the year 2012 they related to around 13 % of women and 15% of men.

The differences in traumatism trends of women and men are clearly seen among the registered fractures. Fractures of the forearm bones were reported almost three times more often in women than men, and they accounted for around 12% of traumatism in women and for 4% of traumatism in men. Whereas, men nearly two times more often than women reported to an outpatient clinic because of the fracture of the wrist and hand area (**Table 4**).

Damage within the bone fragments of the chest and dislocations of the elbow joint, which related to around 1% of people in each population, may be considered incidental results of traumas among women and men (**Table 4**).

Table 4. Types of injuries of women and men's population

Types of Injuries	2010		2010		2011		2011		2012		2012	
	F	F	M	M	F	F	M	M	F	F	M	M
	N	%	N	%	N	%	N	%	N	%	N	%
S22	6	0.5	13	1.0	11	0.9	24	1.8	17	1.2	22	1.4
S42	34	2.9	20	1.6	31	2.6	14	1.0	29	2.2	28	2.0
S43	26	2.2	40	3.1	31	2.6	48	3.5	26	1.9	49	3.5
S52	140	11.8	79	6.2	153	12.6	84	6.2	158	11.8	63	4.5
S53	21	1.8	23	1.8	27	2.2	28	2.1	15	1.1	14	1.0
S62	87	7.3	185	14.5	75	6.2	177	13.0	65	5.8	181	13.0
S63	160	13.5	147	11.6	179	14.8	197	14.5	181	13.5	210	15.0
S82	28	2.4	47	3.7	50	4.1	44	3.2	63	4.7	56	4,0
S83	133	11.2	192	15.1	129	10.7	181	13.3	167	12.4	197	14.1
S92	92	7.8	95	7.5	96	7.9	100	7.3	125	9.3	101	7.2
S93	457	38.6	431	33.9	429	35.4	464	34.1	497	37.0	479	34.3
Total	1184	100.0	1272	100.0	1211	100.0	1361	100.0	1343	100.0	1396	100.0

Source: author's own analysis

In the years 2010–2011 the higher traumatism rate was observed in the summer season. However, already in the year 2012 the number of injuries of the adult population was comparable both in summer and winter seasons (**Table 5**). In both seasons the most frequently diagnosed post-traumatic damage was dislocation of the ankle. In the summer season dislocations of the ankle related to nearly 40% of people in each year (**Table 5**).

Table 5. Traumatism of the summer and winter seasons in the years 2010–2012

Season	2010		2011		2012	
	N	%	N	%	N	%
Summer	1279	52.1	1387	53.9	1369	50.0
Winter	1177	47.9	1185	46.1	1371	50.0
Total	2456	100.0	2572	100.0	2740	100.0

Source: author's own analysis

In the winter season dislocations within the knee joint area as well as dislocations of the radiocarpal joint and hand area prevailed, and were related to around 14% and 15% of the surveyed population respectively. In both seasons around 9% of ambulatory patients were treated due to the fractures of wrist and hand bones. Damage of the bone fragments of the chest and dislocations of the elbow joint accounted for around 1% of the diagnosed traumas in each season (**Table 6**).

Table 6. Injuries in the summer and winter seasons in the years 2010–2012

Types of injuries	2010		2010		2011		2011		2012		2012	
	S.	S.	W.	W.	S.	S.	W.	W.	S.	S.	W.	W.
	N	%	N	%	N	%	N	%	N	%	N	%
S22	12	0.9	7	1.0	13	0.9	22	1.9	18	1.3	18	1.3

S42	28	2.2	26	2.2	20	1.4	25	2.1	21	1.5	36	2.6
S43	22	1.7	44	3.7	37	2.7	42	3.5	35	2.6	40	2.9
S52	100	7.8	119	10.1	116	8.4	121	10.2	95	6.9	126	9.2
S53	20	1.6	22	2.0	28	2.0	27	2.3	14	1.0	15	1.1
S62	141	11.0	131	11.1	133	9.6	119	10.0	128	9.3	118	8.6
S63	153	12.0	154	13.1	175	12.6	201	17.0	181	132	210	15.3
S82	37	2.9	38	3.2	42	3.0	52	4.4	53	3.9	66	4.8
S83	157	12.3	168	14.3	181	13.1	129	10.9	169	12.4	195	14.2
S92	109	8.5	78	6.6	117	8.4	79	6.7	131	9.6	95	6.9
S93	500	39.1	385	32.7	525	37.9	368	31.0	524	38.3	452	33.1
Total	1279	100	1177	100	1387	100	1185	100	1369	100	1371	100

Source: author's own analysis

Discussion

The results of conducted research have shown that over the years 2010 – 2012 the surveyed traumatism relate mostly to the young population of the Świętokrzyskie Province. Injuries of the musculoskeletal system constitute one of the major cause of the adult population reporting to the Outpatient Ambulatory Surgical Clinic Artimed in Kielce. Dislocations of the ankle are among the most frequently diagnosed post-traumatic damage. Fractures constitute a smaller percentage of surveyed injuries. In women fractures of the forearm bones prevail while in men fractures of the wrist and hand area bones are most frequently reported. The smallest percentage of injuries accounted for the damage within the bone fragments of the chest and dislocations of the elbow joint. No significant differences in traumatism between the popultion of women and men and between the summer and winter seasons were revealed.

Garlicki J. in his article describes the problem of a growth in the incidence of traumas in the adult population. The reason for this phenomenon according to the author is the change in lifestyle and showing risk behavior in everyday life [1]. Apart from global traumatism caused by changes in the socio – cultural sphere, injuries sustained in the nearest surroundings are more and more frequently reported. It is estimated that around one fifth of injuries are so called accidental injuries sustained in everyday life environment [3].

The Central Statistical Office (GUS) data from the year 2012 show that in Poland accidents account for nearly 60% of all deaths. In the EHIS study carried out in Poland (EHIS – European Health Interview Survey) the incidence of traumas during the last 12 months was investigated. The study has shown that every 20th Pole sustains an injury, and those injuries are more frequently registered in the group of men than women. It is also documented that most frequently (in over 925 thousand persons) an injury was sustained at home or during leisure time [4]. The GUS survey study of health protection on farms has shown that men two times more often (8.5%) required post-traumatic assistance in a stable medical institution than women (4.1%) [5]. Citing the GUS once again, it needs to be emphasized that the external injuries most frequently relate to the population of people in the 15–50 age range, similarly to the situation among the population of the Świętokrzyskie Province [6].

According to the European Statistical Office (Eurostat) in the year 2012 up to 153 thousand people died of sustained trauma, which accounted for 3% of the total mortality. Higher rates of post-traumatic mortality characterized more often the group of men (3.7%) than women (2.4%) [7].

The EHIS study carried out in the years 2006–2010 within the population of EU member countries has shown that traumatism sustained at home, at school or during physical activities relates to around 3.5% of the population, among such countries as Greece, Poland or Cyprus. The high traumatism rate, around 7.5% related to Slovakia, Czech Republic and Slovenia, in which it amounted to 8%. The study has also revealed that there is no significant difference in traumatism between the population of women and men, however it is more frequently observed in the group of men. According to the EHIS study, injuries sustained during everyday activities at home or outside demonstrate a tendency for growth in the 15 – 34 age range groups. This study revealed the high traumatism rate in people at the age of 75 or more, which characterized Poland and some other countries [4].

According to the WHO data, the external injuries are the cause of 5 million deaths yearly and account for 9% of the mortality all over the world [8, 9]. The fact that traumas most frequently relate to people in the productive age who are socially and vocationally active is an alarming phenomenon. The young men are a group which is especially prone to traumas. By the way, it should be emphasized that traumas are also the cause of different types of disabilities both permanent and temporary [8, 9, 10, 11].

Similar research, describing the traumatism in the adult population, was carried out in the year 2006 in one of the departments of the 6. Military Hospital in Dęblin. The results of this research showed the similar layout of traumas among the population in the separate age groups, i.e. high frequency of the incidence of traumas in the young people group and a very small number of injuries among people over 80 years of age [12].

As the analysis of own research shows dislocations of the ankle were the most frequent post-traumatic damage in the surveyed population. The authors of other studies show the strong correlation between the ankle joint injuries and the physical activity. They point out that the ankle joint contusions most frequently re-

late to the young people who display different forms of physical activity. It is estimated that acute ankle joint injuries relate to the group of young sportsmen in the 10–30% range [13,14]. According to some researchers, the ankle joint injuries in western countries relate to 1 out of 10.000 inhabitants, whereas among active people these indicators are higher [15].

Own research has shown that the smallest percentage of diagnosed traumas, a bit more than 1%, related to the damage within the bone fragments of the chest and the elbow joint. As the specialist literature states, the chest injuries and the multiorgan trauma often overlap, while the multiplicity of accompanying complications constitutes a potential life threat. According to the statistical data, the chest injuries account for 1,6–16% of all body injuries. The low incidence of the chest and the elbow joint damage presented in the study results mainly from the limited diagnostic and medical capacities of the Outpatient Ambulatory Surgical Clinic Artimed in Kielce. Due to the nature of accompanying complications, the chest injuries required specialist in-hospital medical treatment [16, 17].

On account of the complexity of trauma and the specificity of the structure, the elbow joint damage belongs to the injuries requiring in-hospital care in the rescue unit [1]. According to Lasanianos N. and Garnavos Ch. [18] the elbow dislocations, which are registered with a similar frequency in the population of both women and men, constitute the second most common trauma of big joints [19].

Conclusions

1. Young men who are socially and vocationally active are a group which is especially prone to traumas.
2. Gender of the respondents as well as seasons of the year do not influence the traumatism rates.
3. It is advisable to intensify preventive measures based on knowledge and the results of current research in order to create prophylactic programs directed to the social groups which are most exposed to traumatism.

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POLISH MIDWIVES' OPINION ON THE POSSIBILITY OF PRACTICING INDEPENDENTLY IN THE PROFESSION

OPINIA POŁOŻNYCH NA TEMAT MOŻLIWOŚCI SWOBODNEGO PRAKTYKOWANIA W ZAWODZIE

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ABSTRACT

Aim. To evaluate whether midwives from the West-Pomeranian province work as independent professionals under the Polish legislations regulating their profession.
Material and methods. Qualitative research (questionnaire) was used to gain an understanding of the independence of the midwifery profession in Poland. Midwives from hospitals and universities in the West-Pomeranian province, Poland, were studied. We surveyed 115 midwives from October 12, 2009 to June 30, 2010.
Results. Despite different job seniorities, the majority of surveyed midwives (73%) considered their profession as independent in the eyes of the law. When asked about the serious obstacles for independent midwifery practice, 49.6% of midwives stated a lack of knowledge about independent midwife competencies by other medical professionals, while 47% of midwives reported the lack of consistent legal regulations as a major hurdle. Other reasons included insufficient supply of medical equipment (41.7%), no legal authorization to write medical prescriptions (40.8%), and a lack of partnership and cooperation with other medical professionals (40.8%).
Conclusions. Currently there are several obstacles to overcome in order for midwifery to become a fully independent practice in Poland, including a lack of consistent regulations and knowledge about midwife competencies. Educational programs for other healthcare professionals, focused on midwife competencies, would benefit the midwifery profession. Similarly, informative training on midwifery competencies should be introduced as part of undergraduate and postgraduate education for healthcare professionals. In-depth analysis of currently enforced legislation relating to the midwifery profession should be performed and altered to make it more consistent.

KEYWORDS: midwives; independent profession; Poland; competencies; legislation.

STRESZCZENIE

Cel. Poznanie opinii położnych z województwa zachodniopomorskiego na temat możliwości swobodnego praktykowania w zawodzie w ramach obowiązującego w Polsce ustawodawstwa zawodowego.
Materiał i metody. Badaniami objęto 115 położnych czynnych zawodowo na terenie województwa zachodniopomorskiego. Badania przeprowadzone były od 1.10.2009 do 30.06.2010 roku.
Wyniki. Większość ankietowanych położnych – bez względu na staż pracy – uważała, że zawód, który wykonuje, jest ustawowo samodzielny. Opinię taką wyraziło łącznie 73,04% badanych położnych. Wśród trudności stanowiących realną przeszkodę w samodzielnym praktykowaniu w zawodzie ankietowane położne najczęściej wskazywały: nieznajomość przez środowisko medyczne samodzielnych kompetencji położnej tj. 49,57%, brak spójnych uregulowań prawnych – 46,09% badanych. Stosunkowo często podawano powody, takie jak: niewystarczające wyposażenie w aparaturę medyczną – 41,74%, niemożność wypisywania recept – 40,87%, a także niemożność współpracy na partnerskich warunkach z innymi podmiotami ochrony zdrowia – 40,87% respondentek.
Wnioski. Korzystnym rozwiązaniem wydaje się stworzenie programów edukacyjnych skierowanych do pracowników ochrony zdrowia o ustawowych kompetencjach położnych, jak również szkolenie z zakresu samodzielnych kompetencji położnych w uczelniach medycznych w trakcie nauczania przeddyplomowego i podyplomowego. Należałoby przeprowadzić dogłębną analizę obowiązujących przepisów prawnych zarówno nadrzędnych w stosunku do ustawodawstwa położnych, jak i tych bezpośrednio dotyczących profesji.

SŁOWA KLUCZOWE: położna, kompetencje zawodowe, opieka okołoporodowa.

Introduction

The midwifery profession is probably one of the oldest and most common social occupations. Midwives possess specialized knowledge and professional ethics, accompanied by manual and clinical skills related to pregnancy and birth. This skills and knowledge are independent of culture, latitude and the historic era. In the past, the activities of people assisting with child-

birth were regulated by tribal practices, or social and religious customs created by rulers or church institutions. However, the midwifery profession has evolved in the majority of countries (including Poland) into an independent medical profession, which is regulated by competent national authorities.

In Poland, midwifery should be a strong and independently regulated profession in the eyes of the public healthcare system and wider society. This regulation should be in line with other perinatal services, which are also supported by public funds. Creating a regulated healthcare system based on these values would allow midwives to practice as independent professionals, and ultimately fulfill the needs of women during pregnancy, childbirth, and family planning.

In this study, we evaluated whether midwives from the West-Pomeranian province were able to work as independent professionals under the Polish legislations regulating their profession.

Material and methods

The whole study was conducted from October 10, 2009 to June 30, 2010 in the town of Szczecin and the West Pomeranian province. All participants signed an informed consent form to participate in the survey. Ethical approval was obtained from the Bioethics Commission of the Pomeranian Medical University before conducting the study [Approval number KB-0080/182/09 from 14.12.2009].

We studied 115 midwives who were all working in closed and open healthcare facilities, in various legally permitted forms, in the town of Szczecin and the wider West Pomeranian province.

As there was no standardized questionnaire in the literature that could be used to achieve the aims of this study, we produced our own survey tool. The questionnaire consisted of three parts. The first part contained five questions relating to the midwife's age, work experience, education level, place of residence and place of work. The second part consisted of seven questions about what midwives knew about the regulations surrounding their profession. These questions tested their knowledge about labor laws that regulate the midwifery profession, as well as more detailed regulations and their own personal competencies. The third part of the survey consisted of twelve questions examining their preferred forms of practicing as a midwife, and the reasons for undertaking those particular forms. The midwives were also asked about the scope of their personal competencies, i.e., whether they found their knowledge broad enough. Finally, midwives were asked to point out particular work activities, which should become additional midwife competencies in their view.

The gathered questionnaires were archived in an electronic form and essential transformations and preliminary calculations were performed in a Microsoft Excel 2007 spreadsheet. Detailed statistical analysis was performed with the use of appropriate modules of the Statistica 7.1 package.

The chi-squared test was used to study the statistical relations between opinions about the profession of a midwife and particular demographic, sociological and work factors. With the use of this test the null hypothesis, saying that there are no statistical differences between analyzed factors, was tested against an alternative hypothesis being its negation. We performed two chi-squared tests: the Pearson's chi-squared test and to validate the results and the likelihood ratio test. The results of both these tests are usually similar. We also determined the degrees of freedom value (df) and the statistical significance (p-value) for each statistical test used. The null hypothesis was rejected when $p < 0.05$ (i.e., the significance threshold chosen in the study). Otherwise, there were no reasons for rejecting the null hypothesis. If a particular subgroup did not qualify to be used for the chi-squared test, it was eliminated from the analysis. When the prerequisites allowing the use of the chi-squared test were not met (i.e., the expected frequencies were less than 5), only an estimation of the remainder based on the contingency table was calculated. We used the tests of proportions for characterizing the surveyed midwives.

Results

Demographics of the midwives

Midwives aged 35–45 years old and 45–55 years old constituted the two major age groups in this study (i.e., 45.2% and 31.3% of respondents, respectively). Approximately, one tenth of the studied midwives were 25–35 years old (11.3%). The youngest and oldest midwives were the least abundant age groups among respondents (7.8% and 4.4%, respectively).

The majority (58.3%) of the surveyed midwives graduated from post-secondary schools or colleges. One fifth of the midwives (20%) achieved a bachelor's degree in midwifery, while 11.3% of midwives obtained a master's degree in midwifery or nursery, and 10.4% had a master's degree in another field of study.

The majority of the analyzed midwives had either 5–15 years (29%) or >25 years (29%) work experience. A slightly less abundant group of midwives (28%) were those with 15–25 years work experience. Finally, only 13% of midwives surveyed had less than 5 years of experience. The vast majority of the respondents had a permanent post in the hospital (87%), while only 2.6%

were on an employment contract. Some midwives (15.6%) of pointed to another form of employment, including working for the Pomeranian Medical University in Szczecin and voluntary service. **Figure 1** represents the distribution of the type of employment of the surveyed midwives.

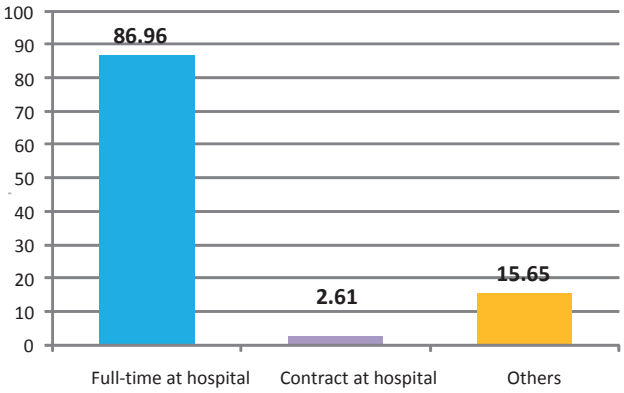

Figure 1. Place of work of midwives surveyed

Source: author's own analysis

Professional independence of the midwives

The midwives surveyed indicated that their level of professional independence depended on their job seniority (i.e., their years of work experience) (**Table 1**). The majority of surveyed midwives (73%) considered their profession as independent in the eyes of the law, irrespective of their seniority and the length of time they had been working in the profession (**Table 1**).

Table 1. Seniority of midwives surveyed and their opinion on the statutory independence of the profession

Midwifery is a statutory independent profession	Up to 5 years		5–15 years		15–25 years		More than 25 years		Total	
	n=15	%	n=34	%	n=32	%	n=34	%	n=115	%
Yes	12	80.00	28	82.35	17	53.13	27	79.41	84	73.04
No	1	6.67	2	5.88	5	15.63	2	5.88	10	8.69
Maybe	1	6.67	1	2.94	1	3.13	1	2.94	4	3.48
Yes, but a doctor is the most important	1	6.67	3	8.82	9	28.13	4	11.76	17	14.78
Total	15	100.0	34	100.0	32	100.0	34	100.0	115	100.0

Source: author's own analysis

Use of professional competencies by the midwives

More than the half (52.9%) of the midwives with 5–15 years of work experience were not always able to use the full spectrum of their competencies at work (**Table 2**). This was the case even in those with work experience of longer than 25 years (44.1%; **Table 2**). On the other hand, 43.7% of midwives with 15–25 years of work experience said they could use their professional competencies to a large extent. However, the difference in opinions between the midwives with differing job seniority were not statistically significant ($p > 0.05$, **Table 3**).

Table 2. Midwives' work experience and the ability to use their professional competencies

Ability to use their professional competencies	Up to 5 years		5–15 years		15–25 years		More than 25 years		Total	
	n	%	n	%	n	%	n	%	n	%
Yes	2	14.28	9	26.4	14	43.75	10	29.41	35	30.70
No	7	50.00	7	20.5	9	28.13	9	26.47	32	28.07
Not always	5	35.71	18	52.9	9	28.13	15	44.12	47	41.23
Total	14	100	34	100	32	100	34	100	114	100

Source: author's own analysis

Table 3. The results of the independence test between midwives' work experience and the ability to use their professional competencies in the workplace

Statistics: use of competence (3) x seniority (4)			
	Chi-square	df	p
Pearson's chi-square	8.963901	df=6	p=0.17563
Chi^2 MLE	8.764994	df=6	p=0.18724

Source: author's own analysis

Obstacles for professional independence

The serious obstacles for independent practice faced by the midwives included the lack of knowledge about independent midwife competencies by other medical professionals (49.6%), and the lack of consistent legal regulations (47%; **Figure 2**). Other reasons for limiting midwife professional independence included: insufficient supply of medical equipment (41.7%), the inability to write medical prescriptions (40.8%), as well as the lack of partnership and cooperation with other medical professionals (40.8%). In addition, every third respondent pointed to economic difficulties (33.9%). Similarly, the inability to prescribe medical leave certificates was reported as a major difficulty to their ability to practice as independent professionals (33%). Only 8.7% of the surveyed midwives claimed that a lack of knowledge and skills was a source of a serious difficulty in practicing as an independent healthcare professional.

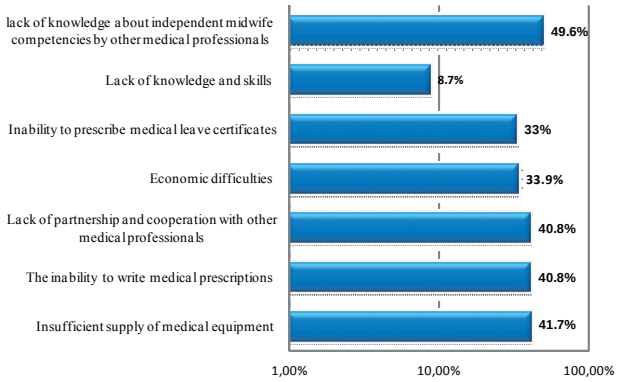

Figure 2. The midwives opinions about the major obstacles limiting their ability to work as independent professionals

Source: author's own analysis

A large number of surveyed midwives (47%) said that despite their work experience, their present competencies were not broad enough (**Table 4**). In midwives with work experience longer than 5 years, a slightly smaller number of respondents were of the opposite opinion, however the difference was not statistically significant ($p > 0.05$; **Table 5**).

Table 4. Seniority of midwives and their opinion on the range of their professional competence

Professional competence of midwives are sufficient	Up to 5 years		5–15 years		15–25 years		More than 25 years		Total	
	n	%	n	%	n	%	n	%	n	%
Yes	3	20.0	12	35.3	12	37.5	12	35.3	39	33.9
No	6	40.0	16	47.1	15	46.9	17	50.0	54	46.9
I do not know	6	40.0	6	17.6	5	15.6	5	14.7	22	19.1
Total	15	100	34	100	32	100	34	100	115	100

Source: author's own analysis

Table 5. Results of the independence test between midwives' seniority and their opinion on professional competence

Statistics: sufficient competence (3) x seniority(4)			
	Chi-square	df	p
Pearson's chi-square	5.245220	df=6	p=0.51277
Chi^2 MLE	4.617452	df=6	p=0.59373

Source: author's own analysis

The majority (63.5%) of the surveyed were of the opinion that midwife competencies should be broadened to allow them to administer more medicines without using medical prescriptions (**Figure 3**). Quite a large group of midwives were of the opinion that, to a limited extent, midwives should be authorized to write prescriptions. Only 28.7% of respondents said that midwives should have the legal right to write certificates for incapacity for work (i.e., medical leave certificates).

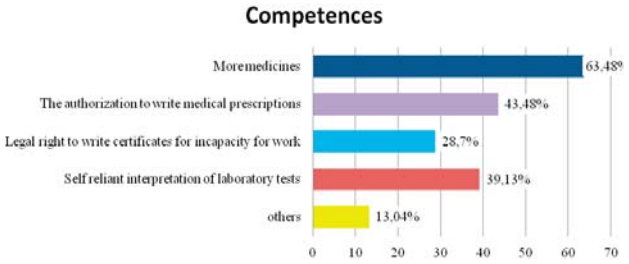

Figure 3. Range of midwives' competence for which it should be expanded in opinion of midwives surveyed

Source: author's own analysis

Discussion

Based on the currently enforced legal regulations in Poland, one can describe the competencies of the profession of midwife as broad. Bączek (2007) points out that comprehensive competencies are related to the midwives' ability to work independently on the basis of their gained education and knowledge. Bączek states that independent competencies of a midwife should refer to the four areas of work activity: thinking, acting, taking decisions and learning (Bączek, 2007). In addition, Piórkowska reported that considering the autonomy and independence of the midwifery profession, no other profession should be controlling or competing with it (Piórkowska, 1998). In line with this, our study found that 73% of the midwives from the West Pomeranian province considered their profession as independent in the eyes of the law.

The emancipation of the midwifery profession has been ongoing (Hamer, 1998). It has taken place against the backdrop of market economy, a relatively new phenomenon that also applies more broadly to the health services (Nowak, 1997). This transformation is influencing many aspects of midwifery, including: legal regulations, postgraduate and undergraduate education, relations with other medical professionals, and interrelations within the midwifery profession. The social image of midwives and patient knowledge about this profession are also slowly changing. These changes provide hope for a better future for midwives, but there are still some obstacles to overcome.

Stromerova (2006) (a Bohemian midwife) is of the opinion that the improvement of the midwife profession in Poland may result from working within the international definition of the profession and keeping appropriate legal boundaries, as well as showing professionalism, ongoing learning and development, a focus on ethics, good relations within the working environment, and an

efficient flow of information. Therefore, in Stromerova's view, there should be an efficient flow of information between different professional bodies functioning in the same country (Stromerova, 2006). Other factors raised by Stromerova include: finding and gathering public funds, the operation of people with the so-called vocation, and taking up new challenges.

In this study, midwives from West Pomerania province were not always able to use their full spectrum of competencies at the place of work. In addition to age, job seniority and education, the surveyed midwives reported economic problems and insufficient supply of medical equipment as obstacles to independent practice. Some midwives also pointed to a lack of social demand as an obstacle to undertaking independent actions. Other problems influencing independent practice involved a lack of knowledge about independent midwife competencies by other medical professionals, a lack of consistent legal regulations, a lack of authorization to write medical prescriptions, a lack of partnership and cooperation with other medical professionals, and an inability to write medical leave certificates. Only a small number claimed that a lack of knowledge and skills affected their ability to practice as independent healthcare professionals.

Similar to our findings, previous studies by Bączek (2007) pointed to social, cultural and economic factors as hurdles facing midwives, and Jędrzejewska (2006) recognized the conflict for legally enforced professional independence with other healthcare providers or embarrassingly low earnings. Jędrzejewska (2006) pointed out that midwives from other European countries had similar dilemmas to Polish midwives but these had been overcome, presumably due to the midwives' determination and professionalism.

Kołtunowicz and Bączek (2005) surveyed 72 midwives from Warsaw and obtained results similar to those presented here. More than half of the respondents confessed they had problems with professional independence (Kołtunowicz and Bączek, 2005). The midwives working in Warsaw expressed the opinion that problems with professional independence are related to enforced regulations, the lack of cooperation with physicians, and insufficient supply of basic medical equipment (Kołtunowicz and Bączek, 2005). Unlike the midwives from West Pomerania province surveyed here, the respondents from Warsaw did not mention insufficient professional training as an obstacle to their practice (Kołtunowicz and Bączek, 2005).

In this study, midwives expressed the opinion that their competencies should be broadened to allow them to administer more medicines without medical prescriptions or they should be authorized to write prescriptions to a limited extent. The legal right to write medical certificates for incapacity to work was not raised as an additional competency by the majority of midwives in this study. These opinions of the West Pomeranian province midwives are similar to the expectations of other women from the same area, who were also asked in this study to point out activities or rights that should be introduced into the scope of midwives' professional competencies (data not shown).

Conclusions

1. A beneficial solution to improve midwifery independence would be to create educational programs for healthcare professionals focused on midwife competencies under the currently enforced statutory laws. Another advisable strategy would be to introduce informative training that explains independent midwife competencies as a part of undergraduate and postgraduate academic education for healthcare professionals.
2. An in-depth analysis of the currently enforced legislation and acts that regulate the midwifery profession should be performed.

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PSYCHOLOGICAL TERROR AS TODAY'S TSUNAMI OF THE WORKING ENVIRONMENT ON THE EXAMPLE OF THE FEMALE NURSE, MALE NURSE AND MIDWIFE'S PROFESSIONS – RESEARCH PERSPECTIVE

TERROR PSYCHICZNY JAKO WSPÓŁCZESNE TSUNAMI ŚRODOWISKA PRACY NA PRZYKŁADZIE ZAWODU PIELĘGNIARKI, PIELĘGNIARZA I POŁOŻNEJ – PERSPEKTYWA BADAWCZA

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ABSTRACT

Aim. The purpose of this publication is an attempt to show the scale and scope, as well as forms, manifestations and consequences of mobbing in the group of female nurses, male nurses and midwives working in open and closed treatment in Poznan hospitals.
Material and methods. The test results were collected by the diagnostic survey using a questionnaire survey and a narrative and free interview in the group of 42 randomly selected employees.
Results. The ¾ (i.e. 66.7%) of the total researched persons experienced mobbing in the workplace. In turn, based on H. Leymann's criterion, 12% of respondents out of the total surveyed were considered as psychological abuse cases. In the opinion of respondents it is vertical mobbing, i.e. mobbers are superiors (83.3%). Victims of mobbing have usually experienced harassment and abuse, personal intimidation and physical violence at work. The most common 'tools' of psychological violence are: excessive workload, ignoring, excluding or boycotting.
Conclusions. People experiencing psychological abuse frequently meet vertical mobbing, which may show dysfunctions in the process of human resources management and the necessary need for remodelling the organization culture in the workplaces. This remodelling will be the form of implementing anti-mobbing prevention in the researched environment.

KEYWORDS: mobbing, psychological terror, female nurses, male nurses, midwives.

STRESZCZENIE

Cel. Celem niniejszej publikacji jest próba ukazania skali i zasięgu oraz form, przejawów, jak również konsekwencji zjawiska mobbingu w grupie zawodowej pielęgniarek, pielęgniarzy i położnych, zatrudnionych w lecznictwie otwartym i zamkniętym w szpitalach na terenie miasta Poznania.
Materiał i metody. Wyniki badań zebrano metodą sondażu diagnostycznego z użyciem kwestionariusza ankiety i wywiadu narracyjnego oraz swobodnego w grupie 42 losowo wybranych pracowników.
Wyniki. W opinii ¾ (tj. 66,7% wskazań) ogółu badanych osób doświadczyli oni w swoim miejscu pracy zjawiska mobbingu. Z kolei bazując na kryterium H. Leymanna, za przypadki dręczenia psychicznego spośród ogółu badanych uznano 12 procent respondentów. W opinii respondentów występuje mobbing wertykalny, tzn. mobberami są przełożeni (83,3% wskazań). Ofiary mobbingu najczęściej doświadczyły nękania i dręczenia poprzez pracę, osobistego zastraszania oraz przemocy fizycznej. Najczęściej stosowanymi „narzędziami" przemocy psychicznej są: obciążanie nadmierną ilością pracy, ignorowanie, wykluczanie lub bojkotowanie.
Wnioski. Osoby doświadczające dręczenia psychicznego najczęściej spotykają się z mobbingiem wertykalnym, co może świadczyć o dysfunkcjach występujących w procesie zarządzania zasobami ludzkimi oraz niezbędnej potrzebie przemodelowania kultury organizacji w środowiskach, w których pracują badane osoby. Przemodelowanie to będzie formą wprowadzenia profilaktyki antymobbingowej w badanym środowisku.

SŁOWA KLUCZOWE: mobbing, terror psychiczny, pielęgniarki, pielęgniarze, położne.

Introduction

The reason for writing this article was the following thought: People in the era of formality and computerization cease '*to be*' – *to* be honest, fair, affectionate, sensitive to truth, beauty, and social values [1]. In the socio-axiological dimension people, unfortunately, de-

viate from the 2500 years old rule of social coexistence and head for excitement with evil '*...on an unimaginable scale crossing endless barriers of severe, precise, complex crimes directed against another person, preparing the other people an inhuman fate in the antropospheric universe*' [2]. The above reflection became simultaneously the voice in the discussion about modern pathologies in the workplace on the example of psychological mobbing aimed at nurses and midwives. This manuscript is a compilation. Theoretical issues concerning definitions, forms, causes, magnitude, course and consequences of the analysed phenomenon were compared with the results of empirical data, collected in one of Poznań hospitals.

The problem of abnormal and deviant behaviours including the ones in the working environment is not a new phenomenon. On the maps of human history numerous examples of such behaviours have been preserved, ranging from family and peer groups to employees. The 21st century man bears the imprint of subsequent new dramaturgy of experiences that have their source in psychological terror arising within several decades in the world and more than ten years in Poland in the working environment. In this context, theorists handling the present issue began to take a closer look at this phenomenon, analyze its sources, as well as psychological, organizational and social consequences.

Basic concepts

A starting point for considerations on mobbing in the working environment is the etymological origin of the word '*mob*' (used as a noun). In English it means 'crowd, rabble, riffraff', i.e. a larger group of people who, acting together, harass their victim. The English verb '*to mob'* means 'to jerk, attack,harass, besiege, gather (around someone)' [3]. Mobbing in the normative sense '*... means the actions or behaviour related to an employee or directed against an employee, consisting in persistent and prolonged harassment or intimidation of an employee, causing his/her underestimation and aiming at his/her humiliation, isolation or elimination from the team of colleagues'* [4]. This definition shows that the idea of mobber's actions is the use of psychological abuse. In turn, Swedish psychiatrist and psycho-sociologist, an expert in the field of mobbing, H. Leymann defines this phenomenon as: ' (...) *psychological terror in the workplace that engages the hostile and unethical communication (using insults, invectives, slanders, shouting, etc. in daily contacts at work) systematically sustained by one or more people against another, which in turn pushes the victim to the position which makes him/her impossible to defense. These activities happen frequently (at least once a week) and they last for an extended period of time (at least half a year). Due to the duration and frequency of abuse, this results in abnormalities in the realm of the psyche, physical health and social functioning of the victim, causing inability to defend the existing job and find a new one*' [5]. H. Leymann as a precursor of research on mobbing in his original definition points to the three basic criteria that charcterize mobbing. They are: the duration of terror, the repeatability of mobbing actions and the existence of mobber's negative intentions (that is the person who carries out mobbing actions).

The process of mobbing is also divided into nine stages, which were distinguished by F. Glasl as follows:

- phase I – the attempt of cooperation and the formation of incidental stresses;
- phase II – polarization of positions and the style of discussion;
- phase III – interaction through deeds, not words;
- phase IV – fear for reputation and coalition;
- phase V – a loss of face (status) and moral outrage;
- phase VI – dominance and accumulation strategies based on fear;
- phase VII – systematic destructive campaigns against the opposite party;
- phase VIII – attacks against the emotional balance of the enemy;
- phase IX – total destruction and suicide [6].

Moreover, as follows from literature analysis, the phenomenon of mobbing occurs in working environments with strong subordination. These are, in particular, hotel and catering industry, military, police or education institutions. The group also includes employees of hospitals and other institutions of medical care. Therefore, the research focuses on signs, forms, extent and consequences of mobbing in the professional group of female and male nurses. The scientific literature shows that health care workers are also a significant group exposed to various forms of mobbing behaviours. The above reflections are confirmed, in particular, by research conducted in 2005 by Buchan et al. They imply that female nurses are victims of violence three times more often than other professionals in the field of healthcare [7].

Aim

Healthcare, including nurses and midwives is one of the professional groups in Poland more exposed to mobbing despite the fact that the employer's duty is to prevent mobbing (art. 94, paragraph 1, Labour Code). The aim of the manuscript was an attempt to show the scale, scope, forms, signs, and consequences of mobbing in the group of professional female nurses, male nurses and midwives working in open and closed treatment in Poznan hospitals.

Material and methods

Based on the words of American sociologist, H. Blumer, '... the nature of researched reality determines the measures used – methods and techniques for obtaining data, and not vice versa' (see Hałas 1994:49). In view of the above, the perceptive key of adopted theoretical methodology will be a diagnostic survey method with the use of a questionnaire survey and a narrative interview as well as a free interview in the group of 42 randomly selected nurses and midwives working in open and closed treatment in Poznan hospitals. The respondents met the established criteria for the sample selection. Applied methodological triangulation in the authors' intention is to contribute to the far-reaching objectivity of the issue discussed.

Results

Results presented in this part of the publication are based on previously accepted theoretical methodology. Respondents were 42 people working in positions of midwives, female and male nurses in open and closed treatment in Poznan hospitals. Among respondents there were 37 women and 5 men.

The research was based on the so-called rigorous criterion of H. Leymann, according to which victims of such abuse were considered only those people who were exposed to at least two out of a list of twenty-two negative actions, repeated at least once a week and lasting at least six months [8]. In accordance with the above criterion, 12% of respondents out of the total number of respondents were considered psychological abuse cases. The rest of the people experienced harassment at work or another form of aggression besides mobbing.

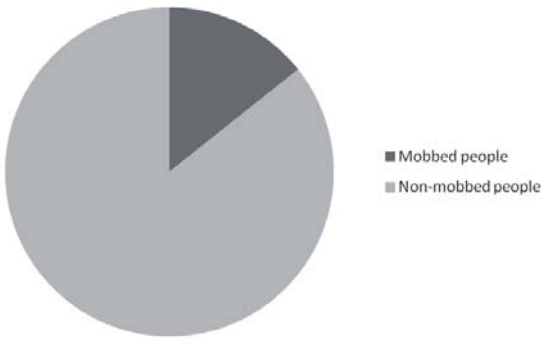

Figure 1. The percentage of mobbed and non-mobbed people according to the criterion of H. Leymann

Source: authors' own research

Results of analyses concerning the mobbers' position show that in the vast majority there is vertical mobbing, i.e. mobbers are superiors (83.3% of indications), and only one person considered a victim of psychological violence pointed to a colleague. This behaviour is defined as horizontal mobbing (**Table 1**). Obtained estimations clearly indicate pathologies in the organization cultures and, above all, dysfunctions arising in the process of human resource management.

Table 1. The position of the mobber

Mobber's position	Mobbed persons	
	Frequency	%
Superior	5	83,3
Employee	1	16,7
Total	6	100,0

Source: author's own research

Significant findings are supplied by analyses of respondents' answers regarding general feelings of being psychological abuse victims (**Table2**). Respondents were asked to answer the question: Did you experience mobbing at work in the last six months? Respondents had at their disposal the same five-step scale of responses from 'I was not mobbed' to 'nearly every day'. More than ¾ of the total number of respondents have the feeling of being mobbed in the workplace (66.7% of indications) several times a week or every day (30.9% and 35.8% of votes, respectively).

It should be emphasized that while among people from the first group, 83.3% of the respondents have a feeling that they experience mobbing at work every day or several times a week, among respondents not considered victims of psychological harassment 66.7% of indications were reported.

Table 2. The feeling of being a victim of mobbing

Frequency	Mobbed		Non-mobbed		Total	
	Frequency	%	Frequency	%	Frequency	%
Not	0	0	4	11,1	4	9,5
Yes, but rarely	0	0	3	8,3	3	7,1
Yes, from time to time	1	16,7	6	16,7	7	16,7
Yes, several times a week	1	16,7	12	33,3	13	30,9
Yes, almost every day	4	66,6	11	30,6	15	35,8
Total	6	100,0	36	100,0	42	100,0

Source: authors' own research

It should be noted that, according to the adopted criterion of H. Lehmann, 12% of respondents were considered victims of mobbing. Overrepresentation of persons having the feeling of being mobbed in relation to the facts may result from deficit of respondents' knowledge of mobbing, which means inappropriate or incorrect understanding and interpretation of the analysed

phenomenon or subjective feelings of respondents as well the ambiguity of the term 'mobbing'.

Another important issue was the identification of mobbing behaviours in respect of persons recognized as victims of mobbing and the evaluation of the degree of these people's impact on mobbing actions in their workplace. For this purpose the Negative Acts Questionnaire (NAQ) of S. Einarsena and B.I. Raknes was used. The questionnaire contains a description of negative actions which the respondents might encounter at work (with no reference to mobbing). Each of the respondents was asked to choose out of 22 points (on a five-step scale: '*never', 'once a month or less than several times a month', 'once a week or more often' and 'every day*') these actions and behaviors that the mobber used in relation to them.

For the purposes of this analysis, the two most common positions were summed up, which, in the opinion of this questionnaire (NAQ) authors, were important for identifying victims of mobbing. These were indications: '*once a week or more often'* and '*every day'*. The distribution of these responses is presented in **Table 3**.

Table 3. Forms of mobbing impacts among the victims of mobbing

No	Negative action (behaviour)	Never		Once a month or less		A few times a month		Once a week or less		Every day	
		N	%	N	%	N	%	N	%	N	%
1.	Concealing information affecting the results of work	0	0.0	1	16.7	1	16.7	2	33.3	2	33.3
2.	Humiliating and ridiculing in connection with work	0	0.0	0	0,0	1	16.7	2	33.3	3	50.0
3.	Delegating tasks below competences	1	16.7	1	16.7	1	16.7	1	16.7	2	33.3
4.	Taking away responsibility	0	0.0	1	16.7	0.0	0.0	2	33.3	3	50.0
5.	Spreading gossip and rumours about the employee	0	0.0	1	16.7	1	16.7	2	33.3	3	50.0
6.	Ignoring, excluding or boycotting the employee	0	0.0	0	0,0	0	0.0	2	33.3	4	66.6
7.	Uttering abusive or offensive comments relating to the employee	1	16.7	0	0,0	1	16.7	2	33.3	2	33.3
8.	Crying, showing anger, rage	0	0.0	1	16.7	1	16.7	2	33.3	2	33.3
9.	Intimidating in the form: violating the private space, pushing, blocking	1	16.7	1	16.7	1	16.7	2	33.3	1	16.7
10.	Allusions or signals from others that the employee needs to leave	0	0.0	1	16.7	0	0.0	1	16.7	4	66.6
11.	Recalling mistakes repeatedly	1	16.7	1	16.7	1	16.7	1	16.7	2	33.3
12.	Ignoring or receiving the employee with hostility	1	16.7	1	16.7	1	16.7	2	33.3	1	16.7
13.	Criticizing work and efforts constantly	0	0.0	1	16.7	1	16.7	2	33.3	2	33.3
14.	Ignoring views and opinions	0	0.0	0	0.0	2	33.3	2	33.3	2	33.3
15.	Playing jokes	0	0.0	4	66.6	0	0.0	1	16.7	1	16.7
16.	Delegating tasks with aims impossible to reach or deadlines impossible to meet	1	16.7	1	16.7	2	33.3	1	16.7	1	16.7
17.	Putting unfounded accusations	1	16.7	1	16.7	1	16.7	1	16.7	2	33.3
18.	Excessive monitoring of work	1	16.7	0	0.0	1	16.7	1	16.7	3	50.0
19.	The pressure not to demand anything the employee is empowered to	0	0.0	0	0.0	1	16.7	1	16.7	4	66.6
20.	Frequent teasing and sarcastic comments	0	0.0	1	16.7	1	16.7	2	33.3	2	33.3
21.	Excessive workload	0	0.0	0	0.0	0	0.0	2	33.3	4	66.6
22.	Threatening with physical violence or actual physical abuse	0	0.0	1	16.7	3	50.0	1	16.7	1	16.7

Source: authors' own research

The results of the research show that the most frequent forms of mobbing given by respondents are: negligence, exclusion or boycott of the employee, allusions or signals from others that the employee needs to leave, pressure suggesting that the employee should not demand anything he/she is empowered to and an excessive workload. Four of these mobbing activities were indicated by 66.6% of the persons considered victims of psycho-terror. In turn, 50.0% of indications concerned humiliation and ridiculing in connection with work, and then taking away responsibility and spreading gossips and rumours about the employee. It should be noted that, in the opinion of the respondents, the above forms of mobbing were experienced every day. However, the lowest number of indications, i.e. 16.7%, arising every

day, concerned, in particular, intimidation in the form of pointing the finger, violation of private space, pushing, blocking the way, ignoring or hostile reception of the employee, delegating tasks with aims impossible to reach or deadlines impossible to meet and threatening with physical violence or actual physical abuse.

Summing up, it must be concluded that mobbers' behaviours can be classified into three categories. These are: 1) harassment and abuse through work – according to respondents, behaviours belonging to this group are the most common; 2) intimidation – with fewer respondents' indications; 3) physical abuse – according to respondents, recognized as victims of psychological violence, these actions were the least frequent.

Conclusions

1. Obtained estimations show that the phenomenon of psychological terror in the environment of female nurses, male nurses and midwives is quite common, as more than ¾ of the total surveyed respondents have the feeling of being mobbed (66.7%) several times a week or every week.
2. Based on the criterion of H. Leymann, 12 percent of respondents were recognized as cases of psychological abuse.
3. Research studies show that victims of psychological terror most often encounter those mobbing activities which include harassment and abuse through work. Then they indicate personal intimidation as another manifestation of analyzed behaviours. The lowest number of mobbing victims are exposed to activities related to physical violence.
4. In the opinion of respondents, most commonly used 'tools' of psychological violence are: ignoring, excluding, or boycotting the employee, allusions or signals from the others that the employee should leave, pressure suggesting that the employee should not demand anything he/she is empowered to and an excessive workload.
5. The scale of the analyzed phenomenon and its type (vertical mobbing) may show dysfunctions in the process of human resources management and the necessary need for remodelling the organization culture in the workplaces.
6. Psychological terror at work regardless of its intensity and form is one of the underlying stressors of modern professional environment and can evoke consequences in mental, physical, social and vocational functioning, including motivation to work and its efficiency.
7. Let the following directive thoughts be the conclusion of the authors' analyses: 'Psychological tsunami' due to its toxicity, favours primarily individual disorders because as E. Kuraciński notices, mobbing '*...causes paralysis of activity, reinforces splitting of the personality and regression of the individual identity'* [9]. The whirlwind of this tsunami reaches the organization sphere as well, particularly management, which is the duty one should fulfil and the gift that should be shared – skilfully and to good use, and this requires developing full and real humanity in oneself [10]. The last sphere destroyed by this tsunami is the social one, which in the researched environment is based on social Darwinism, and hence becomes an arena of mobbing actions.

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HEALTH HABITS OF GIRLS OF CHILDBEARING AGE AND THE PREVENTION OF OBESITY, FERTILITY DISORDERS AND OBSTETRIC COMPLICATIONS. A PRELIMINARY REPORT

ZACHOWANIA ZDROWOTNE DZIEWCZĄT W WIEKU PROKREACYJNYM A PROFILAKTYKA OTYŁOŚCI, ZABURZEŃ PŁODNOŚCI I POWIKŁAŃ POŁOŻNICZYCH – DONIESIENIE WSTĘPNE

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ABSTRACT

Introduction. The World Health Organisation has declared obesity and overweight an epidemic of the 21st century. Both obesity and absence of health promoting attitudes are important issues in the context of female reproductive health, a growing problem of fertility disorders, and future obstetric complications.
Aim. The aim of this paper was to obtain information from girls of child-bearing age on their lifestyle, including dietary attitudes in the context of obesity, fertility disorders and obstetric complications that are inherent to dietary habits and lifestyle. The paper aims to find out priorities for actions related to reproductive health promotion.
Material and methods. 93 students of high schools, aged 17–19 years old were enrolled. The study involved a medical survey on the problems girls of childbearing age have. The study was prepared by an interdisciplinary team of doctors (including a sexologist), psychologists, a dietician and teachers. The study also involved the Eating Attitudes Test-26.
Results. 67.74% of the girls confirmed that diet is very important, yet 56.99% ate sweets every day, 36.56% ate fast food every day, and 45.16% had no breakfast before going to school. It was determined that 50.54% did not do any sport, and 38.71% smoked cigarettes. What is more, 30.11% of the girls have at least once been on a weight loss diet, which resulted in inhibition of menstruation in 7.53% of them. Eating attitude disorders were found in 9.68% of the young women enrolled.
Conclusions. The health education standard represented by the girls is low. Their dietary habits are alarming and may in time cause adverse health problems, including overweight and obesity. Furthermore, almost 40% of the young women were smokers and more than half of them failed to exercise, which could prevent obesity, fertility disorders, and obstetric complications.

STRESZCZENIE

Wstęp. Otyłość oraz nadwaga zostały uznane przez Światową Organizację Zdrowia za epidemie XXI wieku. Występowanie otyłości, jak i brak postaw prozdrowotnych to ważne zagadnienia w kontekście zdrowia prokreacyjnego kobiet, narastającego problemu zaburzeń płodności oraz występowania późniejszych powikłań położniczych.
Cel. Celem pracy było uzyskanie informacji od dziewcząt w wieku prokreacyjnym, dotyczących stylu życia, w tym zbadanie postaw wobec odżywiania, w aspekcie problemu otyłości oraz zaburzeń płodności i powikłań położniczych, które są nierozerwalnie ze sobą związane ze sposobem żywienia i stylem życia. Praca ma na celu pokazanie priorytetów dotyczących działań w zakresie promocji zdrowia prokreacyjnego.
Materiał i metody. W badaniach brały udział 93 uczennice szkół średnich, w wieku 17–19 lat. Badania przeprowadzono za pomocą opracowanej przez interdyscyplinarny zespół, składający się z lekarzy (w tym seksuologa), psychologów, dietetyka i pedagogów, ankiety-wywiadu lekarskiego dotyczącej problemów dziewcząt będących w okresie prokreacyjnym. W badaniach wykorzystano także kwestionariusz postaw wobec odżywiania EAT-26 (*Eating Attitudes Test-26*).
Wyniki. Wśród dziewcząt 67,74% twierdziło, że jedzenie jest bardzo ważne, ale jednocześnie 56,99% codziennie spożywało słodycze, 36,56% codziennie zjadało żywność typu fast-food, a 45,16% dziewcząt nie jadło śniadań przed wyjściem do szkoły. Wykazano, że 50,54% nie uprawiało sportu, a 38,71% paliło papierosy. Ponadto 30,11% dziewcząt przynajmniej raz stosowało dietę odchudzającą, w wyniku której u 7,53% z nich doszło do zahamowania miesiączki. Zaburzenia postaw wobec odżywiania stwierdzono u 9,68% młodych kobiet.
Wnioski. Wśród dziewcząt obserwuje się braki w edukacji prozdrowotnej. Niepokojący jest sposób żywienia, który w perspektywie czasu może mieć negatywne konsekwencje zdrowotne, w tym generować nadwagę i otyłość. Ponadto stwierdzono fakt palenia papierosów przez prawie 40% młodych kobiet i nie podejmowanie przez ponad połowę badanych aktywności fizycznej, która pełni istotną rolę w profilaktyce otyłości, zaburzeń płodności i pozwala zapobiec wielu powikłaniom położniczym.

According to the study, women of childbearing age should be provided with an educational programme that would include issues related to appropriate health promoting behaviours. The education should also be aimed to prevent the development of eating disorders which in turn could affect fertility disorders.

KEYWORDS: overweight, obesity, nutrition, eating disorders, fertility, childbearing age, obstetric complications.

Badania pokazują, że kobiety w wieku prokreacyjnym powinny być objęte programem edukacyjnym uwzględniającym zagadnienia dotyczące prawidłowych zachowań zdrowotnych. Edukacja powinna mieć na celu także zapobieżenie rozwojowi zaburzeń odżywiania (ED-*Eating Disorders*), które mogą mieć wpływ na zaburzenia płodności.

SŁOWA KLUCZOWE: nadwaga, otyłość, żywienie, zaburzenia odżywiania, płodność, wiek prokreacyjny, powikłania położnicze.

Introduction

Infertility in the reproductive age is an increasing problem. It is estimated that in Poland, around 15% of couples who attempt to have children are affected [1, 2]. Causes of female infertility may include endometriosis, fallopian tubal disorders, ovulation disorders related to the polycystic ovarian syndrome and other ovulation disorders of an unexplained ethiopathogenesis. Male infertility may be caused by oligasthenospermia, asthenospermia, teratospermia, azoospermia, oligospermia and immune factors [2].

In recent years, the percentage of unexplained (idiopathic) infertility cases is on the increase. A common cause of female infertility is poor egg quality, whereas male infertility is related to impaired sperm's ability to fertilize the egg and the changes in sperm chromatin [3].

Male and female factors are responsible for infertility to a similar extent. However, recently there has been an increase in male-related factors, especially in urban settings. Such a shift is probably linked to a greater environmental exposure of city dwellers [2, 4].

Both environmental factors and changes in lifestyle have a considerable influence on sperm motility, concentration and morphology [5, 6]. In recent years, among women, there has also been an increase (of up to 20%) in the number of idiopathic factors (including environmental ones) with the simultaneous decrease of tubal factors (due to a widespread and successful treatment). Other female factors such as endometriosis, PCOS and ovulation disorders have remained at the same level [3, 4, 6].

Around 5% of idiopathic infertility cases may be caused by psychosomatic factors [7].

Environmental factors which considerably influence the health of people of reproductive age include: obesity, inappropriate diet, low physical acivity, smoking, alcohol and other psychoactive substances abuse and risky sexual behaviour [8, 9].

Obesity has been an increasing problem for the last two decades, both in developing and developed countries. It is usually defined as abnormal or excessive body fat accumulation. Obesity increases the risk of metabolic diseases. Although the exact pathophysiological mechanisms responsible for such diseases are not yet known, clinical and epidemiological research indicates the link between the heightened inflammation in obesity and developing insulin resistance, which in turn impaires ovulation [11, 12].

The abnormal energy balance is one of the environmental factors which directly contributes to obesity but it can also lead to malnutrition. Both obesity and insufficient body weight can have an influence on reproductive performance, causing hormone imbalance and fallopian tube disorders [8].

Environmental factors, along with genetic and cultural ones, are said to be risk factors for eating disorders. Although the pathogenesis of eating disorders is not yet well understood, reasearch is being done to determine the percentage of those three factors in eating disorders etiology. The existing research shows that environmental and genetic factors play the main role in anorexia, whereas in bulimia, also cultural factors have a slightly bigger influence. In this context, anorexia nervosa and bulimia nervosa are disorders considered as heterogenic, multifactorial and complex [13, 14].

The lack of balance between the process of reaching biological maturity and socio-emotional development is often the cause of eating disorders. Such disorders are related to insufficient food intake but also to excessive eating which is often accompanied with obesity. A distinct problem is poor nutrition (often resulting from ignorance) and insufficient physical activity.

The lack of balance between biological and psychoemotional development may also lead to sexual precocity, early motherhood and the risks related to abnormalities in under-age pregnancies, sexual promiscuity resulting in the increase of sexually transmitted infections, seduction, sexual harrasment and homosexual encounters/relationships, an increase in the number of alcohol and drug addictions and a rise in the number of psychoemotional disorders [13, 14].

Therefore, it was considered necessary to continue and broaden the research which was done 10 years ago in the Gynecology of the Developmental Age and Sexology Centre. The research was done on high school students aged 15–18 and it aimed to assess the influen-

ce of a lifestyle on puberty. The results may encourage prevention measures to be taken early enough.

Research material

The study was conducted on 93 female students of three schools in Środa Wielkopolska: the High School, Vocational School Complex and Agricultural School Complex. The average age and the median value was 18, the minimal Body Mass Index – BMI was 16.78 and the maximal one 27.99, whereas both the average BMI and the median were within the normal range (**Table 1**).

Table 1. General characteristics of the subjects enrolled

	Age (years)	Height [m]	Weight [kg]	BMI [kg/m2]
Min.	17	1.55	45	16.78
Max	19	1.83	79	27.99
Median	18	1.68	58	20.70
Mean value ± SD	17.93±0.63	1.67±0.05	58.67±7.69	20.94±2.3

SD – standard deviation

Source: author's own analysis

Methods

The height and weight of the students were used to calculate their BMI. Weight measurements were taken to the nearest 100g on medical electronic scales (SECA 899). The height was measured to the nearest 1mm on a stadiometer (SECA217). Eating Attitudes Test (EAT-26) was used. This 26-item test is a screening tool designed to determine the frequency of ED across various populations and to assess the progress in the treatment of the patients suffering from eating attitude disorders. The score of 20 or more points may indicate eating attitude disorders and so the possibility of ED or susceptibility to them [15, 16].

A medical survey interview designed by an interdisciplinary team of doctors (including a sexologist), psychologists, teachers and a dietician was used in the research to collect information about the problems girls in the reproductive age face. 10 years ago, the survey was used by the Gynecology of the Developmental Age and Sexology Centre (now a department), in the research done on teenagers aged 15–18 to assess the influence of a lifestyle on puberty.

Results

Although 67.74% of the girls recognize the importance of diet, 56.99% of them eat sweets on a daily basis. 36.56% admit eating fast food every day and 45.16% do not have breakfast before leaving for school. It was determined that 50.54% do not do any sports and 38.71% are smokers. Additionally, 30,11% of the girls have been on a slimming diet at least once and 7.53% of them have suffered from amenorrhea as a result. 6.88% of the respondents rarely eat fruit and vegetables and 49.46% mostly choose white bread made with refined wheat grains. Nearly 60% hardly ever eat fish (< 1 serving per week), which is in stark contrast to regular meat consumption. 57% admit eating meat every day. Also, the girls eat pulses and legumes much too rarely. 75 % eat them less frequently than once a week (**Figure 1**).

The analysis of the EAT-26 questionnaire reported the mean value of 10.53±7.34%. What is more, it was determined that 9.68% of the girls in the research group are likely to suffer from eating disorders (**Table 2**).

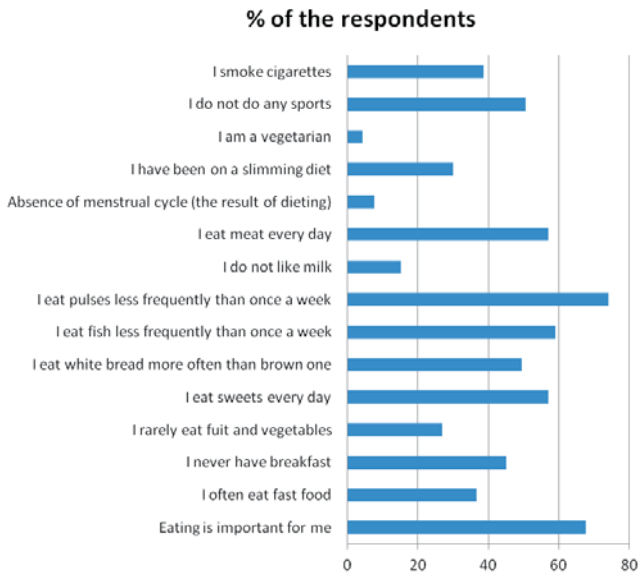

Figure 1. The results of the medical survey interview

Source: author's own analysis

Table 2. EAT-26 results and sexual initiation age

	Number of points in EAT-26 [min-max] N=93	Percentage of girls who scored ⩾20 N=93	Sexual initiation age N=28
Median	9		16
Mean value±SD (min-max)	10,53±7,34 (1-45)	9,68%	16,07±1,25 (14-18)

SD – standard deviation

Source: author's own analysis

Discussion

A well balanced diet seems to be of vital importance in the prevention of fertility disorders. The quality and quantity of carbohydrates and the amount of fibre in diet are among the factors studied so far and related to fertility disorders [17, 18]. Chavarro JE et al. analyzed the data from the NHS II (Nurses' Health Study II) and showed a positive correlation between eating products

with a high glycemic index (such as sweet cornflakes, white rice and potatoes) and ovulatory disorder infertility among primigravidas. A negative correlation was found in case of eating products with a low glycemic index (e.g. brown rice, pasta and wholemeal bread) [17]. As our research indicates, the girls ate products with a high glycemic index and poor in fibre (56,99% ate sweets every day and 49,46% preferred white bread rather than brown one). 30% of them ate food rich in fibre and with a low glycemic index (such as most fruit and vegetables) much too rarely.

The analysis of NHS II showed that the consumption of large amounts of fish and high-fat dairy foods was crucial in the prevention of ovulatory disorder infertility [19].

Mozaffarian D et al. show that palmitoleic acid found in milk may reduce insulin resistance. This is even more important as insulin resistance is a pathogenic mechanism of many diseases, e.g. the polycystic ovary syndrome. PCOS is also an endocrine disorder characterized by the androgen excess and chronic anovulation leading to ovulation disorders and infertility [11, 12]. n-3 Fatty acids found in saltwater fish may in turn play a huge role in the prevention of endometriosis which is, just as PCOS, related to fertility disorders [20]. As our research indicates, nearly 60% of young women eat fish less frequently than once a week, 15% never drink milk and nearly 37% often eat fast food and this percentage is too high. Fast food and sweets, which are eaten by the majority of the studied cohort, are rich in isomeric trans fatty acids. It was shown that replacing 2% of food energy from MFA (*Monounsaturated Fatty Acids*) with energy from trans fatty acids doubles the risk of ovulatory infertility.

It seems that trans isomers are responsible for reducing the activity of PPAR-γ (peroxisome proliferator–activated receptor γ) and thus contributing indirectly to reduced insulin sensitivity, the increase of the inflammatory process and obesity which is a direct risk factor for fertility disorders [19, 21, 22].

The factors that link insulin resistance and obesity are adipokines produced and released by the adipose tissue. PPAR-γ receptors (also known as NR1C3) play an essential role in their regulation. PPARγ are transcriptional factors belonging to the nuclear receptor superfamily

which directly regulate the expression of a large number of genes involved in adipocyte

differentiation, lipid and carbohydrate metabolism as well as adipokine synthesis. They are implicated in metabolic disorders such as obesity, insulin resistance, dyslipidemia and hypertension [10].

Chavarro JE et al. showed that overweight women whose BMI was between 25 to 29,99 kg/m^2 had a 30% higher risk of ovulatory disorder infertility, whereas obese women (BMI of 30 or more) had more than twofold greater risk than women with the right BMI [17].

Not only does physical activity help to maintain the right weight but it also aids the implantation of embryos and lowers miscarriage risk. As it was shown, regular exercise and weight loss also lead to lowering insulin resistance [9, 23]. In view of the above, it is worrying that about half of the girls studied admitted having no physical activity at all.

Another important factor in the pathogenesis of fertility disorders is the type of protein that is eaten. It was determined that substituting 5% of energy from the plant protein for the animal protein halves the risk of ovulatory infertility. This is probably due to the fact that the plant protein has a positive influence on insulin resistance and lowers the concentration of IGF-I (*Insulin-like growth factor 1)* which has an important role in the pathogenesis of PCOS (*Polycystic Ovary Syndrome*) [17, 24]. One of the best sources of the plant-based protein are pulses. However, almost 75% of the girls ate them less frequently than once a week. Pulses and legumes, together with whole grain cereal products are also a source of non-heme iron. As it was shown, non-heme iron from plant-based foods may substantially reduce the risk of ovulatory infertility [17, 25].

Among factors responsible for infertility are past or present eating disorders, related to both anorexia (AN – *anorexia nervosa)* and bulimia (BN – *bulimia nervosa)* [26, 27]. It was determined that ED are not only positively correlated to infertility but also result in high incidence of twin pregnancies, mothers' negative attitude towards pregnancy and a higher unintended pregnancy rate [26, 27]. Unplanned pregnancies have implications especially for young, emotionally immature women who are studying [14]. It should be emphasized that the respondents of the study had their sexual initiation quite early, i.e. at the age of 16 (**Table 2**). However, the data have yet to be confirmed on a bigger research sample, since only 30% of the respondents answered the question about the sexual initiation age (**Table 2**).

Conclusions

A well balanced diet (both in terms of quality and quantity), sufficient physical activity, avoiding smoking, stress and drinking alcohol may have a major significance in the prevention of infertility. Half of the respondents of the study do not follow a balanced diet, and they lack physical activity. In the long run, these factors may lead to overweight and obesity. Additionally, 40% of them smoke. Therefore, involving young women in an educational programme should be a matter for consideration. Such a programme should include issues related

to appropriate health attitudes and the prevention and treatment of eating disorders which, together with environmental factors mentioned above, can be related to fertility disorders. This is especially important since eating disorders are showing an upward trend [3].

According to this study, educating young people is crucial. Environmental factors are modifiable and in order to limit the exposure to them, educational programmes should be implemented as early as possible.

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THE HEALTH BEHAVIOUR AND THE HEALTH STATUS OF PATIENTS WITH CHRONIC KIDNEY DISEASE TREATED BY THE OUTPATIENTS DEPARTMENT- IN THE LIGHT OF RESEARCH USING THE QUESTIONNAIRES "INVENTORY OF THE HEALTH BEHAVIOUR (IHB/IZZ)" AND "GENERAL HEALTH QUESTIONNAIRE GHQ-28 (GHQ-28)"

ZACHOWANIA ZDROWOTNE A STAN ZDROWIA PACJENTÓW Z PRZEWLEKŁĄ CHOROBĄ NEREK LECZONYCH AMBULATORYJNIE – W ŚWIETLE BADANIA Z UŻYCIEM KWESTIONARIUSZY INWENTARZ ZACHOWAŃ ZDROWOTNYCH (IZZ) I KWESTIONARIUSZ OGÓLNEGO STANU ZDROWIA (GHQ-28)

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ABSTRACT

Introduction. An important aspect of the operation of a chronically ill person is his or her lifestyle. By changing the health behaviour can affect the course of the disease, including delaying its progression.
The aim of the study was to determine the relationship between the health behaviour and health status within a recorded group of patients with chronic kidney disease, treated by the Outpatients Department.
Material. In total 36 people were tested, consisting of 27 women and 9 men who were being treated for chronic kidney disease (CKD) in the nephrology clinic. The average duration of treatment in the clinic was 7.17 years (SD = 5.85). The average age of the respondents was 46.67 years (SD = 14.70).
Methods. We used the following research tools: 1) The structured interview was used to collect socio-demographic data; 2) Inventory of The Health Behaviour (IHB)(IZZ – Author, Juczyński; 3) Questionnaire of the General State of Health – GHQ-28, Author, D. Goldberg, Polish adaptation Makowska and Merecz.
Results. The examined patients are characterised by the average severity of complaints about their health. They presented their average severity of their health behaviour. They mostly cared about preventive behaviour, declared in the systematic execution of examinations (n = 29; 80%). The respondents admit to smoking (n = 8; 22%). A half of the respondents (n = 18; 50%) declared that they occasionally drank alcohol. The majority of respondents (n = 26; 72%) tried to do some physical activity in spite of the disease.

STRESZCZENIE

Wstęp. Ważnym aspektem funkcjonowania osoby chorej przewlekle jest styl życia, który można określić jako decyzje i zachowania dotyczące zdrowia. Dzięki zmianie zachowań zdrowotnych można wpłynąć na przebieg choroby, m.in. opóźnić jej postęp.
Celem badań było określenie związku miedzy zachowaniami zdrowotnymi a stanem zdrowia w grupie chorych z przewlekłą chorobą nerek leczonych ambulatoryjnie.
Materiał. Przebadano 36 osób, w tym kobiet 27 i mężczyzn 9, leczonych w poradni nefrologicznej z powodu przewlekłej choroby nerek (PChN). Średni czas leczenia w poradni nefrologicznej wynosił 7,17 lat (SD = 5,85). Średnia wieku badanych wynosiła 46,67 lata (SD = 14,70).
Metody. Zastosowano następujące narzędzia badawcze: 1) wywiad strukturalizowany służący do opisania grupy pacjentów ze względu na właściwości społeczno-demograficzne, 2) Inwentarz Zachowań Zdrowotnych IZZ – autor Juczyński. IZZ przeznaczony jest do badania osób dorosłych, zarówno zdrowych jak i chorych. 3) Kwestionariusz Ogólnego Stanu Zdrowia – GHQ-28 D. Goldberga, w polskiej adaptacji Makowskiej i Merecz.
Wyniki. Badanych chorych cechuje przeciętne nasilenie skarg na stan zdrowia. Prezentują przeciętne nasilenie zachowań zdrowotnych. Najbardziej dbają o zachowania profilaktyczne, deklarują systematyczne wykonywanie badań kontrolnych (n = 29; 80%). Badani przyznają się do palenia tytoniu (n = 8; 22%). Połowa badanych (n = 18; 50%) deklarowała sporadyczne picie alkoholu, a druga połowa całkowitą abstynencję. Większość badanych (n = 26; 72%) starała się podejmować aktywność fizyczną pomimo choroby.

Conclusions. Most of the respondents revealed the average severity of their health behaviour. Patients require regular, purposeful health education, with periodic evaluation of their current health behaviour.

KEYWORDS: health behaviour, health status, chronic kidney disease, education.

Wnioski. Badani w większości przejawiają przeciętne nasilenie zachowań zdrowotnych. Pacjenci wymagają systematycznej, celowej edukacji zdrowotnej, z okresową oceną aktualnych zachowań zdrowotnych.

SŁOWA KLUCZOWE: zachowania zdrowotne, stan zdrowia, przewlekła choroba nerek, edukacja.

Introduction

Chronic diseases are a major problem for modern medicine in today's society. Statistics show that 60% of deaths worldwide are caused by chronic diseases; they have also affected a growing number of people of working age [1].

Chronic kidney disease (CKD) is a common disease in the populations of developed countries. This chronic disease develops gradually, often sub-clinically; hence it is difficult to diagnose, because the actual frequency of its occurrence is very difficult to determine.

In Poland, the number of patients with CKD in the adult population was evaluated in a study PolNef 2004–2007 at 18.4% [2]. This is a result lower than in studies of the Japanese population, 28.8% [3], and significantly higher than the Dutch population of 7% [4], and the US 11% [5]. It is believed that in a population having a high risk of developing CKD consisting of people with diabetes, hypertension or who are relatives of patients with CKD, the incidence of CKD can represent up to 50% [2]. This is confirmed by the results of the multi-study research PolSenior 2007–2010, where it has been shown that the characteristics of CKD manifested themselves in 25% of respondents in the age group of 65–69 years, 60% of people in the group of 85–89 years, but awareness of the disease had only been tested in one in every 20 people [6, 7].

An important aspect of the functioning of a chronically ill person, beyond adherence to medical recommendations, is presented by his or her lifestyle, which can be defined as the decisions and behaviour of health. Lifestyle plays an important role in chronic diseases, so it is important to help patients understand and make appropriate changes in their lives. By changing health behavior, they can not only reduce the risk of disease, but also affect the course of any disease [8].

Health behaviour can be defined as any form of human activity which is focused on health goals [9]. These objectives can have a positive or negative impact on health, respectively, so you can distinguish healthy behaviour (avoidance of disease, improving health) and behaviour that is 'unhealthy' (harmful to health). Different types of health behaviour improve the quality of life and the functioning of the disease, while unhealthy activities are directed against their own health. Their harmfulness to health is often aggravated by the fact that they generally occur together with others, e.g. Smoking reveals a strong relationship with alcohol abuse and physical inactivity [10, 11].

Regardless of the classification of any health behaviour, the results of many recent studies indicate relationships or relationships of cause and effect between the behaviour and health of the individual. Studies show that 7 of the 10 most common causes of death given are related to human health behaviour [12].

Making healthy behaviour conducive to a realistic picture of the disease – the more accurately human beings can assess the status of their health, the less likely they would be in making his or her activity unfavourable from the point of view of health [13].

In the case of chronic illnesses, the adoption of better health behavior seems to be a sensible and beneficial idea, but within medical practice it is known than it makes a lot of trouble for patients. Some people have a lack of specific knowledge, skills and any other positive attitudes, and yet another people are already making full use of their knowledge and skills in the treatment process [14].

People's health behaviour in the situation of chronic kidney disease (CKD) comes down to making informed patient action to protect and preserve health. Study results show that the faster the progression of CKD, expressed in the rate of decline in kidney function (glomerular filtration rate), observed in patients presenting adverse health behaviour, and not using treatment recommendations, regardless of age [2, 11].

The aim of this study was to determine the relationship between the health behaviour and health status in patients with CKD, who are being treated whilst outpatients.

The following hypotheses erected:

1. There is a relationship between the health behaviour in a group of patients with CKD and their health.
2. The relationship between the health behaviour in a group of patients and health, differentiates according to:

a) socio-demographic variables: age, sex, national origin, living with family or alone;
b) somatic state variables: duration of treatment, family obligations.

The study was conducted after obtaining the consent of the Bio-Ethics Committee of Collegium Medicum in Bydgoszcz.

Material and methods

In order to verify the hypotheses and data collection, the following research tools were used:

1. A structured interview was used to describe a group of patients because of their socio-demographic characteristics.
2. Inventory Behavioural Health (IBH) (IZZ – Juczyński`s), which contains 24 statements describing health-related behaviour: healthy eating habits, taking into account the type of food they eat, preventive behaviour regarding compliance with health recommendations, health practices including daily sleep habits, recreation and physical activity and positive, mental attitude expressed in avoiding too strong emotions, stresses and tensions or situations that affect depression. The inventory was intended to examine adults, both healthy and sick. The questionnaire IBH (IZZ) has good statistical parameters (Cronbach's alpha value of the index is 0,85 for the whole Inventory, and for its four subscales / categories are in the range from 0,60 to 0,65) [12].
3. General State of Health Questionnaire GHQ-28 (General Health Questionnaires GHQ – 28), D. Goldberg, using Makowska and Merecz's Polish adaptation. This questionnaire allows the identification of people whose health has been temporarily or long-term weakened as a result of experiencing various difficulties in life. GHQ-28 measures the general state of mental health and its four dimensions, i.e.: the severity of somatic symptoms (scale A), the level of anxiety and insomnia (scale B), disorders of functioning (scale C) and depressive symptoms (scale D). Each of the four scales contains seven questions. The examined patient marked the answers that the most accurately reflect his or her feelings. These responses were scored from 0 (I feel better than normal) to 3 (I feel much worse than usual). The Global Health Indicator is calculated by adding the sum of points obtained in the four analysed scales. The higher the score, the worse the patient's health. The Polish version of this tool is characterised by high reliability and good accuracy [15].

The level of nicotine addiction was investigated by the questionnaire HSI (Indicator Intensity Smoking HSI), a shortened version of Fagerström's Test.

In total, 36 people were tested together, which consisted of women n = 27 (75%) and men n = 9 (25%) were being treated in the nephrology clinic because of CKD. The average duration of treatment in the clinic was 7,17 years (SD = 5,85). Almost half of the respondents (n = 15; 42%) was charged with familial renal disease, and other persons (n = 21) had no such burdens. The average age for all was 46,67 years (SD = 14,70), and men and women were of a similar age. Most of the respondents had received secondary education (n = 16; 44,4%), others primary (n = 4; 11,1%), vocational education (n = 8; 22,2%) and higher (n = 4; 11,1%). The respondents lived in the city (n = 19; 52,8%) and in the country (n = 17; 47,2%). The majority of respondents (n = 31; 86%) lived with a family, a few (n = 5; 14%) lived alone. The respondents evaluated the material and housing conditions on a 4-point scale, where 1 – meant poor, 2 – sufficient, 3 – good, 4 – very good. None of the respondents did not think he or she had a bad housing conditions (M = 2.83; SD = 0.65); similarly, respondents positively rated their material conditions (M = 2.50; SD = 0.65).

Statistical analysis

The following statistical tests were used:

1. For a description of variables in the groups mean (M) and standard deviation (SD), and the numerical amount (n) and the percentage (%);
2. To determine the direction and strength of the association between variables test of linear correlation r-Pearson (occurred linear relationship between the variables and variables were quantitative) test or non-parametric R-Spearman (when the variables were qualitative and there was no linear relationship between variables).
3. To determine the significance of differences between means parametric t-Student's test or Mann-Whitney U's non-parametric test.

Results

Health behaviour – the average results of the analysed variables.

The examined patients are characterised by the average severity of their health behaviour. It's calculated that the rate of health behaviour, of which the average raw score is 86.75, and the sten result is close to 6 (5.94). The average scores for each category of health behaviour were comparable to the standardised medium and did not show statistically significant differences (**Table 1**).

Table 1. Descriptive statistics for the health behaviour from questionnaire IBH

Health behaviour	N	M	SD	min- max.
Health behaviour – raw overall result	36	86.75	15.63	48.00 -115.00
Health behaviour – stens	36	5.94	2.24	1.00 -10.00
Proper eating habits	36	3.46	0.86	1.33 – 5.00
Preventive behaviour	36	3.70	0.82	2.16 – 4.80
Positive mental attitude	36	3.54	0.77	2.16 -5.00
Health Practice	36	3.46	0.67	2.30 – 4.80

Source: authors` own analysis.

Preventive patients' types of behaviour manifest themselves in the following treatment recommendations. Respondents most frequently declare the systematic execution of examinations (n = 29; 80%), and the rest succumb to them rarely (n = 7; 20%). Within the scope of the recommendations of doctors, patients usually use them sometimes (n = 24; 67%), some (n = 10; 28%) apply to them, and few (n = 2; 5%) do not comply with the medical recommendations.

Health practices of patients were different: the respondents admit to smoking (n = 8; 22%), although the majority (n = 28; 78%) do not smoke. Further analysis revealed that two people have an average level and one high level of physical nicotine addiction. Among the respondents, there were not many people who often drank alcohol, half (n = 18; 50%) declared occasional drinking, and the second half – total abstinence. Only two people do not take physical activity, the majority of respondents (n = 26; 72%) tried to be active despite illness, and others (n = 8; 22%) take it regularly.

The health status of respondents – the average results of the questionnaire GHQ-28

The respondents assessed their health as average. In the study group the average raw GHQ-28 score was 27.67, and the rate converted in stens was close to 6, which was in the average range. The respondents most frequently reported problems with anxiety and insomnia, and somatic symptoms, rarely having functional disorders and the least symptoms of depression (**Table 2**).

Table 2. Descriptive statistics for dimensions of health test questionnaire GHQ-28

Dimensions of health	N	M	SD	min- max.
Somatic symptoms	36	8.31	4.01	2.00 – 17.00
Anxiety and insomnia	36	8.61	4.85	1.00 – 21.00
Dysfunctions	36	7.78	2.59	3.00 – 14.00
Symptoms of depression	36	2.89	3.15	0.00 – 11.00
Sum GHQ	36	27.67	12.59	11.00 – 62.00
Sum GHQ – stens	36	5.78	1.87	3.00 – 9.00

Source: authors` own analysis

Experiencing symptoms of CKD

The patients were examined in terms of the frequency about the feelings of the symptoms of CKD, and were asked about the feeling of nausea, swelling and bone pain. The incidence of reported symptoms in the group was varied. The majority of respondents reported at least, once a week, nausea (86.0%), edema (66%), and bone pain felt with great diversity, some every day (39%), and others less frequently than once a week (36%).

The relationship between their health behaviour and the health of the examined patients

Between the health behaviour and the analysed aspects of their health states, a statistically, significant, positive relationship occurred:

- Between the complaints of edema and normal eating habits,
- Between the sum of symptoms, and in particular the type of complaints, anxiety and insomnia (scale B) and health behaviour in general, and above all, preventive behaviour (**Tables 3 and 4**). The patients are more likely to have complaints of edema, restlessness and insomnia, although they care more about compliance with health behaviour, in particular preventive behaviour. In summary, it can be stated that the respondents feel, notice more symptoms and feel sicker, yet they show more positive health behavior attitudes.

Table 3. Statistically significant correlation r-Pearson between dimensions of health and health behavior in the group (n = 36)

Dimensions of health	Positive mental attitude	Health practice
Somatic symptoms	0.1040 p=0.546	-0.0079 p=0.963
Anxiety and insomnia	0.1655 p=0.335	0.1770 p=0.302
Dysfunctions	0.2003 p=0.242	0.1428 p=0.406
Symptoms of depression	0.1596 p=0.353	0.0653 p=0.705
Sum GHQ	0.1866 p=0.276	0.1199 p=0.486

Source: authors` own analysis

Table 4. Statistically significant correlation R-Spearman between the dimensions of health and health behaviour in the group (n = 36)

A pair of variables	R – Spearman	P.
Health behaviour-raw score overall & anxiety and insomnia	0.389	0.019
Health behaviour-raw score overall & sum GHQ	0.370	0.026
Proper eating habits & swellings	0.445	0.007
Preventive behaviour & anxiety and insomnia	0.404	0.015
Preventive behaviour & sum of GHQ	0.402	0.015

Source: authors` own analysis

The relationship between health behaviour and state of health in the group of women and men was differential. There was a positive, statistically significant association between the presence of edema and observance of the principles of proper nutrition (R-Spearman = 0.538, p = 0.004), and a negative relationship – between edema and drinking alcohol (R-Spearman = -0.496, p = 0.009). Women who have swelling do not drink alcohol and take care in having proper nutrition.

The group of men revealed a statistically significant negative relationship between the complaints of somatic symptoms, anxiety and insomnia, disorders in functioning and depressive symptoms (all symptoms measured by the scale of GHQ-28) and alcohol (R-Spearman = -0.682, p = 0.043); whereas a positive statistically significant relationship occurred between the practices of health and somatic symptoms, particularly anxiety and insomnia (R-Spearman = 0.718, p = 0.029). The men feel stronger somatic disorders with different picture when they do not drink alcohol and begin to take care and use better health practices (R-Spearman = 0.644, p = 0.061).

Taking into account the place of residence, it turns out that there are differences in the types of relationships between health behaviour and the state of health of the patients. In the group of people living in the city there is a statistically significant positive relationship between health behaviour, mainly preventive behaviour and complaints about the general somatic state and anxiety and insomnia. In addition, there is a statistically significant association between the occurrence of edema and drinking alcohol (negative R-Spearman = -0.709, p = 0.001) and normal eating habits (positive R-Spearman = 0.603, p = 0.006). People living in a city care more about health behaviour when they experience more health problems.

In the group of people living in rural areas, it was noted that there is the existence of a positive statistical relationship between health behaviour expressed in the care of diet (R Spearman = 0.602, p = 0.011) and the practices of health (R-Spearman = 0.483, p = 0.050), when there are different types of symptoms and health problems.

The relationship between health behaviour and the state of health in a group of patients' unloaded disease was not statistically significant, while the group loaded with kidney disease showed statistically significant positive interdependencies between (**Tables 5 and 6**):

- Showing symptoms of depression and health behaviour, especially expressed in normal eating habits, a positive mental attitude and practices of health.
- Reporting complaints about health symptoms, particularly on somatic symptoms, anxiety, insomnia and health behaviour.
- Reporting complaints about health symptoms and the use of health practices and healthy eating habits.
- The occurrence of edema and general complaints about health and health behaviour especially expressed in normal eating habits.
- The occurrence of bone pain and taking care of preventive behaviour.

Table 5. R-Pearson's correlation between dimensions of health and health behaviour in the test group carrying familial disease of the kidneys (n = 15)

Dimensions of health	Positive mental attitude	Health practice
Somatic symptoms	0.3046 p=0.270	0.2895 p=0.295
Anxiety and insomnia	0.2804 p=0.311	0.4261 p=0.113
Dysfunctions	0.2788 p=0.314	0.4244 p=0.115
Symptoms of depression	0.6763 p=0.006	0.7322 p=0.002
Sum GHQ	0.4296 p=0.110	0.5223 p=0.046

Source: authors` own analysis

Table 6. Statistically significant correlations of R-Spearman between dimensions of health and health behaviour in the test group of people carrying familial disease of the kidneys (n = 15)

A pair of variables	R - Spearman	P.
Health behaviour-raw result & swellings	0.600	0.018
Health behaviour-result raw & somatic symptoms	0.515	0.049
Health behaviour- result raw & anxiety and insomnia	0.549	0.034
Health behaviour-result raw & symptoms of depression	0.705	0.003
Health behaviour-result raw &sum GHQ	0.660	0.007
Proper eating habits & swellings	0.687	0.005
Proper eating habits & symptoms of depression	0.613	0.015
Proper eating habits & sum of GHQ	0.550	0.034
Preventive behaviour & bone pain	0.562	0.029

Source: authors` own analysis

Those who are subject to familial kidney disease, who had been complaining of the symptoms of depression, tended to care more about the use of various types of health behaviour in their lives. When experiencing a variety of somatic symptoms and anxiety, they are

more likely to behave in a pro-health way. When they notice swellings they then take more care about proper nutrition and when they feel bone pains then they are more likely to take preventive behavior and measures. The research indicates that patients burdened with familial renal disease show greater care of their health.

The examined patients were classified into three groups, determined by the severity of the presented health behaviour. The patients in group 1 (n = 9) exhibited a low tendency, in group 2 (n = 19) – the average one, in group 3 (n = 8) increased tendency to make their health behavior better. Then, it was compared with each other extreme groups (groups 1 and 3) in terms of analysed health aspects (**Table 7**). People with a high intensity of health behaviour more often significantly complained about the state of their health.

Table 7. Significance test of differences between the U Mann-Whitney average for analyses of the dimensions of health due to stronger health behaviour for the entire group

Dimensions of health	Low severity of health behavior.		High severity of health behavior.		Z- U Mann- Whitney.	p.	Z – U Mann-Whitney..	p.
	M	SD	M	SD				
Duration of therapy (clinic nephrology)	9.3	5.7	9.2	6.5	0.23	0.820	0.23	0,819
Nausea	1.2	0.4	1.2	0.9	0.65	0.518	0.92	0.355
Bone pain	1.8	1.1	2.6	1.5	-1.29	0.197	-1.34	0.179
Swelling	1.2	0.4	2.0	1.4	-0.80	0.425	-0.99	0.324
Somatic symptoms	6.4	4.6	9.0	3.8	-1.41	0.160	-1.41	0.158
Anxiety and insomnia	7.4	5.4	1.,1	3.8	-1.94	0.053	-1.96	0.050
Dysfunction	7.2	2.8	8.3	2.5	-1.25	0.210	-1.30	0.193
Symptoms of depression	1.8	3.2	3.1	2.6	-1.67	0.095	-1.72	0.086
Sum GHQ	22.9	14.9	30.7	9.0	-2.09	0.037	-2.09	0.036

Source: authors` own analysis

Discussion

Our own research confirmed the observed adverse cause associated with an increase in interest in their own health and improving their health behaviour only in the case of an occurrence of the disease or exacerbation of its symptoms. It was shown the relation between positive health behaviour and noticeable symptoms of the disease. The respondents often abandoned their negative behaviour (e.g. drinking alcohol) in the case of the appearance of symptoms such as swelling, pain and other somatic complaints. The highest level of health behaviour showed that these patients were the ones who reported the most complaints. This tendency is noticed in a group of chronically ill patients, as adherence to medical recommendations is difficult for the patient because it requires a lot of limitations. Many patients in the period of silence symptoms departed from the recommendations and presented adverse health behaviour, or if the symptoms are not too bothersome, they do not introduce any changes in their functioning [11, 14].

In the developed countries it is estimated that only 50% of chronically ill patients apply or use medical recommendations, and with the passage of time the awareness of the disease is increasing among patients, and adherence to medical recommendations is being reduced [16].

In the research of people with cardiovascular disease led by Rząca's team *et al.,* it was demonstrated that the awareness of the health risk does not transfer into greater health awareness and making for more positive behaviour [17]. Similarly, in research carried out by Kara and Zasnarska, the research of people with hypertension and smoking tobacco (one of the main risk factors in circulatory diseases) showed that 100% of these people are aware of the dangers of addiction and despite of the declared need to give up smoking, even 2 / 3 of the respondents do not implement it in everyday life [18]. Also, among people with peripheral vascular disease, it has been shown that men are generally less careful about their health. In general, they use similar health practices as healthy people and have less care than patients after myocardial infarction (84.00), diabetes (92.44) and dialysis (83.45) [12, 19]. Similar overall results were obtained in this study (86.75).

The desired pro-health behaviour in CKD is the systematic taking advantage of medical advice and monitoring of the state through laboratory tests. The respondents frequently exhibited preventive behaviour (a visit to the doctor [nephrologist]) in the case of disclosure of the symptoms rather than systematic, planned visits to the doctor. This may be due to a lack of full awareness of the importance of visits than rather than with any objective obstacles to access to a doctor (nephrologist) [11]. Similar observations about the lack of systematic checks at the doctor put forward by King *et al*., shown in the results of their study PolNef 2007 [2]. Thus, it can be concluded, that in the group of chronic patients there is the lack of awareness about the role of their active participation in the therapeutic process. Often, patients recognise that the lack of symptoms is the result of an improvement in their health and exempt them from complying with the recommendations and follow-up visits. Smolen's *et al*. research, consisting in the analysis of the health behaviour of the elderly, showed a general result (88.89), which as compared with the result of this study (86.67) is significantly higher [20]. So, the higher the general score of health behaviour (92.92) was evinced in patients with type 2 diabetes examined by Kurowska [21].

In the treatment of patients with CKD it leads to five main aims: 1 – suppression of the activity of any disease that causes kidney damage; 2 – suppression of progression of renal impaired function (a reduction of the adverse effects of reduced kidney weight compound and other factors of the risk of progression); 3 – prevention of the occurrence and treatment of disorders resulting from loss of active mass of the kidneys, especially the prevention and treatment of diseases of the cardiovascular system; 4 – diagnosis and treatment of comorbidities; 5 – an optimal preparation and selection of the best methods of renal replacement therapy [22]. In order for the realisation of these goals to be possible, the co-operation of each patient is required by the patient's therapeutic team. You need to prepare the patient for a life with CKD, raise his or her health awareness and ability to self-care through the active educational programme. For each patient with CKD, an individual plan therapeutic is required, depending on the stage of the disease, taking into account patient education, current cognitive abilities and the motivation for active participation in the treatment process [22, 23, 24, 25, 26].

Conclusions

In spite of the overall high health-consciousness of subjects, patients were presented with an average of selected ailments, including unhealthy behaviour, and the incidence of healthy behaviour was increasing, mainly in the situation of the exacerbation of symptoms. People with a hereditary taint, frequently showed better health behaviour. Patients with CKD require systematic, purposeful health education, with periodic evaluation of current health behaviour.

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THE MOST IMPORTANT HEALTH HAZARDS OCCURRING IN THE MOTORCYCLE SPORT

NAJWAŻNIEJSZE ZAGROŻENIA ZDROWOTNE WYSTĘPUJĄCE W SPORCIE MOTOCYKLOWYM

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ABSTRACT

Introduction. The motorcycling is becoming more popular year-on-year, especially among young people. The number of motorcyclists is constantly growing, hence getting to know the most important factors bringing health risk and knowing challenges and troubles the motorcyclists face in road traffic is of such great importance.
Aim. The aim of this study was to investigate the major health hazards occurring in the motorcycle sport.
Material and methods. The method of a diagnostic survey with the use of a questionnaire technique was applied in research. The tool for carrying out research was the questionnaire. 115 motorcyclists (85 men and 30 women) were surveyed. Research was conducted in southern Poland. The age range of respondents varied from 18 to 65.
Results. Results of conducted research have confirmed that injuries of upper and lower limbs as well as injuries related to the spine are the most frequent health hazards occurring in this sport. Car drivers create the biggest hazard to motorcyclists. Results of research also indicate that the type of the motorcycle which is most frequently involved in a collision is a sports motorcycle, whereas an inexperienced young man who rides with bravado is an average motorcyclist.
Conclusions. The occurrence of the major health hazards in motorcycle sport differs significantly in the selected age groups. Young people are by far exposed most often to all sorts of injuries. Inappropriate speed not adjusted to the road conditions as well as speeding can be classified as major reasons for road accidents.

KEYWORDS: injuries, extreme sport, risk, accidents, hazards.

STRESZCZENIE

Wstęp. Sport motocyklowy z roku na rok staje się coraz popularniejszy, szczególnie wśród ludzi młodych. Liczba motocyklistów ciągle rośnie, dlatego tak ważnym tematem jest poznanie najważniejszych czynników zagrażających zdrowiu, wyzwań i trudności z jakimi spotykają się oni w ruchu drogowym. Celem badań było poznanie najważniejszych zagrożeń zdrowotnych występujących w sporcie motocyklowym.
Materiał i metody. W badaniach zastosowano metodę sondażu diagnostycznego, techniką ankietowania. Narzędziem do przeprowadzenia badań był kwestionariusz ankiety. Przebadano 115 motocyklistów, w tym 85 mężczyzn oraz 30 kobiet. Badania przeprowadzono na terenie południowej Polski. Rozpiętość wiekowa uczestników wynosiła od 18. do 65. roku życia.
Wyniki. Wyniki przeprowadzonych badań potwierdzają, że najczęstszym zagrożeniem zdrowotnym występującym w tym sporcie są urazy kończyn dolnych oraz górnych, jak również urazy związane z kręgosłupem. Najczęstszą z kolei przyczyną wystąpienia wypadku motocyklowego, a tym samym największym zagrożeniem dla motocyklistów są kierowcy samochodów osobowych. Wyniki badań wskazują również, że motocyklem, który najczęściej bierze udział w kolizji jest motor sportowy, natomiast statystyczny kierowca motoru to młody niedoświadczony człowiek odznaczający się brawurą.
Wnioski. Występowanie najważniejszych zagrożeń zdrowotnych w sporcie motocyklowym znacząco różni się w wybranych grupach wiekowych. Zdecydowanie częściej na wszelkiego rodzaju urazy narażeni są ludzie młodzi. Do głównych przyczyn wypadków drogowych zaliczyć można m.in. niedostosowanie prędkości do warunków panujących na drodze, przekraczanie prędkości oraz nieprawidłowe wyprzedzanie.

SŁOWA KLUCZOWE: urazy, sport ekstremalny, ryzyko, wypadki, zagrożenia.

Introduction

The motorcycling is becoming more and more popular among young people. The number of motorcyclists is constantly growing, hence getting to know the most important factors bringing health risk is of such great importance. Pointing at challenges and troubles motorcyclists face in road traffic as well as taking steps thanks to which it will be possible to stop the growing number of motorcyclists who are killed or injured in road accidents, are also essential [3, 4].

In the year 2013 motorcyclists were involved in 2 210 accidents in total. Data have shown that in 967 cases they were responsible for the occurrence of the accidents. As a result of these accidents 253 people were

killed in total and 2 075 injured (of which 1808 were drivers and 267 passengers) [3, 4]. For comparison car drivers caused 22 036 accidents and cyclists 1 786 respectively. Truck drivers caused 1 179 accidents, a bit more than cyclists [1, 2]. In the year 2014 motorcyclists caused 1 023 accidents [3, 4].

In the year 2014 motorcyclists were involved in 2 378 road accidents, 1 023 of which were caused by them. In these accidents 261 people in total were killed and 2 495 injured. The majority of victims were motorcyclists - 230 killed and 1 964 injured and those who travelled with them – 7 killed and 269 injured. In comparison to the year 2013, therefore, the number of fatalities decreased (by twelve), whereas the number of injured increased (by 156) [5, 6].

Motorcyclists are especially prone to fractures, dislocations, subluxations, rotations, damages of tendons or ligaments. Intense drive and perfecting the motorcycle drive increase the wearing out of tissues [5, 6, 7, 8]. The most frequent injuries in motorcycle accidents are limbs and spine injuries. Majority of them concern upper limbs, especially shoulders, including fractures of clavicles [12].

The aim of the research was to investigate the major health hazards occurring in the motorcycle sport. The influences of age, gender, education level and place of residence on the occurrence of health hazards among motorcyclists were acknowledged as research variables. It is expected that the knowledge gained will be possibly used to create health programs aimed at reducing the incidence of traumas occurring in the motorcycle sport.

Material and methods

The main research problem in this study was stated as follows: What are the major health hazards occurring in the motorcycle sport?

In order to thoroughly investigate the problem the following detailed issues were addressed: First – To what degree do the health hazards occurring in the motorcycle sport depend on the place of residence? Second – To what degree does the occurrence of health hazards vary in the selected age groups? Third – What significance to the reduction of the occurrence of specific effects of accidents does the motorcyclists' knowledge of the causes of accidents have?

Research conducted in this study allows to put forward the following main hypothesis: the major health hazards occurring in the motorcycle sport are craniocerebral and spine traumas as well as limbs injuries.

Apart from the main hypothesis the following detailed hypotheses were formulated: the health hazards occurring in the motorcycle sport depend on the place of residence; the occurrence of the health hazards differs to a large extent in the selected age groups; the motorcyclists' knowledge of the causes of accidents is of great significance to the reduction of the occurrence of the health hazards.

The incidence of health hazards in motorcycle sport was acknowledged as a dependent variable. On the other hand, the operands in this study are: age (empirical indicator: age range < 18 - 30, > 31 - 65), gender (empirical indicator: woman, man), education (empirical indicator: higher, secondary, vocational, primary), place of residence (empirical indicator: village, town up to 10 thousand, town up to 100 thousand , town > 100 thousand). The indicators of dependent variables (Zz) were the answers given by the motorcyclists coming from questionnaires.

The method of a diagnostic survey was used in this study. The questionnaire technique was applied in the next step of the research. The tool for carrying out research was the questionnaire which contained 24 close questions. The first part of the questionnaire was a certificate in which general questions were placed. They related to: age, sex, education and place of residence. The second part of the questionnaire contained questions related to the number of motorcycles in possession, the distance covered (in kilometers), questions concerning dangers and effects of riding a motorcycle as well as questions related to the errors most frequently made by motorcyclists. The research was conducted in the year 2014 (from the middle of April to the end of October) during the so-called motorcycling season. 115 motorcyclists, among them 85 men and 30 women were surveyed. Research was conducted in southern Poland in the following cities and towns: Kielce, Częstochowa, Kraków, Tarnów, Rzeszów and Bałtów. The age range of respondents varied from 18 to 65.

Results

The relations between age, gender, education level or place of residence and different determinants of health hazards characteristic of motorcycling were investigated with the use of the chi-square test. The activity was aimed at revealing different relationships. In the case of the tables in which significant connections between variables were shown, in order to assess their interrelation force the V-Cramer and C-Pearson rates were applied.

There are interrelations between the age of the initiation into motorcycling and the sex of a motorcyclist. Up to 25% of women had their first contact with a motorcycle when they were 25 years of age. In the group of men a substantial proportion (44.4% of the surveyed) had their first contact with a motorcycle when they were between 21 and 25 years of age. Only three respon-

dents had their first contact with a motorcycle before they were 10 years of age.

t = 1.902069, p = 0.04. The result is statistically characteristic with the assumption p < 0.05.

Table 1. The age of the respondents' first contact with a motorcycle (by gender)

First contact with a motorcycle	Number of respondents					
	Women		Men		Together	
	n	%	n	%	n	%
>25	13	25.0	8	12.7	21	18.3
21-25	4	7.7	28	44.4	32	27.8
19-20	10	19.2	23	36.5	33	28.7
16-18	3	5.8	18	28.6	21	18.3
15-10	0	0.0	5	7.9	5	4.3
<10	0	0.0	3	4.8	3	2.6
Together	30	26.1	85	73.9	115	100

Source: author's own analysis

The relation between the type of an accident experienced and the gender of respondents was also investigated. On the basis of the results of the chi-square test a significant connection between variables was shown. The highest percentage of women (21.2%) had an accident which was described as fall and glide on the road surface (cut), while the smallest number of persons who had an accident experienced an accident with a passenger (3 respondents). As far as men are concerned the majority of them experienced a collision and suffered from the fall.

$x^2 = 11.614$, df = 5, p = 0.040, Rc = 0.303

Table 2. Type of an accident experienced (by gender of respondents)

Type of an accident	Number of tested					
	Women		Men		Together	
	n	%	n	%	n	%
Fall	8	15.4	17	27.0	25	21.7
Cut	11	21.2	16	25.4	27	23.5
Collision	8	15.4	18	28.6	26	22.6
Running into/Hovering	0	0.0	8	12.7	8	7.0
An accident with a passenger	3	5.8	13	20.6	16	13.9
Other	0	0,].0	13	20.6	13	11.3
Together	30	26.1	85	73.9	115	100.00

Source: author's own analysis

Statistical analysis of the most common causes of accidents and the gender of respondents revealed the significant relation between variables. Among women the lack of experience was the most frequently given cause of accidents (17.3%), the second most commonly pointed out was the error of a car driver (11.5%), the smallest percentage of respondents – 1.9% showed the ride under the influence of intoxicants and disobeying the traffic rules as the cause of an accident. In the case of men the highest percentage of causes of accidents also accounts for the error of a car driver (28.6%), the second cause most commonly pointed out by respondents were bad weather conditions (20.6%). The least commonly mentioned cause of an accident was the error of another motorcyclist – 4.8%. Among all answers the highest percentage of causes of accidents accounts for the error of a car driver (20.9%), whereas the smallest one for a defective motorcycle (3.5% responses).

$x^2 = 19.26$, df = 9, p = 0.023 Rc = 0.379

Table 3. The most common causes of an accident (by gender of respondents)

Cause	Number of tested					
	Women		Men		Together	
	n	%	n	%	n	%
Complicity	4	7.7	4	6,3	8	7
Error of another motorcyclist	2	3.8	3	4.8	5	4.3
Error of a car driver	6	11.5	18	28.6	24	20.9
Excessive speed	3	5.8	11	17.5	14	12.2
Bad weather	2	3.8	13	20.6	15	13
Poor condition of roads	2	3.8	10	15.9	12	10.4
Lack of experience	9	17.3	5	7.9	14	12.2
Driving under the influence of intoxicants	1	1.9	8	12.7	9	7.8
Disobeying the traffic rules/ Failure to comply	1	1.9	9	14.3	10	8.7
Faulty motorcycle	0	0	4	6.3	4	3.5
Together	30	26.1	85	73.9	115	100

Source: author's own analysis

The research on the correlation between the overall length of motorcycling given in kilometers and the sex of respondents has not shown any significant interrelations between variables. Accordingly, additional rates were not examined, though on the basis of own observations it may be noticed that men are those who drive their motorcycle longer, 24 men has from 10 to 15 years of experience, while there are only 8 such women. Taking into consideration both sexes it may be stated that the highest percentage of respondents (27,8%) accounts for those who drive a motorcycle from 10 to 15 years, whereas the smallest one (20%) accounts for those respondents whose experience in motorcycling falls into the range between 4 and 6 years, it is worth mentioning that 9.6% of the surveyed women pointed out the same riding experience.

$x^2 = 4.271$, df = 3, p = 0.234

Table 4. The length of motorcycling given in years (by gender of the respondents)

The length of motorcycling given in years	Number of tested					
	Women		Men		Together	
	n	%	n	%	n	%
10-15 years	8	15.4	24	38.1	32	27.8
6-9 years	5	9.6	28	44.4	33	28.7
4-6 years	9	17.3	14	22.2	23	20.0
0-3 years	8	15.4	19	30.2	27	23.5
Together	30	26.1	85	73.9	115	100

Source: author's own analysis

Statistical analysis made with the use of the chi-square test revealed the significant statistical relations between variables. In the case of women the highest percentage (21.2%) accounts for those who covered the distance less than 5 thousand kilometers, none of the women covered the distance more than 100 thousand kilometers, whereas the smallest percentage (7.7%) accounts for those who covered from 20 to 50 thousand kilometers. In the case of men it is slightly different – since the highest percentage (30.2%) accounts for the respondents who covered from 5 to 10 thousand kilometers.

$x^2 = 18.899$, df = 5, p = 0.002 Rc = 0.37

Table 5. Distance covered in kilometers (by gender of respondents)

Distance	Number of tested					
	Women		Men		Together	
	n	%	n	%	n	%
>100 thousand	0	0.0	11	17.5	11	9.6
50-100 thousand	0	0.0	14	22.2	14	12.2
20-50 thousand	4	7.7	18	28.6	22	19.1
10-20 thousand	6	11.5	14	22.2	20	17.4
5-10 thousand	9	17.3	19	30.2	28	24.3
<5 thousand	11	21.2	9	14.3	20	17.4
Together	30	26.1	85	73.9	115	100.00

Source: author's own analysis

Discussion

Motorcycle accidents with certainty do not happen as frequently as car collisions, however the injuries and the consequences of the first ones are by far more severe for the motorcyclists as well as for their passengers. The motorcyclists are not protected in any way by their vehicles in contrast with car drivers. Numerous research concerning the analysis of accidents with the participation of motorcyclists and their injuries shows the broadness of the issues. The research into the major health hazards occurring in the motorcycle sport which has been carried out allows to recognize those hazards as well as the factors leading to their occurrence.

According to the analysis made by the authors of this study around 75% of the injuries motorcyclists are subjects to are both upper and lower limbs injuries, including fractures, dislocations, subluxations, damages of shoulders or joints.

The analysis of the results of research conducted by The European Association of Motorcycle Producers – ACEM (*Association des Constructeurs Européens de Motocycles*), also revealed that in the case of motorcyclists the highest percentage of traumas (around 32%) accounted for upper and lower limbs injuries (around 24%) [3, 12].

According to the analysis made by the authors of this study the majority of the respondents (84%) pointed out that the main cause of collisions and falls of different types as well as other sorts of accidents was the irresponsibility of a car driver. This is the very group of traffic participants which is responsible for the majority of collisions. It may result from the fact that in our country drivers are not accustomed to looking into mirrors, do not pay enough attention to others who take part in the traffic. The equally important cause of the accidents in the opinion of respondents (around 20% responses) is the excessive speed not adjusted to the road conditions.

On the basis of the results of research conducted by The European Association of Motorcycle Producers – ACEM, it may be stated that cars were most frequently in collisions with motorcycles (around 60% cases). Hence they created the biggest hazard for the motorcyclists [3, 5, 6, 12].

The results of own research show that over 60% of motorcyclists do not always use the complete motorcycling suit, i.e. the one which would allow to limit potential injuries during an accident with high speed. This is of particular importance as far as putting on a motorcycle helmet is concerned. Such behavior may result from the fact that among the respondents there are young, inexperienced beginners just starting motorcycling. Such persons who are guided by bravado may not exercise full consciousness of the fact that the helmet is a crucial body protection which may save life.

Wearing a motorcycling suit is meant to reduce the scale and degree of body injuries which may be sustained during road accidents [38, 39]. According to the authors of the publication entitled *Costs of Injuries Resulting from Motorcycle Crashes* [29] there is a correlation between the use of motorcycling clothing and the weakening of the severity of injuries, mainly of lower limbs. The function of motorcycling clothing is to protect a motorcyclist from injuries, damages and atmospheric factors. Yet, it is necessary to remember that motorcycling clothing also influences the organism of a motorcyclist (with high temperatures it reduces the perception of a rider). The research mentioned above

did not show however that the motorcyclists did not use the complete protective clothing [38, 39].

The type of a motorcycle which definitely most frequently took part in accidents is described as a sports motorcycle or the so called racing motorcycle. This type of a motorcycle reaches very high speed. However, it is designed for professional riders who possess sufficient knowledge of the vehicle itself and above all adequate experience. The straight majority of persons surveyed who were in a collision, i.e. around 89% of respondents, owned a sports motorcycle. The least, i.e. around 9% owned a scooter and around 2% had any accident riding this type of a motorcycle.

The results of research conducted by The European Association of Motorcycle Producers show that the majority of motorcycles which were in any types of collisions constituted sports motorcycles (65% cases) as well as cross/enduro type motorcycles (45%). It is worth emphasizing that the first were in collisions which took place on the outskirts of towns or cities while the latter were more often in collisions which happened on A roads or at the intersections [33].

Conclusions

The current discussion may be put into the framework of clear conclusions. They constitute a peculiar summary of issues raised in this article. The first conclusion coming to one's mind is the statement that the most common health hazards occurring in the motorcycle sport are injuries of limbs and the spine. Secondly – health hazards occurring in the motorcycle sport are not dependent on the place of residence. Thirdly – the occurrence of health hazards differs significantly in selected age groups and fourthly – the motorcyclists' knowledge of the causes of accidents has significance to the reduction of the frequency of the occurrence of health hazards.

Taking into consideration the constantly growing popularity of the motorcycle sport it seems to be justified to continue research on the subject.

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THE LEVEL OF NURSES' KNOWLEDGE ABOUT THE COMPLICATIONS OF GALLSTONE DISEASE FOLLOWING LAPAROSCOPIC CHOLECYSTECTOMY

POZIOM WIEDZY PIELĘGNIAREK NA TEMAT POWIKŁAŃ KAMICY PĘCHERZYKA ŻÓŁCIOWEGO PO CHOLECYSTEKTOMII LAPAROSKOPOWEJ

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ABSTRACT

Introduction. Gallbladder disease is a condition involving the accumulation of bile deposits in the gallbladder consisting of chemical compounds normally dissolved in bile and eliminated to the gastrointestinal tract. A high standard of nursing care is a significant factor in patient recovery, especially that laparoscopy, though less invasive than the traditional open surgery, nevertheless carries the risk of complications. Close monitoring of patients and proper performance of nursing procedures contribute to faster recuperation of hospitalized patients.
Aim. The aim of the project was to evaluate the knowledge of nurses regarding proper care for patients who undergo laparoscopic cholecystectomy and complications of the procedure. Work seniority was compared with the rates of correct answers.
Material and methods. The study was conducted using a diagnostic survey, using a questionnaire as the research instrument. The questionnaire consisted of 11 multiple choice questions. Participants were 45 nurses from three departments of the following hospitals: Regional Specialist Hospital in Siedlce and the Witold Orłowski Independent Public Teaching Hospital in Warsaw.
Results. The fewest correct answers were given by the nurses working at the Department of General and Vascular Surgery in Siedlce. The nurses from the Department of Clinical Nutrition and Surgery and the Department of Clinical General and Gastrointestinal Surgery in Warsaw had the same number of correct answers in the questionnaire.
Conclusions. The nurses demonstrated a sufficiently high level of knowledge. A correlation was found between work seniority and the number of correct answers.

KEYWORDS: gallbladder disease, nursing care, laparoscopic cholecystectomy.

STRESZCZENIE

Wstęp. Kamica pęcherzyka żółciowego to schorzenie polegające na odkładaniu się złogów żółciowych, zbudowanych z substancji chemicznych, w pęcherzyku żółciowym, które w warunkach fizjologicznych rozpuszczane są w żółci i dalej usuwane do przewodu pokarmowego. Wysoki poziom opieki pielęgniarskiej jest istotnym elementem w procesie rekonwalescencji pacjenta, zwłaszcza że laparoskopowa chirurgia, będąc mniej inwazyjną metodą od zabiegu z klasycznego otwarcia, niesie ze sobą ryzyko powikłań. Prawidłowa obserwacja pacjenta oraz poprawne wykonywanie zabiegów pielęgniarskich przyczyniają się do szybszego powrotu do zdrowia hospitalizowanych pacjentów.
Cel. Celem pracy była ocena poziomu wiedzy pielęgniarek obejmującej zagadnienia opieki nad pacjentem po cholecystektomii laparoskopowej oraz powikłania wynikające z wykonania tego zabiegu. Porównywano staż pracy z odsetkiem udzielonych prawidłowo odpowiedzi.
Materiał i metody. Badanie przeprowadzono metodą sondażu diagnostycznego, wykorzystując jako narzędzie badawcze kwestionariusz ankiety. Ankieta zawierała 11 pytań zamkniętych jednokrotnego wyboru. W badaniu wzięło udział 45 pielęgniarek z trzech oddziałów następujących szpitali: Wojewódzkiego Szpitala Specjalistycznego w Siedlcach oraz Samodzielnego Publicznego Szpitala Klinicznego im. prof. Witolda Orłowskiego w Warszawie.
Wyniki. Najmniej poprawnych odpowiedzi udzieliły pielęgniarki pracujące na Oddziale Chirurgii Ogólnej i Naczyniowej w Siedlcach. Pielęgniarki z Oddziału Klinicznego Żywienia i Chirurgii oraz Oddziału Klinicznej Chirurgii Ogólnej Przewodu Pokarmowego w Warszawie uzyskały taką samą ilość poprawnych odpowiedzi w kwestionariuszu ankiety.
Wnioski. Stan wiedzy pielęgniarek oceniono na zadowalająco wysoki. Wykazano zależność pomiędzy stażem pracy a ilością poprawnie udzielonych odpowiedzi.

SŁOWA KLUCZOWE: kamica pęcherzyka żółciowego, opieka pielęgniarska, cholecystektomia laparoskopowa.

Introduction

Gallstones (cholelithiasis) are the most common biliary disorder. The formation of stones in the biliary duct is due to excessive secretion of cholesterol into bile, while biliary deposits can form in the gallbladder and in the extrahepatic and intrahepatic bile ducts. Gallstones are

usually composed of bile pigments, cholesterol, and mixed structures, e.g. combining proteins and calcium salts [1, 2].

Worldwide, the prevalence of gallbladder disease is between 10 and 20 per cent, with women being affected three times more often than males. Risk factors include age, multiple pregnancies in women, inappropriate weight-loss diet, diabetes, vagotomy, cirrhosis of the liver, genetics and prolonged parenteral nutrition. The incidence in Poland is 14%, with the disease affecting 18% of women and 8.2% of men.

Conditions that increase cholesterol secretion into bile and thus contribute to the formation of bile deposits are hyperadrenocorticism, diabetes, hypothyroidism and other endocrine disorders. A further risk factor for gallstones is high fat consumption. Gallstones can present as either symptomatic or asymptomatic. 20% of patients with deposits in the gallbladder experience no pain from the condition. The main and characteristic symptoms of the disease include acute pain in the right upper quadrant abdominal pain. In addition to pain, patients may experience nausea, vomiting, tympanites and restricted movement due to intense pain.

Ultrasonography is the diagnostic method of choice in bile duct diseases. Detailed history and physical examination can help determine the type of pain and factors that aggravate the discomfort. The purpose of that course of action is to assess the gallbladder and biliary duct, as well as organs such as the pancreas and liver.

Surgery is the effective therapeutic protocol for gallbladder diseases. Laparoscopic cholecystectomy is the most commonly used minimally invasive procedure. It is currently a much better alternative for patients to the traditional open surgery, primarily because it minimizes pain, cuts hospitalization time and ensures faster resumption of physical activity [6].

Laparoscopic gallbladder removal requires three to four small openings in order to introduce surgical instruments and a camera to the peritoneal cavity. To increase the field of view, pneumoperitoneum is established by the injection of carbon dioxide which raises the abdominal wall to reveal the surgical area. The first trocar, containing the camera, is inserted above or below the umbilicus. Subsequent trocars are used to insert a suction tube, forceps to grasp and manipulate the gallbladder and to prepare and apply clips [8].

Complications of full-blown gallbladder disease may include: acute pancreatitis, acute cholecystitis, and cholangitis. Cholangitis may result in: empyema, hydrocholecystis, gallbladder gangrene and perforation, as well as biliary cirrhosis, biliary peritonitis and liver abscess.

Laparoscopic cholecystectomy is currently the gold standard in the treatment of gallstones. Despite its advantages, the procedure carries the risk of complications. They mainly include operative complications associated with the establishment of pneumoperitoneum, insertion of trocars into the abdominal cavity, and postoperative complications [5, 11, 12].

Intra-operative haemorrhages are due mainly to the tearing of the liver capsule where it connects with the gallbladder, clipping the main trunk of the cystic artery and the branches of the cystic artery during separation from the gallbladder bed. Another complication of the intra-operative kind is opening of the gallbladder lumen resulting in gallstones dropping out. This makes successful completion of the laparoscopy difficult and may occur when the gallbladder is forcefully extracted from the abdominal cavity or pulled with forceps. Thermal lesions in the form of bile duct wall burns are caused by incompetent manipulation of instruments.

A group at high risk of complications from pneumoperitoneum are patients with respiratory system conditions who exhibit slow heart rate, increased levels of carbon dioxide and hypotension, air embolism. If air embolism occurs, the injection of carbon dioxide must be stopped. In all subjects, carbon dioxide is easily absorbed into the blood; within 4 hours after surgery most of the gas is eliminated via the respiratory system. Filling the abdominal cavity with gas may cause shoulder pain. This happens when carbon dioxide is rapidly injected into the abdominal cavity or its presence results in diaphragm irritation. In subjects with a history of multiple abdominal surgeries, intestinal perforation may occur due to its adhesion to the anterior abdominal wall. Lesions of this kind are usually resolved laparoscopically during the procedure, although the decision is made during surgery and depends on the patient's status and the size of the lesion.

The insertion of trocars may result in abdominal wall haemorrhage that usually resolves spontaneously. Lesions in the abdominal cavity may affect: inferior vena cava, mesenteric blood vessels and the aorta as bleeding sites. Injuries can also occur during electrocoagulation, instrument manipulation, insertion of trocar, or Veress needle. These complications are usually managed laparoscopically; in special cases a classic open surgery of the abdominal cavity is performed [10, 13].

Pain, fever, hypotension and the elevated heart rate are some of the post-operative complications that can be caused by infections and intraabdominal abscesses. The recommended course of action is ultrasound and CT, followed by the aspiration of pus. Infections of wounds in the navel area are unproblematic and usually

treated topically while observing recommended hygiene and wound dressing procedures [9].

Laparoscopic cholecystectomy may result in bile leakage and formation of a bile reservoir. This causes pain and results from bile leaking from the site in the liver; in extreme cases bile leakage may be due to bile duct injuries. Treatment involves drainage guided by ultrasound, CT or exploration of the abdominal cavity by laparoscopy or open surgery. A biliary leakage stopped within a few days can be managed with conservative treatment [3, 4, 7].

The most dangerous iatrogenic complication is the inter-operative bile duct stricture or complete sectioning, which is an indication for bile duct reconstructive surgery. Such a serious bile duct trauma requires a diagnostic or therapeutic ERCP procedure with cannulation and stenting of bile ducts. In cases where endoscopic bile duct repair is impossible, surgery is recommended.

Aim

1. To analyse the knowledge of nurses at the Department of General and Vascular Surgery in Siedlce, Department of Clinical Nutrition and Surgery in Warsaw and Department of General and Gastrointestinal Surgery regarding complications of laparoscopic cholecystectomy due to gallbladder disease.
2. To demonstrate correlations between work seniority and actual level of knowledge regarding complications of laparoscopic cholecystectomy due to gallbladder disease.

Material and methods

A diagnostic survey was used to evaluate nurses employed at Wojewódzki Szpital Specjalistyczny (Regional Specialist Hospital) in Siedlce and Samodzielny Publiczny Szpital Kliniczny im. Prof. Witolda Orłowskiego (Prof. Witold Orłowski Independent Public Teaching Hospital) in Warsaw. Participants were 45 registered nurses, 15 from the Department of General and Vascular Surgery in Siedlce, 15 from the General and Gastrointestinal Surgery Department in Warsaw and 15 from the Department of Clinical Nutrition and Surgery in Warsaw.

The questionnaire consisted of 11 multiple choice items. The items included questions about symptoms of complications, types of complications following laparoscopic cholecystectomy, prevention of complications and their management.

Results

In the first part of the questionnaire, the most challenging for the participants were the questions about the complications associated with air embolism during laparoscopic cholecystectomy, i.e. questions 4 and 5. Question four asked what type of the complication intestinal puncture during laparoscopy constituted. Only 16 out of 45 respondents answered correctly, with no correct answers provided by nurses employed at the Regional Hospital in Siedlce. 11 nurses working at the Department of Clinical Nutrition and Surgery in Warsaw and 5 nurses from the Department of General and Gastrointestinal Surgery in Warsaw answered the question correctly. Only 9 nurses gave the right answer to Question 5 related to air embolism during laparoscopic cholecystectomy.

The rates of correct answers were related to the place of employment. The fewest correct answers were given by the nurses working at the Department of General and Vascular Surgery in Siedlce. The nurses from the Department of Clinical Nutrition and Surgery and the Department of General and Gastrointestinal Surgery in Warsaw had the same number of correct answers in the questionnaire.

The analysis of the effects of seniority on the number of correct answers revealed a direct proportionality between the number of correct answers and the number of participants with a given number of years of work experience. Nurses with 10 or more years of service answered significantly more questions correctly than nurses working for less than a year, who gave the most incorrect answers.

With respect to self-assessment by the medical staff, as many as 26 nurses evaluated their knowledge as sufficient for taking care of patients who undergo laparoscopic cholecystectomy. In addition, 35 surveyed nurses admitted they would be willing to undergo additional training on post-laparoscopic cholecystectomy complications. Three out of four nurses with less than 1-year experience declared willingness to attend training, even though only one of them considered her knowledge to be insufficient. The greatest number of nurses willing to attend training was among those with over 10 years of seniority. Nurses with 1–5 and 5–10 years' experience were relatively less interested in training.

Discussion

Cholecystectomy is a relatively common surgical procedure. Today, the laparoscopic procedure is performed more often than classic open surgery. Despite significant progress in medical science and treatment methods, laparoscopic cholecystectomy still carries the risks of procedure-related complications. Efficient cooperation among the team of diagnosticians and modern methods have reduced hospitalization time and improved patients' general status post-surgery. Overall, the complications are less severe that those resulting from open surgery. Thus, the laparoscopic procedure has significantly more benefits to patients.

Nursing care extended to patients undergoing laparoscopic cholecystectomy is crucially important considering that nurses spend the most time with patients during working hours. They should therefore be adequately trained in recognizing the initial symptoms indicative of post-operative complications. Laparoscopic gallbladder removal is a rapidly developing area of medicine; nursing knowledge is invaluable in working with patients and guarantees their safety during hospitalization.

The present survey helped establish the current knowledge and patient care skills following laparoscopic cholecystectomy. It also demonstrated the level of competence in taking care of patients diagnosed with post-operative complications.

Conclusions

1. The data on the number of nurses interested in expanding their competences and knowledge on the care for patients following laparoscopic cholecystectomy are encouraging.
2. A crucial aspect of nurses' profession is education in patient care combined with work experience, which is why it is so important to hold scientific meetings and provide training in new skills for nurses.
3. The level of knowledge of nurses at the Regional Specialist Hospital in Siedlce and the Witold Orłowski Independent Public Teaching Hospital in Warsaw is assessed as high.

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DIETARY INTERVENTION OR VITAMIN AND MINERAL SUPPLEMENTATION DURING PREGNANCY?

INTERWENCJA DIETETYCZNA CZY SUPLEMENTACJA WITAMINOWO-MINERALNA PODCZAS CIĄŻY?

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ABSTRACT

Introduction. Pregnancy increases demand for many minerals and vitamins. Most of them should be provided primarily in a well-balanced diet, not just by supplementation using pharmaceutical products.
Aim. The aim of the paper was to determine whether a correctly managed individual dietary intervention in pregnant patients leads to improvement of their nutrition and hence provision of necessary minerals and vitamins vital in terms of pregnancy.
Material and methods. 57 healthy pregnant women with a correct body mass index, aged 22–41 were enrolled. Diet of the participants was assessed three times: upon enrolment (before the dietary intervention was introduced), after week 10, and after week 18 based on their food diaries filled in on an on-going basis.
Results. Insufficient intake of most minerals and vitamins was noted prior to the dietary intervention. After 18 weeks of the intervention, clearly too low intake expressed as a percentage of recommended intake was noted for iron and folates. The diet did not provide the required amount of potassium as well.
Conclusions. Patients who underwent an 18 week dietary intervention during pregnancy are capable of providing sufficient amounts of most minerals and vitamins through a proper dietary balance. Folic acid is an exception and it should be provided from other sources as well. Pregnant women should also consider supplementation of iron as, according to the study, patients are capable of providing only half of the recommended intake of this important mineral. In order to complement potassium, intake of foodstuffs rich in this mineral should be increased.

KEYWORDS: diet in pregnancy, dietary intervention, pregnancy, supplementation, diet.

STRESZCZENIE

Wstęp. Podczas ciąży wzrasta zapotrzebowanie na wiele składników mineralnych i witamin. Pokrycie zapotrzebowania na większość z nich powinno być realizowane przede wszystkim poprzez prawidłowe bilansowanie diety, nie zaś wyłącznie poprzez suplementację preparatami farmaceutycznymi.
Cel. Celem pracy było zbadanie, czy odpowiednio prowadzona zindywidualizowana interwencja dietetyczna u pacjentek ciężarnych prowadzi do poprawy sposobu żywienia kobiet i związanego z tym pokrycia zapotrzebowania na ważne z punktu widzenia ciąży składniki mineralne i witaminy.
Materiał i metody. Do badań zgłosiło się 57 zdrowych kobiet ciężarnych z prawidłowym wskaźnikiem masy ciała (BMI), w wieku od 22–41 lat. Sposób żywienia badanych oceniany był – na podstawie prowadzonego przez pacjentki dzienniczka bieżącego notowania – trzykrotnie tj. po zgłoszeniu się do badań, czyli przed wdrożeniem interwencji dietetycznej oraz po 10 i 18 tygodniach jej przebiegu.
Wyniki. Przed rozpoczęciem interwencji żywieniowej obserwowano niedostateczną podaż większości składników mineralnych i witamin. Po 18 tygodniach interwencji zdecydowanie zbyt niskie spożycie, wyrażone jako procent normy spożycia, odnotowano wyłącznie w przypadku żelaza oraz folianów. Dieta nie pokrywała także w pełni zapotrzebowania na potas.
Wnioski. Pacjentki poddane podczas ciąży 18-tygodniowej interwencji dietetycznej są w stanie, poprzez prawidłowe bilansowanie diety, pokryć zapotrzebowanie na większość składników mineralnych i witamin. Wyjątek stanowi kwas foliowy, w którą to witaminę dieta powinna być uzupełniana (głównie z uwagi na profilaktykę wad cewy nerwowej). U ciężarnych należy rozważyć także suplementację żelaza, gdyż jak wynika z niniejszych badań, pacjentki są w stanie tylko w połowie pokryć zapotrzebowania na ten ważny składnik mineralny. Natomiast w celu uzupełnienia potasu w diecie, należałby zwiększyć spożycie bogatych w ten składnik mineralny nasion roślin strączkowych (które były w niewielkich ilościach uwzględniane przez ciężarne w jadłospisie) lub innych bogatych w potas produktów spożywczych.

SŁOWA KLUCZOWE: interwencja dietetyczna, ciąża, suplementacja, dieta.

Introduction

During pregnancy the demand for many minerals and vitamins increases. Pharmaceutical products that contain these nutrients should be used in justified cases as dietary supplements, not as an alternative to natural, wholegrain products, diary products, meat, fish, vegetables, or fruit.

Supplements of folic acid are an exception. They are recommended for women prior to conception and in pregnancy until the end of organogenesis. The recommended amount of folic acid to prevent development of open defects of the central nervous system is 0.4 mg a day. Folic acid is a key contributor to the process of production of nucleic acids (vital for correct division of foetal cells), participates in production of blood in the mother and the foetus, prevents premature labour, and low birth weight. Metabolism of homocysteine depends on correct intake of folic acid as well. It has been found that as a result of supplementation of folic acid in pregnant women prior to conception and in the first weeks of pregnancy, their children exhibited a significant reduction of occurrence of congenital disorders of the neural tube, including anacephaly, spina bifida, myelomeningocoele, and encephalocele [1–3].

Currently, complementation of folic acid products with vitamin B12 is being considered as B12 deficiency in pregnant women serum may increase the risk of neural tube defects in the foetus. During pregnancy blood concentration of this vitamin is reduced due to hemodilution, hormonal changes, variations of binding proteins levels, and increased transfer of B12 to the foetus, which is incapable of vitamin B12 synthesis [4].

In recent years, increasingly more attention is paid to properties of vitamin D. The primary role of vitamin D is to regulate calcium-phosphate metabolism. Studies have shown that maintenance of the right homoeostasis of vitamin D and calcium may decrease the risk of insulin resistance and type 2 diabetes; insufficient concentration of vitamin D has a negative impact on functions of pancreatic beta cells and insulin secretion [5]. Reduced mineralisation of the osseous tissue and even osteomalacia were found in multiparous women who gave births in short intervals and had calcium and vitamin D deficiency. Vitamin D affects also processes of transcription of over 200 genes and has tumour suppressive (reduced risk of some neoplasms), immunomodulating (activation of antibacterial peptides genes), and anti-inflammatory (restriction of cytokines secretion) properties. Natural sources of vitamin D include fish fats, but 80–100% of vitamin D is synthesised by the body upon skin exposure to UV radiation. It has been demonstrated that the supplementation of vitamin D3 reduces the risk of bacterial vaginosis related to some pregnancy complications. Nevertheless, recommendations to supplement vitamin D apply solely to women who live in countries with insufficient sun exposure or those who cover most of their body for cultural reasons. Recommended daily intake for pregnant and breast-feeding women with dietary D3 deficiency or limited skin synthesis was 800–1000 μg a day. Today the dose of 2000 IU a day is said to be justified [2, 6].

Iron and calcium are minerals of particular importance during pregnancy. Calcium is a component of the skeleton and improper intake of this mineral during pregnancy may result in metabolic complications in the mother and the foetus. The most common complications include osteopenia, osteoporosis, hyperaesthesia, dystonia in the mother and inhibited growth of the foetus with bone mineralisation disorders. Calcium demand increases in the second and third trimester and during lactation. The process of calcium absorption in the GI tract is influenced by vitamin D and organic acids, lactose, and indigestible oligosaccharides. Oxalates and phytates from diet inhibit absorption of calcium. High intake of proteins of animal origin, overuse of salt, and coffee are all related to excessive loss of calcium in the system. Maintaining the right calcium-phosphorus balance, which prevents bone resorption, is vital as well. The additional calcium demand should be satisfied with increased consumption of milk or dairy products [2, 7].

Women who eliminate dairy products from their diet (e.g. vegans, lactose-intolerant women, or those allergic to milk proteins) should eat substitute calcium-rich products, including calcium-fortified foods. Alternative sources of calcium include: beans, soy, eggs, fish whose fishbone is edible, almonds, nuts, dried figs, broccoli, and kale. Examples of calcium-fortified foodstuffs are vegetable milk, orange juice, tofu, wholemeal bread. According to numerous studies, water may be an important source of many minerals; it may be the most important source of calcium second to milk and dairy products. Water can be a good source of calcium if it contains more than 150 mg of calcium ions per litre [8].

It has been found that the combination of calcium supplementation and correct metabolism of vitamin D improves its bioavailability. Calcium is used as well as a vital component in preventing pre-eclampsia by normalisation of arterial pressure. Randomised studies demonstrated a significant reduction of incidence of pre-eclampsia achieved with calcium supplementation in high-risk nulliparous women [9–15].

The risk of calcium insufficiency is greater in people who avoid the sun, multiparous women, and breast-feeding women. Daily calcium demand increases in breast-feeding and young women and amounts to about

1200 mg, which, if not compensated for in diet, requires supplementation with oral preparations. The risk of preterm labour and low birth weight was found to be reduced in young pregnant women who received calcium supplementation. The beneficial influence of calcium on prevention of preterm labour probably results from the fact that it relaxes smooth muscles of the uterus [6, 16].

Iron deficiency in pregnancy may result in anaemia. Iron deficiency anaemia may cause preterm labour and low birth weight [16, 17]. First and foremost, an attempt should be made to include in the diet natural foodstuffs that contain iron, i.e. low-fat meat (in particular red meat), fish, dried fruit, wholegrain products, legumes, and other. If it is impossible to provide the adequate amount of iron, dietary supplementation should be commenced. A randomised study has confirmed that iron supplementation in mothers increased birth weight by over 200 g and limited the risk of low birth weight and preterm birth [18]. Supplementation with iron compounds should be implemented in particular in women who suffered from anaemia prior to conception and reinstated after week 8 of pregnancy. Iron supplementation is recommended in pregnant women with a risk of anaemia, i.e. in women on a vegan diet, in absorption disorders, and in women with anaemia (Hb < 11 mg/dl). It is also justified to continue intake of iron preparation during lactation as it reduces the risk of anaemia in the child [6].

During pregnancy, vitamins and minerals are important due to rapid metabolism and development of the foetus. Nevertheless, over-supplementation may be dangerous [19]. For example, the recommended daily intake of vitamin A in pregnant women above the age of 19 is 770 µg (20). Vitamin A insufficiency is a rare problem, but overdose may cause congenial disorders in the foetus. What is more, supplementation of vitamin A in doses exceeding the recommended dosage during pregnancy may be teratogenic [2, 6, 21].

Aim

The aim of this study was to determine whether an individualised dietary education in pregnant patients leads to improvement of their nutrition and hence provision of the sufficient amounts of all necessary minerals and vitamins vital in terms of pregnancy that are commonly taken in pregnancy as dietary supplements.

Material and methods

The study involved 57 pregnant women. All the pregnant women were notified orally and in writing prior to enrolment about detailed plan, assumptions, and scope of the study, and gave written consents to take part in the study. The study project was approved by the Independent Ethics Committee at the Karol Marcinkowski Medical University in Poznań (decision No. 248/10).

The women were provided care by a gynaecologist, and on average from week 16 of pregnancy of a dietician who provided a regular, individual dietary education programme. The mean age of patients at day 0 was 29.35±3.44 years; body mass index (BMI) was 22.04±2.52 (**Table 1**). For every participant, data for the period before the dietary intervention and for week 10 and 18 of the intervention collected in daily dietary logbooks was analysed using the Dietetyk 2 software (Institute for Food and Nutrition). Nutrition value of food rations was compared to the demand of each participant determined individually in relation to norms of the Institute for Food and Nutrition (20).

Statistical analysis

Mean values, standard deviation, and median were calculated, and the data analysed with the Wilcoxon test. The assumed statistical significance level was $p<0.05$.

Table 1. General profile of the study population

Parameter	n=57				
	Mean	Standard deviation	Median	Min.	Max.
enrolment (week of pregnancy)	15.91	4.97	15	8	23
age upon enrolment (years)	29.35	3.44	28	22	41
Body mass prior to pregnancy (kg)	62.97	7.84	61	49	86.6
Body height (m)	1.69	0.06	1.69	1.59	1.84
BMI prior to pregnancy (kg/m2)	22.04	2.52	21.6	18.78	31.43

Source: author's own analysis

Results

Prior to the dietary intervention, the study group exhibited insufficient intake of most minerals such as iron, potassium, calcium, and magnesium and vitamins: folates, vitamin D, niacin, vitamin B_1, and vitamin E. The degree of coverage of nutritional norms was verified against norms of the Institute for Food and Nutrition set individually for each patient (20).

After 10 weeks of the intervention, a statistically significant increase of intake of almost all vitamins and minerals that were insufficiently provided before was noted (except for niacin). After 8 more weeks of the intervention, too low intake (for only about a half of demand) expressed as a percentage of normal intake was noted for iron and folates. Moreover, the potassium content in diet was insignificantly lower than recommended (**Figures 1, 2**).

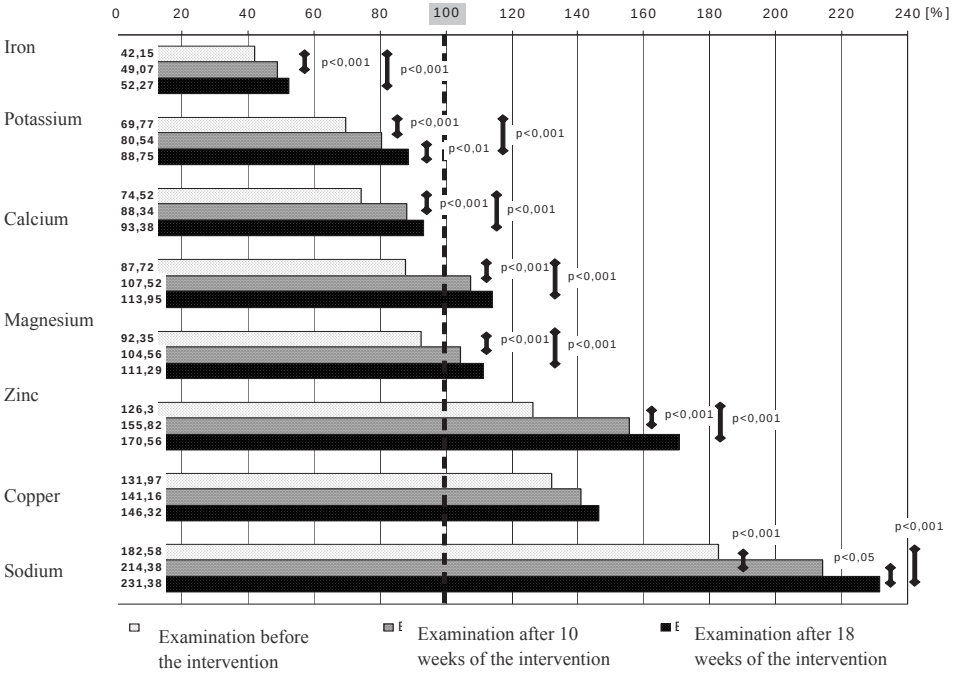

Figure 1. Changes in mineral content in DFI (daily food intake) as compared to the nutrition norm assessed after 10 and 18 weeks of the dietary intervention

Source: author's own analysis

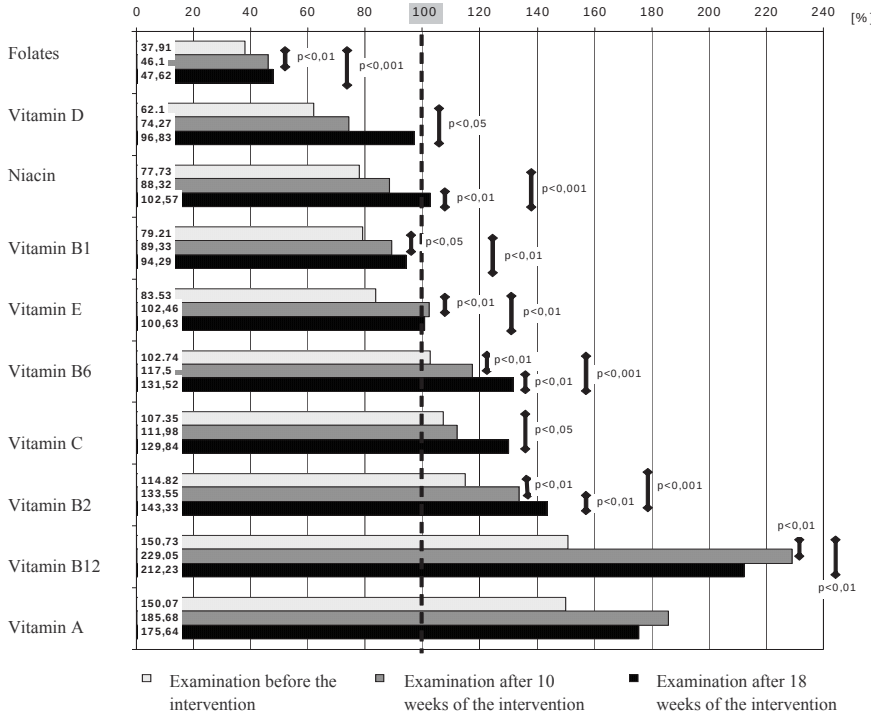

Figure 2. Changes in vitamin content in DFI (daily food intake) as compared to the nutrition standard assessed after 10 and 18 weeks of the dietary intervention

Source: author's own analysis

Discussion

Study results indicate that pregnant patients whose demand for many minerals and vitamins increases should first and foremost modify their diet so that it would provide nutrients necessary both for the mother and the foetus in a natural way. This facilitates much better results in terms of health than a substitution of varied diet with mineral and vitamin preparations [21].

Nevertheless, according to the study, it is extremely difficult to provide sufficient amount of folic acid with food. Folic acid should, therefore, be supplemented. An increased dose of folic acid should be used in obese patients, during the treatment of megaloblastic anaemia, in women who used the hormone contraception, antiepileptic drugs, smoked cigarettes, and in women who suffer from hyperhomocysteinaemia with reduced activity of methylene tetrahydrofolate reductase (MTHFR). If this enzymatic block is diagnosed, it is recommended to complement the diet with folic acid also in the form of active folates (no studies on complete substitution of folic acid with metafolin in prevention of open defects of the central nervous system) [6, 22–24].

Supplementation with mineral and vitamin preparations is also recommended in pregnant women with anaemia caused by iron deficiency, in pregnant women who eat small amounts of food of animal origin or vegetarians, in multiple pregnancies, and in HIV positive women. In vegans and lacto-ovo vegetarians, supplementation of vitamin B12 is also vital [25].

In regular pregnancies, the decision to supplement minerals and vitamins with preparations, on the other hand, should always be made after consulting a physician and analysing diet by a dietician who specialises in pregnancy nutrition. Supplementation should be aimed to provide nutrients that are necessary according to the physician providing prenatal care and that were found in insufficient amounts in diet analysis.

According to the study, despite 18 weeks of individual dietary intervention aimed to teach pregnant women how to correctly diversify diet, and the introduction of many changes to participants' diets, only about 50% of demand for folic acid and iron could be satisfied. Supplementation of these components throughout the whole period of pregnancy should therefore be necessary. Intake of potassium was also slightly below the norm. In this case, it would be enough to increase intake of legumes (which were included by pregnant women in their diets to a small extent) or other potassium-rich foodstuffs such as nuts, some fish, and wholegrain bread to cover demand norms.

Conclusions for practice

1. The 18 weeks of a dietary intervention improved diet of 57 pregnant participants. As a result of varied diet, the women were able to satisfy the demand for most minerals and vitamins except for folic acid, iron, and potassium.
2. All pregnant women should take folic acid supplement during pregnancy. What is more, iron supplementation should be considered individually as, according to the study, meeting nutritional norms during pregnancy when the demand is greater is impossible using only dietotherapy.
3. The decision to supplement other minerals and vitamins with dietary preparations, on the other hand, should each time be made after consulting a physician, analysing patient's health, individual dietary education, and analysing patient's diet by a dietician. Supplementation should be aimed to provide nutrients that were found to be deficient in diet analysis and are necessary as regards patient's health.

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FREE RADICAL PROCESSES IN RATS' ORGANISMS ON THE BACKGROUND OF DRINKING WATER WITH DIFFERENT CONTENTS OF SODIUM AND POTASSIUM STEARATE IN COMBINATION WITH MAGNESIUM

ВІЛЬНОРАДИКАЛЬНІ ПРОЦЕСИ В ОРГАНІЗМІ ЩУРІВ НА ФОНІ ВЖИВАННЯ ВОДИ З РІЗНИМ ВМІСТОМ СТЕАРАТАМИ КАЛІЮ ТА НАТРІЮ В КОМБІНАЦІЇ З МАРГАНЦЕМ

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ABSTRACT

The effect of drinking water with different contents of sodium and potassium stearate in combination with magnesium on lipid peroxidation and antioxidants in rats' organisms was examined. After that it was established that the prolonged use of water that had concentrations of potassium and sodium stearate in different doses affected the experimental animals' hepatocyte cell membranes due to the activation of lipid peroxidation and antioxidant system suppression. The combination of stearates and magnesium increases the toxic effects.

KEYWORDS: potassium stearate, sodium stearate, magnesium chloride, lipid peroxidation, thiobarbituric reactive substances, conjugated dienes, catalase, superoxide dismutase.

АНОТАЦІЯ

Вивчено вплив питної води з різним вмістом стеарату калію та натрію в комбінації з магнієм на перекисне окислення ліпідів і стан антиоксидантного захисту в організмі щурів. Встановлено, що тривале вживання піддослідними тваринами питної води з концентраціями стеарату калію та натрію в різних дозах негативно впливає на стан клітинних мембран гепатоцитів внаслідок активації процесів перекисного окиснення ліпідів та пригніченню антиоксидантної системи. Комбінація стеаратів з магнієм навіть посилює їх токсичну дію.

КЛЮЧОВІ СЛОВА: стеарат калію, стеарат натрію, магнію хлорид, перекисне окислення ліпідів, антиоксидантний захист, ТБК-активні продукти, дієнові кон'югати, каталаза, супероксиддисмутаза.

Постановка проблеми

Відомо, що здоров'я людини значною мірою залежить від якості води, яку вона вживає. Високий рівень забруднення джерел питного водопостачання, недостатня ефективність існуючих технологій водопідготовки, низький рівень забезпеченості водою населення викликають погіршення якості води. Однією з причин недостатньої якості питної води є низька якість природної води, яка постійно забруднюється стічними водами промислових та комунальних підприємств, поверхневими стоками з полів і територій населених пунктів з якими потрапляє велика кількість токсичних речовин [1]. Серед них не останнє місце займають поверхнево-активні речовини (ПАР) і важкі метали (ВМ).

На думку багатьох вчених, ПАР - мало токсичні для тварин і людини речовини [2,3]. Проте, ці речовини, маючи деяку хімічну спорідненість з відповідними компонентами мембран клітин, при надходженні в організм накопичуються на клітинних мембранах і при досягненні відповідної концентрації можуть викликати порушення ряду важливих біохімічних процесів. ВМ також мають виражені мембранотоксичні властивості, впливають на активність ензимів та перебіг біохімічних процесів, здатні до кумуляції в тканинах і за тривалої дії спричинюють віддалені негативні ефекти. Тому ризик для здоров'я людини та тварин зростає навіть у разі надходження їх в організм у незначній кількості [4]. Більшість токсикантів мають гепатотропну спрямованість своєї токсичної дії або метаболізуються в печінці [5]. Тому доцільним було проведення експерименту на піддослідних тваринах з метою встановлення потенційної токсичної дії комбінації ПАР і ВМ на процеси вільно-радикального окислення (ВРО) в тканинах печінки.

Аналіз останніх досліджень і публікацій

Проблеми забруднення поверхневих та підземних вод та можливість несприятливого впливу питної води з різним хімічним складом на організм водоспоживачів неодноразово розглядали вітчизняні та зарубіжні вчені, зокрема Волощенко О.Г., Гончарук В.В., Кондратюк В.А., Мудрий І.В., Омельянець М.І., Прокопов В.О., Рахманін Ю.А., Сердюк А.М., Щербань М.Г. та інші. Досліджено, що в даний час в Україні проблема забезпечення населення питною водою нормативної якості внаслідок зростання антропогенного навантаження комунальних та промислових стоків на водні ресурси загострюється, а тому екологічну ситуацію, що склалась в Україні, можна охарактеризувати як наближену до кризової, хоча встановлено вплив різноманітних хімічних сполук, які можуть надходити в організм з питною водою і регламентовані зчисленими гігієнічними нормативами. Але узагальнення літературних даних виявило недостатню кількість досліджень дії ПАР нтмима печінку на рівні порогових і підпорогових доз, особливо в комбінації з ВМ, що обмежує можливість прогнозування наслідків впливу цих чинників на здоров'я населення.

Мета статті

Встановити особливості перекисного окислення ліпідів (ПОЛ) та стану аксидантного захисту (АОЗ) в організмі піддослідних тварин, а саме в печінці, яка будучи місцем метаболізму хімічних сполук і біологічних компонентів особливо зазнає їх шкідливого впливу, при вживанні питної води з різним вмістом стеарату калію та натрію впродовж 30 днів в комбінації з марганцем.

Методологія

Досліди проведені на 78 білих безпородних щурах-самцях масою 180-200 г. Групи відбирали методом рандомізації. Експерименти проводили відповідно до конвенції Ради Європи щодо захисту хребетних тварин, яких використовують у наукових цілях, та норм біомедичної етики і «Загальних етичних принципів експериментів на тваринах», ухвалених Першим національним конгресом з біоетики (Київ, 2001). Було сформовано 13 груп по 6 тварин в кожній.

Тварини знаходилися на загально прийнятому раціоні віварію в однакових умовах і відрізнялися лише за якістю питної води, яку тварини споживали з автопоїлок. Щурі контрольної групи (К) вживали воду з міського водогону (6 тварин). Експериментальні групи (по 12 щурів) вживали питну воду з різними концентраціями стеаратів калію (StK) і натрію (StNa) в різних дозах. Тварини 1-ї групи (StK_1) вживали питну воду з вмістом стеарату калію в кількості 125,0 мг/дм^3 (що дорівнювало максимально недіючій дозі (МНД) речовини), 2-ї групи (StK_2) - 62,5 мг/дм^3 (або ½ МНД), 3-ї групи (StK_3) – 31,2 мг/дм^3 (або ¼ МНД), 4-ї групи ($StNa_1$) – вживали питну воду з вмістом стеарату натрію в кількості 125,0 мг/дм^3 (що дорівнювало МНД речовини), 5-ї групи ($StNa_2$) - 62,5 мг/дм^3 (або ½ МНД), 6-ї групи ($StNa_3$) – 31,2 мг/дм^3 (або ¼ МНД). Через 25 днів від початку експерименту кожну дослідну групу поділили на 2 підгрупи по 6 щурів, яким було внутрішньошлунково введено марганцю хлорид в дозі 1/20 від $ЛД_{50}$.

Тварин виводили з експерименту шляхом кровопускання під тіопентал-натрієвим наркозом через 30 днів від початку досліду. Вміст ТБК-активних (тіо-барбітурова кислота) продуктів визначали в гомогенаті печінки за реакцією з тіобарбітуровою кислотою [6], кількість дієнових кон'югатів (ДК) – за інтенсивністю поглинання світла гептановою фракцією [7]. Стан ферментної ланки антиоксидної системи оцінювали за супероксиддисмутазною активністю (СОД), яку визначали за ступенем інгібування відновлення нітротетразолію синього [8] та каталазною активністю (КТ), яку досліджували фотоколориметричним методом за інтенсивністю забарвлення комплексу, що утворюється при взаємодії пероксиду водню з молібдатом амонію [9]. Оцінку достовірності відмінностей між групами проводили зі застосовуванням непараметричного методу за U–критерієм Уілкоксона (Уітні–Манна) [10]. Математично–статистичну обробку отриманих результатів проводили із застосуванням програми Statistica.

Виклад основного матеріалу

До аніонних ПАР, які входять до складу синтетичних миючих засобів і широко використовуються більш ніж у 100 галузях народного господарства відносяться стеарати калію і натрію. Стеарат калію, як і стеарат натрію представляют собою суміш лужних металів і стеаратів та пальмітатів з перевагою стеарату. Токсичність стеаратів пов'язана з деструкцією їх в організмі на кислотний радикал і катіон металу, який в основному проявляє токсичну дію.

Марганець (II), який вважають відносно нетоксичним металом [11], має здатність легко змінювати ступінь окиснення, широко зустрічається у прісних водоймах, проявляючи негативну дію на гідробіонти [12]. В літературних джерелах зазначається про особливість марганцю змінювати ступінь токсичності в залежності від співвідношення рівнів концентрацій марганцю і заліза, що впливає на зміну токсичності останнього для фітопланктону [13].

Хімічне забруднення довкілля виконує роль стресора, що спричинює структурно-функціональні відхилення у клітинах та їх мембранах, порушує гомеостаз і викликає активацію перекисного окиснення ліпідів (ПОЛ) [14]. У сукупності відбувається реакція-відповідь організму на дію хімічних агентів у вигляді токсичного стресу [15].

Активні форми кисню, що утворюються у процесах ПОЛ, забезпечують цитотоксичну дію, впливають на регуляцію процесів поділу клітин, модуляцію апоптозу та ліпідні компоненти біомембран [16].

Останніми роками чимало досліджень присвячені процесам вільнорадикального перекисного окиснення ліпідів (ПОЛ). Це великою мірою зумовлено тим, що дефект в зазначеній ланці метаболізму здатний суттєво знизити резистентність організму до впливу на нього несприятливих чинників зовнішнього та внутрішнього середовища. Внаслідок вільнорадикального розриву поліненасичених жирних кислот при ПОЛ утворюються ТБК-активні продукти (ТБК-АП), які слугують біомаркером наявності цих процесів і оксидативного стресу. Таким чином, концентрація ТБК-АП відображає активність процесів ПОЛ в організмі та може бути маркером ступеня інтоксикації організму. Як правило, високий вміст ТБК-активних продуктів відповідає важкому ступеню ендогенної та екзогенної інтоксикації.

Для оцінки інтенсивності ПОЛ найбільш часто використовують кількісне визначення ДК та ТБК-активних продуктів. Досліджено, що при ПОЛ у тканинах на перших етапах утворюються ДК поліненасичених вищих жирних кислот, пізніше – ТБК-АП. Останні призводять до пошкодження клітинних мембран і стінок судин, що є одним з провідних факторів розвитку запального процесу та його хронізації .

Результати досліджень показали, що при вживанні води з різними концентраціями стеарату калію і натрію відмічалися зміни показників ПОЛ (рис. 1).

Концентрація ТБК-АП у гомогенаті печінки тварин контрольної групи дорівнювала 1,18 ± 0,03 мкмоль/кг. В інших групах цей показник був більший за виключенням тварин 3-ї групи. Так, на 30 добу експерименту в гомогенаті печінки щурів 1-ї групи відмічалося зростання концентрації ТБК-АП в 2,4 рази ($p < 0,01$), 2-ї групи – в 1,6 раз ($p < 0,01$) в порівнянні з контролем. В 3-й групі концентрація показника була практично на рівні контрольних величин.

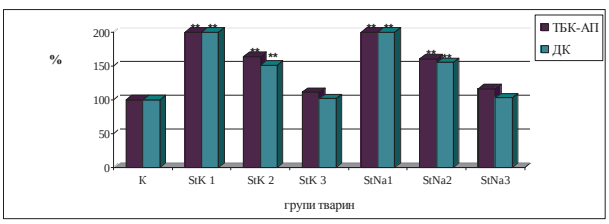

Рис. 1. Зміни показників перекисного окиснення ліпідів в гомогенаті печінки піддослідних тварин при вживанні питної води з різним вмістом стеаратів калію та натрію

(Примітка: тут і надалі * – достовірність відмінностей показників дослідних і контрольної груп (*– $p<0,1$; ** – $p<0,01$)).

Концентрація ДК в гомогенаті печінки, як видно на рис. 1, також збільшилася в порівнянні з контрольною групою. Так, в 1-й групі показник зріс в 2,2 рази ($p < 0,01$), а в 2-й – в 1,5 раз ($p < 0,01$). В 3-й групі різниці з контрольною групою практично не було. При вживанні води з різними концентраціями стеарату натрію відмічалися наступні зміни показників ПОЛ: в гомогенаті печінки тварин 4-ї групи відмічалося зростання ТБК-АП та ДК в 2,1 рази, в 5-й групі - в 1,6. В 6-й групі різниці з контрольною практично не було.

Введення щурам на фоні 25 денного споживання води з різними концентраціями стеарату калію і марганцю хлориду призвело до ще більшої стимуляції процесів ПОЛ (рис. 2). Так, кількість ТБК-АП у щурів 1-ї групи, які вживали питну воду з найбільшою концентрацією стеарату калію, після внутрішньо шлункового введення марганцю хлориду зросла в 3,6 рази в порівнянні з контрольними величинами ($p < 0,01$), а в 2-й – в 3,0 рази ($p < 0,01$). В 3-й групі кількість ТБК-АП також перевищувала контрольні величини в 2,2 рази ($p < 0,1$).

Вміст ДК у гомогенаті печінки всіх трьох дослідних груп перевищував як контрольні величини, так і показники у щурів, яким не вводили важкий метал. Так, у щурів 1-ї групи показники практично однаково зросли в 3,3 рази, а 2-ї – в 2,7 рази. Навіть в 3-й групі вони в 2 рази перевищували контрольні величини, що може свідчити про те, що марганець змінює ступінь окиснення і токсичності стеарату калію, викликаючи посилення вільнорадикальних процесів в тканині печінки.

У тварин, які вживали воду зі стеаратом натрію, спостерігалося менш виражені зміни даних показників.

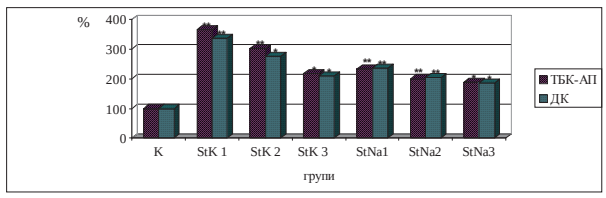

Рис. 2. Зміни показників перекисного окиснення ліпідів в гомогенаті печінки піддослідних тварин під дією субтоксичних доз марганцю на тлі вживання питної води з різним вмістом стеаратів калію та натрію.

Так, кількість ТБК-АП та ДК у щурів 4-ї групи, які вживали питну воду з найбільшою концентрацією стеарату натрію, після внутрішньо шлункового введення марганцю хлориду зросла практично однаково - в 2,4 рази в порівнянні з контрольними величинами ($p < 0,01$), в 2-й – в 2,0 рази ($p < 0,01$). В 3-й групі кількість ТБК-АП також перевищувала контрольні величини в 1,8 раз ($p < 0,1$). Якщо порівняти між собою стеарати, то можна зробити висновок, що марганця хлорид на фоні вживання

води з субтоксичним вмістом стеарату калію більш негативно впливає на печінку, ніж стеарат натрію.

Причинами посилення ВРО можуть бути зниження активності системи антиоксидного захисту, які здатні знешкоджувати активні форми кисню, котрі і є безпосередніми ініціаторами пероксидного окиснення білків, а також пригнічення активності внутрішньоклітинних протеаз, що забезпечують деградацію білкових молекул. Проведені нами дослідження активності антиоксидантних ферментів підтвердили це. Стан ферментної ланки антиоксидної системи оцінювали за активністю каталази (КТ) та супероксиддисмутази (СОД). Встановлено, що у піддослідних тварин, які споживали воду з різними концентраціями стеарату калію, було пригнічення активності цих показників (рис. 3).

У 1-й дослідній групі тварин, які вживали питну воду з вмістом стеарату калію в кількості 125,0 мг/дм^3, спостерігалося зменшення КТ в 1,9 разу ($p < 0,001$), в 2-й групі, які питну воду з вмістом стеарату калію 65,5 мг/дм^3 – в 1,2 разу в порівняні з контрольною групою. Щодо СОД, то спостерігалися наступні зміни: у 1-й групі тварин активність ензиму зменшилася в 2,4 раз ($p < 0,001$), а в 2-й групі – в 1,8 раза. В 3-й групі обидва показника мало відрізнялися від контролю.

Споживання води з різними концентраціями стеарату натрію викликало активацію ферментів АОЗ. В 4-й групі рівень КТ в гомогенаті печінки збільшився в 1,4 раза, а СОД – в 2,0 раза ($p < 0,01$). В 5-й групі зміни були менш вираженими, хоча збереглася тенденція в зростанні КТ, а кількість СОД в 1,4 раза була вища в порівняні з контрольною групою ($p < 0,01$). В 6-й групі показники мало відрізнялися від контрольних величин.

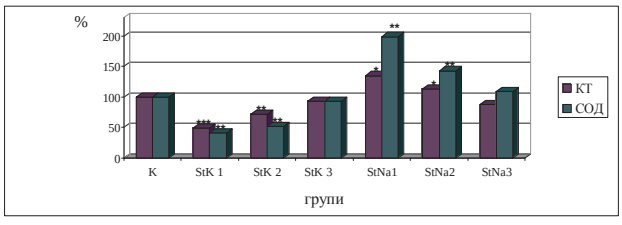

Рис. 3. Зміни показників антиоксидантного захисту в гомогенаті печінки піддослідних тварин при вживанні питної води з різним вмістом стеарату калію та натрію

Введення щурам цих груп марганцю хлориду в дозі 1/20 від $ЛД_{50}$ призвело до ще більшого пригнічення АОС. Так, в 1-й групі відмічалося достовірне ($p < 0,001$) зниження обох показників: активність КТ зменшилася в 2,0 рази, а СОД в 2,4 рази в порівняні з контрольною групою (рис. 4). В 2-й групі пригнічення показників було менш виражене – в 1,4 і 1,9 разів відповідно ($p < 0,001$).

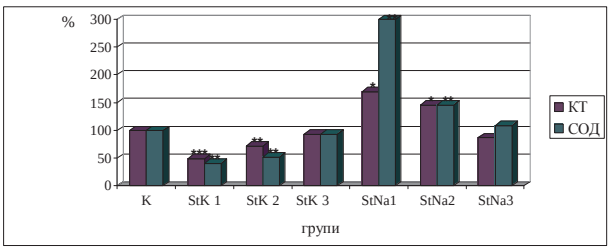

Рис. 4. Зміни показників антиоксидантного захисту в гомогенаті печінки піддослідних тварин під дією субтоксичних доз марганцю на тлі вживання питної води з різним вмістом стеаратів калію і натрію.

І лише в останній 3-й групі рівень ензимів знаходився практично на рівні контрольних величин. В 4-й групі, тварини якої споживали воду з найбільшою концентрацією стеарату натрію, навпаки, відмічалося зростання ферментів АОС. Рівень КТ в гомогенаті печінки збільшився в 1,7 раза, а СОД – в 3,0 раза ($p < 0,01$). В 5-й групі зміни були менш вираженими, а кількість КТ та СОД в 1,4 раза була вища в порівняні з контрольною групою ($p < 0,01$). В 6-й групі показники мало відрізнялися від контрольних величин.

Висновки

Таким чином, в результаті проведеного експерименту можна зробити наступні висновки:

1. Вживання піддослідними тваринами питної води з вмістом стеаратів калію та натрію в різних дозах на протязі 25 днів викликає зростання рівня показників перекисного окиснення ліпідів, а саме ТБК-активних продуктів та дієнових кон'югат, кількість яких прямо пропорційна до концентрації стеаратів у питній воді.
2. Вживання піддослідними тваринами питної води з вмістом стеаратів калію та натрію в різних дозах з наступним введення субтоксичних доз марганцю викликає більш виражену активацію процесів перекисного окиснення ліпідів, яка більше проявляється на фоні вживання стеарату калію.
3. Вживання піддослідними тваринами питної води з вмістом стеаратів калію та натрію в різних дозах викликало зміни вмісту ферментів антиоксидантного захисту вода зі стеаратом калію пригнічує активність цих показників, а зі стеаратом натрію викликає активацію. Введення субтоксичних доз марганцю призвело до посилення даних змін.

Отримані результати вимагають подальшого вивчення в майбутньому.

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MODEL OF THE STRUCTURE OF NURSING KNOWLEDGE FOR RESEARCH AND PRACTICE

MODEL STRUKTURY WIEDZY PIELĘGNIARSKIEJ DLA BADAŃ NAUKOWYCH I PRAKTYKI ZAWODOWEJ

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ABSTRACT

This article represents the authors' collaborative vision for a proposed structure for nursing knowledge. The authors created a vision by examining key elements of nursing epistemology and proposing a model based on the scholarly inquiry. The authors' proposal is substantiated by current existing theoretical frameworks, which were evaluated and modified using deductive reasoning in supporting the creation of the proposed model. The authors provide three real life examples based on clinical experience to illustrate the connection of proposed concepts within the model to practice. In conclusion, the authors investigated the methods with which nurse theorists arrange recognized truths into a structure for nursing knowledge for research and practice.

KEYWORDS: model, structure, nursing knowledge, research, practice.

STRESZCZENIE

Artykuł przedstawia wariant modelu struktury wiedzy pielęgniarskiej. Autorzy opracowali wersję modelu w oparciu o analizę kluczowych elementów pielęgniarskiej epistemologii oraz na podstawie naukowego wnioskowania dedukcyjnego. Schemat ten jest zbudowany na podstawie aktualnie istniejących podstaw teoretycznych, które były oceniane i modyfikowane przez autorów podczas procesu interpretacji i syntezy. Artykuł zawiera również trzy kliniczne przykłady ilustrujące połączenie proponowanych koncepcji modelu z praktyką zawodową pielęgniarstwa. Podsumowując, autorzy badali metody i teorie obecnych teoretyków pielęgniarstwa, które to koncepcje uwzględniają fakty i przedmiotowość w kompleksowej aranżacji wiedzy pielęgniarskiej na podstawie badań naukowych, jak również aktualnej praktyki zawodowej.

SŁOWA KLUCZOWE: model, struktura, wiedza pielęgniarska, badania naukowe, praktyka zawodowa.

Introduction

Independent of educational preparation, but dependent on practical experiences, nursing knowledge is developed and nurtured on an individual level. It is through our practical experiences, which are founded in our research, that we, as nurses, sovereign to our practice environment, advance and mold new knowledge. Our practice demands that we ask questions, and it is the answers to these questions that propels the discipline forward. By questioning and hypothesizing, we formulate theories and concepts. It is here that one may argue, that nursing knowledge is structured through our practice, that research is conceived in our practice, and that practice would not exist without research. A gear mechanism representation supports us to recognize, that in order for nursing knowledge to exist, both practice and research work in unison.

Creating Model of the Structure of Nursing Knowledge

During collaborative discussion, a model of the structure of nursing knowledge for research and practice was created to demonstrate how the authors believe the components of nursing knowledge should be arranged and how they are connected to each other. Our model depicts a gear mechanism, where the operation of the mechanism functions in unison with all components. Gears were utilized to illustrate the dynamic, flexible, evolving, and coordinated nature of knowledge development. The practice and knowledge gear is de-

picted larger, since we believe this forms the foundation of nursing. However, practice and knowledge are not more important than the other components. Practice cannot occur without knowledge, and knowledge cannot be verified without testing it in practice [1-4]. The terms directional flexibility, dynamic, and evolving underpin the model. Caring and competence are integral to the foundational philosophy of our model. We believe that nursing knowledge must include caring and competence [5], because nursing is both an art and a science. Within those spheres are found conscience and creativity [5,6], because true caring cannot occur without these elements. We note that both contribute to practice and knowledge because they support nursing intuition and guide our care. The authors emphasized the importance of four C's – caring, competence, conscience, and creativity as vital parts in development of the structure of nursing knowledge.

When articulating ideas regarding nursing philosophy, theory, and conceptual models, it is necessary to identify whether one adheres to the belief that there is little or no difference between the definitions of these terms, and therefore can be used interchangeably, or whether each has a distinct definition [3, 4]. Several nurse scientists recommend that these terms should be stratified [3] or clarified according to "substance" [4]. For our purposes, we believe that each has a distinct definition.

Theoretical Framework

The framework for theoretical thinking created by Kim [7] consists of five levels. In the first and highest level, she placed philosophy of science; the second is listed as the metaparadigm level; the third level contains nursing philosophy; the fourth is designated as the paradigm level; and the fifth is the theory level [7]. In defining the five levels, Kim states that the philosophy of science and nursing philosophy levels are intricately associated, in that nursing philosophy guides the formation of nursing theories, whereas philosophy of science dictates the methodology in the creation of nursing theory [7].

Reed [8] succinctly defined philosophy of science and practice as the foundational beliefs of a discipline and its approach in conducting science. She explains that nursing philosophy represents the epistemology and ontology that is distinct to nursing, as well as the methodological framework that is used in the conduction of nursing research and practice [8].

According to Fawcett [9] theories, conceptual models, and metaparadigms differ in their level of abstraction. She views the metaparadigm at the top of a hierarchy, describing them as encompassing the phenomena of interest to nursing [9]. Next in her hierarchy are conceptual models, which she defines as broad beliefs about "…individuals, groups, situations, and events of interest" to the discipline. On the lowest tier of her hierarchy are theories, which provide particular ideas about phenomena [9]. Weaver and Olson [10] describe a paradigm as "beliefs and practices" that guide and provide structure for research within a discipline. They list among others, positivism and critical social theory as examples [10].

In our worldview nursing philosophies, theories, and conceptual models build upon one another, and are also dynamic and evolving. As new nursing knowledge is generated in the form of theories and conceptual models, nursing philosophy may undergo expansion. Likewise, nursing philosophy will influence the generation of new nursing knowledge. This view is supported by several nurse scientists [3, 4, 11].

Therefore, our model is not hierarchical, but rather one composed of active and interacting components. Hierarchical nursing knowledge models limit the generation of knowledge to at most two directions; up or down, or up and down only. Alternatively, some

models are depicted in a circular or spiral pattern. Circular and spiral models also limit the generation of knowledge to at most two directions. Hierarchical and circular or spiral models also do not demonstrate how ideas and knowledge are interconnected.

The metaparadigm provides the four basic concepts of nursing [12]. The nursing metaparadigm connects with the central mechanism as a conceptualization that should be brought into every aspect of theory design and knowledge generation, and as a practice element since it is integral to all areas of nursing practice. Paradigms create general and abstract concepts that apply to practice [8]. Nursing knowledge is formed from various sources, such as experience; introspection and insight; empirical evidence; and knowledge from other disciplines, and unified into cohesiveness with imagination and creativity [2, 3, 4, 11]. The nurse scholar uses the characteristics of conscience, competence, creativity, and caring to identify problems and to develop solutions to those problems. Furthermore, we view the structure of nursing knowledge to be based upon practice and practice to be based upon nursing knowledge, as has been exemplified by many nurse scientists [1–4]. All sources of knowledge are examined for their application to nursing and at times are modified or expanded upon in order to address nursing phenomena [1–4].

Model Description

The mechanism by which knowledge is generated in our model demonstrates how all these sources of knowledge interact. As the gears in the mechanism in-

teract and move with one another, each influences one another in the creation of new knowledge. This mechanism moves both forward and backward; at times faster or slower. The gears are not limited in the speed at which they can move, which explains how ideas and knowledge are generated at a faster pace at some times than at other times. In this process of movement forward and backward, at times faster or slower, ideas and knowledge move upward and downward, forward and backward, faster and slower, generating a flow of new ideas out into the surrounding realm of existing nursing knowledge.

Examples from Practice

To illustrate the connection of the proposed concepts, three examples will be provided within each author's specialty. Examples provided are real life experience applications of the proposed model. The first example is provided by a labor and delivery nurse. The second example is provided by a critical care nurse, and the third one by an emergency room nurse.

Labor and Delivery

An example of how practice can influence nursing knowledge is evident when a practicing nurse recognizes a problem with care delivery and decides to investigate how that problem can be rectified. She has noted that laboring mothers who wish to deliver naturally desire to have additional non-pharmacological options for managing labor, but her unit does not provide any. She does a literature review and chooses to examine the use of aromatherapy during labor. She learns how different essential oils are used to control anxiety, nausea, and pain, and proposes implementing their use on her unit. A pilot program is introduced, and is met with great enthusiasm by midwives and their patients. A follow-up survey demonstrates that both midwives and their patients found the aromatherapy helpful, so the program is expanded in the unit. The nurse then writes an article about the process, which motivates other labor and delivery nurses to try its use on their units.

Critical Care

At the beginning of her shift, a nurse was checking the schedule to determine her assignment. She noted that on that day her assigned patients were on two different sides of the hallway. Patient number one was recently admitted to the unit with a diagnosis of drug overdose. The patient was on a ventilator, sedated and restrained, as last night he self-extubated and had to be urgently intubated. Sedation was not effective because he had a high tolerance to any sedatives. Patient number two was an alert and oriented women admitted with ketoacidosis on an hourly insulin drip.

The nurse utilized her competence and application of critical thinking skills to assess her patients. She was concerned that both patients required closed monitoring and that the distance between her patients could prohibit her from responding to an emergency in a timely and effective manner. As she was a caring nurse, she approached the charge nurse with her concerns. However, her request to switch one of her patients was rejected because in this unit the same nurses were required to care for the same patients while working consecutive days.

A few hours in to her shift while she was checking the blood glucose level for patient two and changing the insulin drip according to the protocol, she heard her charge nurse call for her. Upon entering the room of patient one she discovered that the patient self-extubated once again, that the vent alarm failed, and did not signal outside of the room as expected. Due to the failure of the alarm, the nursing response was delayed. In addition to the technical issue with the dysfunctional vent alarm, the nurse was upset that she was not closer to the patient so that she could have monitored him more closely.

This incident prompted the nurse to reassess the scenario and to create a proposed solution to this avoidable event in the future. She examined the current literature that was addressing nursing assignments based on patient acuity. Then based upon her findings, she utilized her creativity and proposed a new acuity-based assignment model to her immediate manager. The unit manager agreed to try this new model for several weeks, and then to seek feedback from the nursing staff. A short survey was created by the manager to monitor potential improvement of nursing care throughout the implemented strategy. Survey results generated after four weeks of trial revealed that nurses were overall satisfied with the new model for patient assignments and felt more confident while providing safe patient care. The new and creative way of managing the patient assignment was noted by upper management, and the unit was approved to run a pilot study. The results obtained from this pilot study are currently in the process of publication. This scenario demonstrates that both practice and research work in harmony.

Emergency Room

A patient presents to the acute care setting with "flu like symptoms." Vital signs are within normal limits; skin color is consistent with race; a positive history for intravenous drug use is noted on the medical record. Throughout the day, the patient's cognition changes, although vital signs remain within normal limits. The competent, in-tune, nurse may query early septic shock based on the past medical history; identify risk for an inadequ-

ate fever response; and advocate for advanced serum laboratory testing and prophylactic antibiotic coverage. In this instance, the patient is at risk for being inappropriately labelled or judged due to his past medical history, which could potentially be thought of as behavioral or as having just abused drugs intravenously. Instead, by putting the pieces of the puzzle together, the expert nurse uses past experience, intuition and independent/shared theory to advocate for this patient and establish an appropriate plan of care.

The situation was observed by the emergency room (ER) unit manager. Based on that observation, the manager generated a research question: How do we support the expert nurse to role model behaviors consistent with practice, so that other, more novice nurses may also benefit from this knowledge? The ER manager then conducted a literature review to obtain the stated science on the above question. The manager found minimal data supporting the proposed hypothesis, so a decision was made by the management to support a research study that would explore the proposed hypothesis.

Conclusion

As new knowledge is generated, new questions will emerge. Supporting new learning and further questions are found in a practice environment keen on supporting solid nursing research. A gear mechanism model, which supports both practice and research as being synonymous with one another, as well as being no more important than the other, is a key to understanding the foundation of nursing knowledge, as well as the future of nursing knowledge. Caring and competence, and conscience and creativity are integral to both nursing practice and the generation of nursing knowledge, because these characteristics support a discipline whose foundation is based upon art and science. Furthermore, we view the structure of nursing knowledge based upon practice and practice, as has been exemplified by many nurse scientists [1–4].

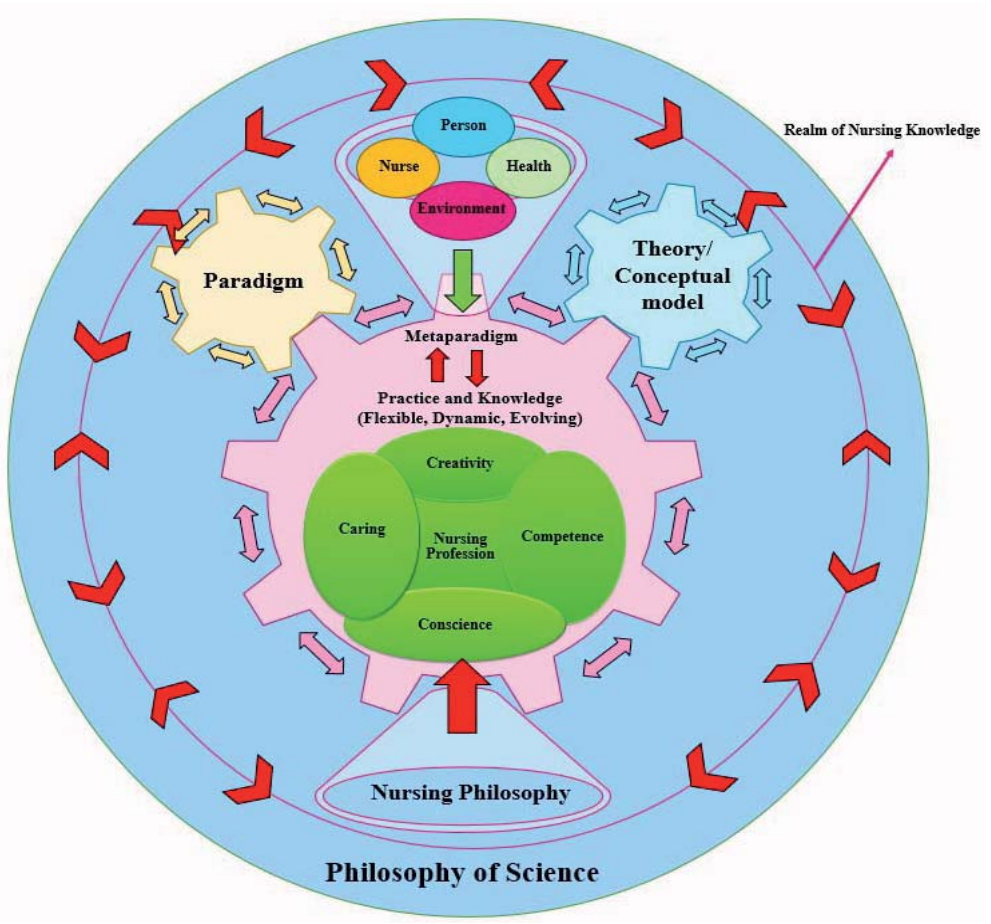

Figure 1. Model of the Structure of Nursing Knowledge for Research and Practice
Source: author's own analysis

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EMOTIONAL INTELLIGENCE FOR LEADERS IN NURSING

INTELIGENCJA EMOCJONALNA DLA LIDERÓW PIELĘGNIARSTWA

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ABSTRACT

A nurse's leader emotional intelligence (EI) is closely linked to his or her ability to therapeutically handle interpersonal conflicts. EI is based on the ability to accurately identify another person's emotions from facial expressions, body language, and speech. Communicating with respect and concern for the other person is a salient way to effectively manage a conflict. When nurse leaders lack EI, results suffer and team morale plummets. The core themes associated with EI include: gratitude, altruism, compassion, empathy, forgiveness, happiness, and mindfulness. An emotionally intelligent person is able to identify these themes and respond appropriately without great effort.

KEYWORDS: emotional intelligence, interpersonal conflicts, nursing, leaders.

STRESZCZENIE

Inteligencja emocjonalna (IE) lidera pielęgniarstwa jest ściśle związana z terapeutyczną zdolnością do rozwiązywania konfliktów interpersonalnych. IE oparta jest na zdolności do dokładnego odczytania emocji innej osoby z wyrazu jej twarzy, języka ciała i mowy. Komunikowanie się z szacunkiem i troską o drugiego człowieka jest najistotniejszym sposobem skutecznego rozwiązywania konfliktu. Gdy liderom pielęgniarstwa brakuje wiedzy z zakresu IE spada zarówno efektywność przywództwa, jak i morale zespołu. Autorzy proponują pięć podstawowych cech związanych z IE: wdzięczność, altruizm, współczucie, empatia, przebaczenie, szczęście i spostrzegawczość. Emocjonalnie inteligentny lider jest w stanie nie tylko zidentyfikować te cechy, ale także je umiejętnie wykorzystywać, by odpowiednio reagować w każdej sytuacji.

SŁOWA KLUCZOWE: inteligencja emocjonalna, konflikty interpersonalne, pielęgniarstwo, lider.

Introduction

Currently there are many definitions of Emotional Intelligence (EI). The authors of this paper will present EI model that is based on the trait EI model. EI trait can be understood as the ability of self-perceptions of the person's empathy, impulsivity, and assertiveness, as well as social and personal intelligence apply to response to another person and situation in a therapeutic manner [1]. Goleman [2] suggested that emotional intelligence consisted of five defining qualities: self-awareness, self-regulation, motivation, social awareness, and relationship management. All of the above qualities contribute to persons EI. Relatively new research shows that a person's ability to gauge a situation regarding emotions of others is a driving force for successful collaboration [3]. High EI is an indicator of being able to handle stressful situations and competitive environments [4]. A nurse leader's EI is closely linked to his or her ability to therapeutically handle interpersonal conflicts. EI has been shown to promote connection, rapport and trust within a healthcare team [5].

Conceptualization of EI into Nursing Practice

The concept of utilizing EI to gauge the emotions of one's self and others was initially proposed in 1990 [6]. EI was applied to the management specialty in 1995 by Goleman. According to Goleman [7], EI consists of five fundamental aspects: self-awareness, self-regulation, motivation, empathy, and social skills. Although EI has been shown to effectively cultivate a therapeutic environment and improve patient outcomes, the concept of EI has primarily been utilized as a means to adequately prepare nursing students for the rigors of the nursing field [8]. The principal theory regarding EI is that emotions and intelligence are connected. This principal theory links a person's ability to feel, think, and consequently behave in an intelligent manner.

EI in the Professional Setting

A major reason for implementing EI is to prepare leaders for stressful work conditions. Leadership is an emotionally taxing endeavor [9]. According to McKenna & Webb [10], many employers are pushing for values-based initiatives and EI measures to determine placement for leadership positions. Effective collaboration is a common competency that is sought out by corporate entities. The transformational leadership style is optimal for developing therapeutic work relationships. EI is a cornerstone of the transformational leadership style [11]. An effective leader ensures that all members of a team feel valued, relevant, and safe. EI training has been shown to decrease the incidence of horizontal coworker violence [12].

Characteristics of High EI

EI is based on the ability to accurately identify another person's emotions from facial expressions, body language, and speech. This is essential for a nurse to possess because the correct interpretation of these signs will inform the nurse of which intervention is most likely to produce positive outcomes (**Table 1**). Nurse leaders who are assertive with their speech set forward clear expectations, yet maintain respect for others. Using the language that focuses on the speaker's role or using the word "I" is an assertive tactic which shows that the comment is universal and collaborative. When attending an issue with another person who is visibly upset, the emotionally intelligent nurse leader will speak in moderate and soft tones. Communicating with respect and concern for the other person is a salient way to effectively manage a conflict. For the successful conclusion of any conflict, ending on a positive note sets the tone for effective and collaborative future relations. Spano-Szekely and colleagues [13] stated that being able to motivate teams into productive work is the hallmark of an emotionally intelligent nurse leader. Nurse leaders who behave in these ways are referred to as emotionally intelligent individuals. The nurse leader should be aware of his or her own emotional state and utilize the emotions of the team to drive operations [14].

Table 1. Clinical Outcomes of High versus Low EI

Clinical Outcomes of High versus Low EI	
High EI	Low EI
Invite positive outcomes	Increased horizontal work violence
Establish clear expectations	Lack of team engagement
Cultivate Collaboration	Team moral plummets
Effective conflict resolution	Ineffective conflict resolution
Drive productive operations	Undermining of operations

Source: author's own analysis

Characteristics of Low EI

When nurse leaders lack EI, results suffer and team morale plummets. Lack of EI has been shown to lead toward negative professional interactions that include anxiety, biased thought processes, apathetic attitude, and disparaging automatic thinking [15]. Working in an environment where one does not feel as if he or she is being understood is frustrating. Presumption of knowing another person's intentions is disingenuous and disrespectful. Inability to relate to others is a sign of low EI. Nurse leaders with low EI may communicate in ineffective ways. Passive communication includes inability to advocate for one's self, avoiding conflict, and is typically utilized by those with a lower self-esteem. Aggressive communication is when a person advocate's for himself without regard for respecting others. This may be characterized by verbal abuse, deflection of blame, and interrupting others. Passive-aggressive communication is when a person displays a passive affect, but internally feels aggressive towards others. The operative feature of the passive-aggressive leader is an undermining of the project fueled by resentment related to inability to advocate for his rights. If a sentence starts with the word "you", it is typically regarded as an accusation or a shift of blame. The ineffective conflict resolution may take many forms. Being argumentative while trying to "win" a conversation is a losing proposition. Reacting to the other person's emotions or getting distracted may be interpreted as disrespect. Following scripts typically makes others feel that you are not invested in the conversation and presuming that you know the other person's intentions belittles their value.

Core Themes of EI

Authors proposed the core themes associated with EI include: gratitude, altruism, compassion, empathy, forgiveness, happiness, and mindfulness. Gratitude is the theme that involves thanking others for a service or job well done with the end result that the other person feels appreciated. Altruism is the state of being concerned more for other's rights than one's own. Compassion is an action taken place for one who has not earned or does not deserve it. Empathy is the ability to assume how one would imagine they may feel in a similar situation as another person. Forgiveness is the forbearance of transgression or wrongdoing. Happiness is the state of being proactively content with one's circumstances. Mindfulness is the awareness and appreciation for one's surroundings. All themes are connected with bidirectional arrows and can occur simultaneously, together or separate depending upon the situation and/or environment as well as other behavior (**Figure 1**).

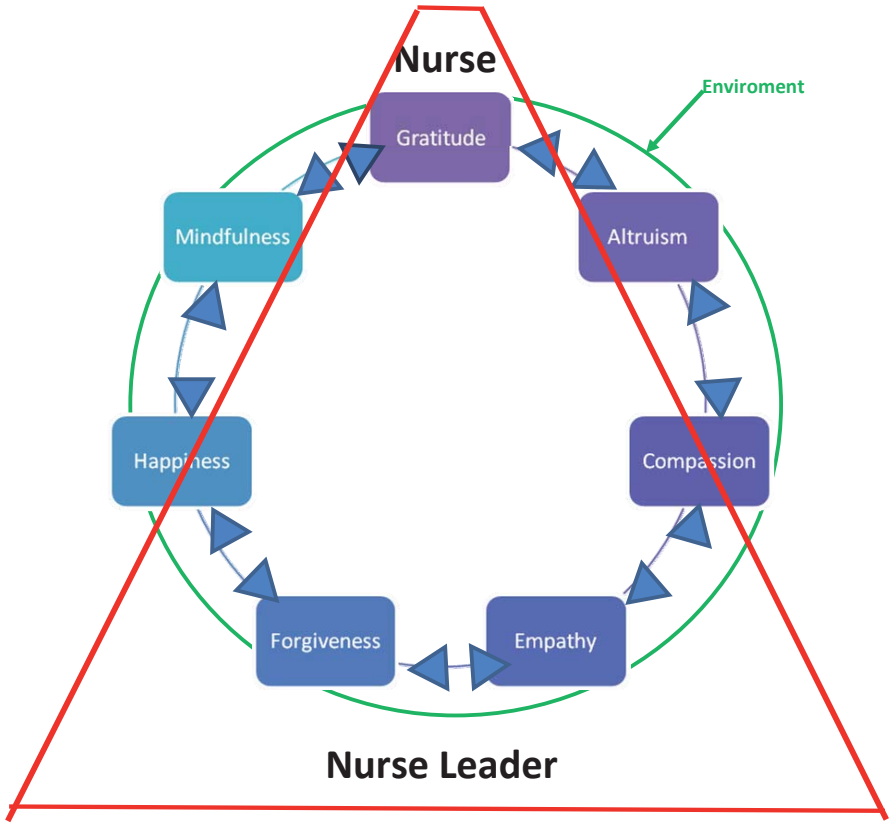

Figure 1. Core Themes of EI

Source: author's own analysis

Conclusion

EI plays a substantial role in how effective a nurse is able to perform. Self-respect and respect towards others is the keystone for high EI. Therapeutic communication is a vital facet of properly relating to others. Being assertive with communication sets forth clear expectations while demanding that respect be afforded to all parties involved. Self-awareness regarding how one is feeling at a certain time is essential for developing EI. Accurate effective forecasting, such as being able to predict how one's self will react in a future circumstance, is indicative of well EI [16]. The ability to accurately assess what emotion another person is feeling by taking visual cues of their facial expression and body position will help the emotionally intelligent leader to properly handle many conflicts in the workplace. Seven core themes associated with EI include: gratitude, altruism, compassion, empathy, forgiveness, happiness, and mindfulness. An emotionally intelligent person is able to identify these themes and respond appropriately without great effort.

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"SILVER SNOWFLAKE" – PARKINSON'S FALL PREVENTION INITIATIVE

"SREBRNY PŁATEK" – INICJATYWA ZAPOBIEGAJĄCA UPADKOM PACJENTÓW Z CHOROBĄ PARKINSONA

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ABSTRACT

The "Silver Snowflake" initiative was created to educate globally Every Patient and Every Provider, about new research and intervention available to prevent falls in patients with Parkinson Disease (PD). The mission of this initiative is to internationally educate patients and families about causative factors of falls in Parkinson's patients and existing modalities that can be utilized to minimize the risk of falling. Creators of the initiative strive to make the education material free and available in other languages to raise global awareness. Provided education includes free webinar, posters and brochures currently available in English and Polish. Materials provided present anatomy and Parkinson's disease symptoms that cause patients to lose balance and make them at risk for falling. The suggestion on evidence based research exercises modalities that help prevent PD patients falls are also included. Education also highlights the importance of the home safety tip to prevent falls in patients with PD.

KEYWORDS: Parkinson, fall prevention, initiative, free education.

STRESZCZENIE

Inicjatywa "Srebrny Płatek" została stworzona z myślą o pacjentach z chorobą Parkinsona. Projekt ten ma na celu zapobieganie upadkom pacjentów dotkniętych chorobą Parkinsona poprzez właściwą edukację zarówno chorych, jak i ich opiekunów. Propagowanie wyników nowych badań oraz interwencji jest kluczowym faktorem przy zapobieganiu upadkom pacjentów z chorobą Parkinsona. Głównym celem tej inicjatywy jest powszechna (globalna) edukacja pacjentów i ich rodzin na temat czynników wpływających na/powodujących upadki u pacjentów z chorobą Parkinsona oraz na sposoby, które mogą być łatwo wykorzystane, aby zminimalizować ryzyko upadku. Twórcy inicjatywy "Srebrny Płatek" dążą do tego, aby wszelkie materiały edukacyjne dotyczące choroby Parkinsona były darmowe i łatwo dostępne w wielu językach, co wpłynęłoby na podniesienie globalnej świadomości dotyczącej choroby Parkinsona. Autorzy projektu przewidują różne formy przekazu edukacyjnego, m.in. bezpłatne webinarium oraz publikacje plakatów i broszur (obecnie dostępne w języku angielskim i polskim). Propagowane materiały prezentują anatomię i objawy choroby Parkinsona oraz wyszczególniają symptomy choroby odpowiedzialne za niestabilność postawy pacjenta i te, które bezpośrednio zwiększają zagrożenie upadkami. Obecne badania naukowe sugerują, że ćwiczenia fizyczne są niezbędne do zmniejszania ryzyka upadków. Materiały zawarte w tekście wskazują odpowiednie ćwiczenia, które pomagają pacjentom chorym na Parkinsona w zapobieganiu upadkom i kontuzjom. Problem bezpieczeństwa chorego w domu jest również poruszony, a porady szczegółowo opisane.

SŁOWA KLUCZOWE: choroba Parkinsona, zapobieganie upadkom, inicjatywa, darmowa edukacja.

Introduction

Parkinson's Disease (PD) prevalence is on the rise. According to the Parkinson's Disease Foundations, an estimated 60,000 Americans are diagnosed each year with PD [1]. Many current evidence based studies have shown that falls are common in Parkinson's disease. The clinical impact of falls is significant, often leading to a debilitating fear of reoccurring falls. Costs associated with post falls care are substantial. Falls are a serious problem among those with neurologic disorders like Parkinson's. This growing concern was supported by recently collected statistical data in the state of the science paper written by Allen, Schwarzel, & Canning in 2013 [2]. They show that 60.5% of Parkinson

patients reported at least one fall and 39% reported recurrent falls within a one year period. Despite the fact that the fall in Parkinson's patients are concerning and the cost of post falls care substantial, few if any clinical guidelines have specifically addressed prevention and interventional strategies for patients with Parkinson's disease. "Silver Snowflake" Parkinson's Fall Prevention was created as an undergoing initiative to close the gap and to educate healthcare provided, patients and their families about why the patients with Parkinson's are prone to falls and provide some intervention currently available to prevent falls in patients with Parkinson's disease.

About Initiative

Mission of this initiative is to educate, globally, Every Patient and Every Provider about new research and interventions available to prevent falls in patients with Parkinson's Disease. Materials provided internationally educate patients and families about the causative factors of falls in Parkinson's patients and existing modalities that can be utilized to minimize the risk of falling. Comprehensive review of currently acceptable measures of the impaired balance concept in patients with PD is presented in the form of **Table 1**. Creators of this program strive to make the educational materials free and available in other languages to raise global awareness. The proposed implementation outline:

- 2015
  1. January 2015, Free Brochure will be available in English!
  2. February 2015, Free Poster will be available in English!
  3. July 2015, Free video will be available in English.
- 2016
  1. Materials will be translated into Polish.
- 2016–2017
  1. Translation of the materials into other languages will continue.

All educational materials will be provided free of charge, as we want to make this education available internationally. The free materials will include the seminar, poster and brochures, as well as the web site link that will have all the materials easily accessible and available in a variety of languages.

Facts about PD

Allen, Schwarzel, & Canning in 2013 [2] state of the science paper indicated that 60.5% of Parkinson's patients reported at least one fall and 39% reported recurrent falls within a one year period. Parkinson's Disease Foundation estimates that one million people in the US and seven to ten million worldwide live with PD. Currently research proves that each PD patient will experience symptoms differently. We also know that PD is a chronic and progressive movement disorder. The cause of PD is unknown and there is no cure. Treatment options are designed to manage the symptoms. Treatment options include: medication, surgery, physical activity, exercise, adaptive equipment [1].

Parkinson's Disease Foundation [1] describes pathophysiology of PD as a malfunction and death of brain nerve cells called neurons in an area of the brain called the substantia nigra. The substantia nigra is one of the movement control centers located in the brain just above the spinal cord. Dying neurons in the brain are used to distribute dopamine. Dopamine is a chemical helping with the communication of the brain that controls movement and coordination. As PD progresses dopamine production may get reduced to as low as 20% and disable the PD patient to control movement normally. Two categories of symptoms are currently identified as primary and secondary. Primary motor signs of PD include tremor of the hands, arms, legs, jaw and face; slowness of movement or bradykinesia; rigidity or stiffness of the limbs and trunk; postural instability or impaired balance and coordination. Secondary non-motor signs of PD include the loss of the sense of smell; constipation; REM behavior disorders (a sleep disorder); mood disorders; orthostatic hypotension (low blood pressure when standing up).

PD and Falls

Falls are a major source of morbidity and disability in Parkinson's disease (PD). The risk of falls is increased in patients with PD [3]. Contreras & Grandas [4] study discovered that the risk of falls increased exponentially with age, especially from 70 years forward. Patients aged >70 years at the onset of Parkinson's disease experienced falls significantly earlier than younger patients. Amar, Stack, Fitton, Ashburn, & Roberts [5] study with the participant median age of 76 years, diagnosed with PD within 6 years, discovered that of 40 participants without cognitive impairment, 40% recalled falls and 55% fell during follow-up and that in 36 participants with mild cognitive impairment, 42% recalled falls and 42% fell during follow-up. In patients with PD stability and mobility are compromised due to disease symptoms such as: stiffness (rigidity) and slow movement (bradykinesia), postural changes (freezing gait and the stooped posture); impaired postural reflexes (postural instability or impaired balance and coordination); weight distribution problem while walking (centers of mass—CoM due to the stooped posture) [6]. The above symptoms disrupt the flow of the five factors of dynatomy that help patients maintain their stability and mobility

principals and cause them to be prone to falls. **Figure 1** illustrates the concepts of five factors of dynatomy and how they correlate with symptoms of PD.

Most PD patients fall because of the above mentioned disease symptoms, but other risk factors include: history of prior falls, the patient is at risk for falling again; recent surgery, some medications. A person's home that is not adapted for PD needs: insufficient lighting in the house; lack of grab bars and the nonskid tape in the tub or shower; clutter; small animals running around the house. Ongoing assessment of PD patient impaired balance is imperative. Currently available and tested by research tools to asses PD patient impaired balance include Berg Balance Scale (BBS), Timed "Up & Go" Test (TUG) and Tinetti Balance Test (TBT). The matrix for Reviewing Measures for Concept of Impaired Balance is included in **Table 1**.

Conclusion

The first step is to educate yourself on what causes PD patients to be more prone to falls. The second step is to talk to your patients about exercises that can increase their stability and mobility. The third step emphasizes the need for exercising regularly, as research proves that several different exercise systems can help prevent falls. We encourage the patient to utilize the "Silver Snowflake" Parkinson's Fall Prevention Initiative as falls can be prevented.

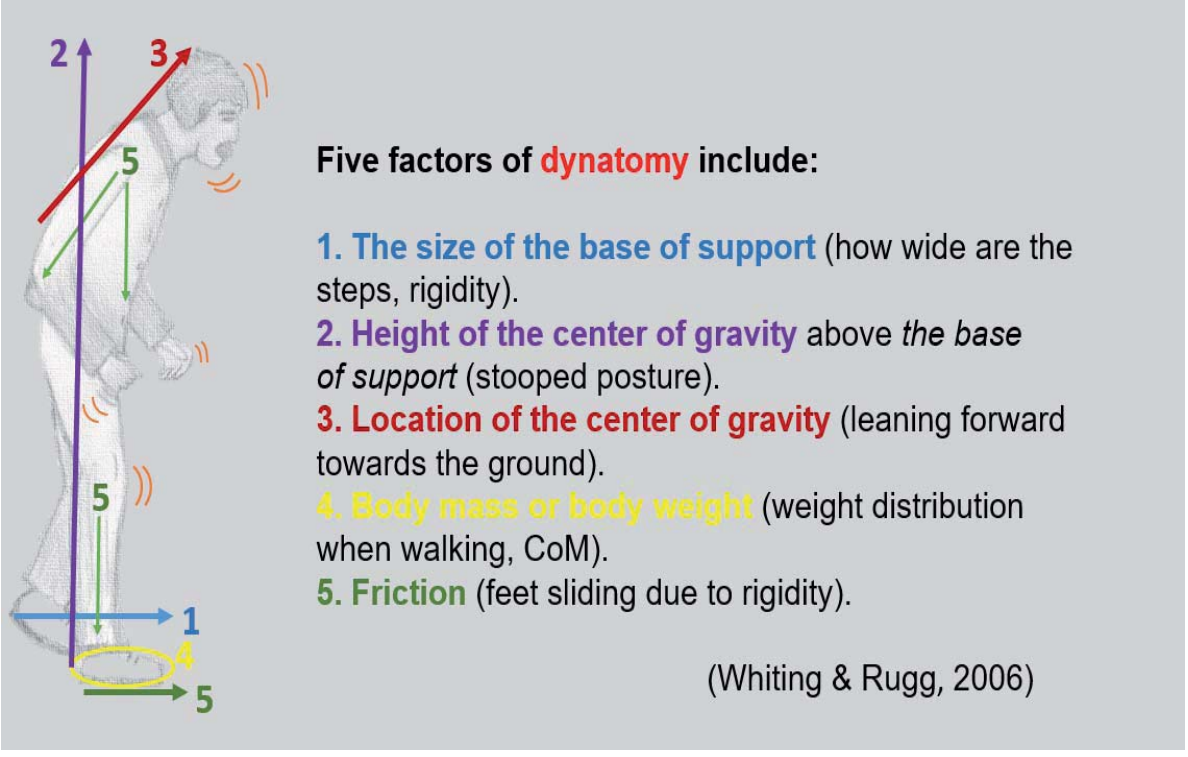

Figure 1. Concepts of five factors of dynatomy in correlation with symptoms of PD

Source: author's own analysis

Table 1. Matrix for Reviewing Measures for Concept of Impaired Balance

	OVERVIEW OF MEASURE	Measure 1	Measure 2	Measure 3
1	Name of measure or instrument	Berg Balance Scale (BBS)	Timed "Up & Go" Test (TUG)	Tinetti Balance Test (TBT)
2	This measure's definition of your concept of interest	This scale is used to objectively determine a person's capability to safely balance during a series of programmed tasks. The test time interval is 20 minutes. This 14-item scale is designed to measure static and dynamic balance of the older adult in a clinical setting.	This is a timed walking test designed to measure gait performance that correlates to balance and fall risk. This was developed as a clinical measure of balance in elderly individuals. This is a timed 3 meter walk. The time starts when the persons stands up from the chair and ends when the person returns to the chair in a sitting position.	The Tinetti Balance Test is used to objectively measure person's balance. During the 10-15 minute timeframe the patient preforms 8 programmed tasks. The test is scored on the patient's ability to perform specific tasks.
3	Original publication (reference)	Berg, K., Wood-Dauphine, S., Williams, J. I., & Gayton, D. (1989). Measuring balance in the elderly: preliminary development of an instrument. *Physiotherapy Canada*, *41*(6), 304-311.	Podsiadlo, D., & Richardson, S. (1991). The timed "Up & Go": a test of basic functional mobility for frail elderly persons. *Journal of the American geriatrics Society*, *39*(2), 142-148.	Tinetti, M. (1986). Performance-oriented assessment of mobility problems in elderly patients. *Journal Of The American Geriatrics Society, 34*(2), 119-126 8p.
4	Any additional key studies that contributed a lot to the measure's development (reference)	1. Berg, K. O., Wood-Dauphinee, S. L., Williams, J. I., & Maki, B. (1991). Measuring balance in the elderly: validation of an instrument. *Canadian journal of public health= Revue canadienne de sante publique*, *83*, S7-11. 2. Leddy, A., Crowner, B., & Earhart, G. (2011). Functional gait assessment and balance evaluation system test: reliability, validity, sensitivity, and specificity for identifying individuals with parkinson disease who fall. *Physical Therapy, 91*(1), 102-113 12p. doi:10.2522/ptj.20100113 3. Steffen, T., & Seney, M. (2008). Test-retest reliability and minimal detectable change on balance and ambulation tests, the 36-Item Short-Form Health Survey, and the Unified Parkinson Disease Rating Scale in people with parkinsonism [corrected] [published erratum appears in PHYS THER. *Physical Therapy, 88*(6), 733-746 14p. doi:10.2522/ptj.20070214 4. Downs, S., Marquez, J., & Chiarelli, P. (2014). Normative scores on the Berg Balance Scale decline after age 70 years in healthy community-dwelling people: a systematic review. *Journal of physiotherapy*, *60*(2), 85-89. 5. King L, Priest K, Salarian A, Pierce D, Horak F. Comparing the Mini-BESTest with the Berg Balance Scale to Evaluate Balance Disorders in Parkinson's Disease. *Parkinson's Disease (20420080)* [serial online]. January 2012;:1-7 7p. Available from: CINAHL Plus with Full Text, Ipswich, MA. Accessed December 10, 2015.	1. Dal Bello-Haas, V., Klassen, L., Sheppard, M. S., & Metcalfe, A. (2015). Psychometric properties of activity, self-efficacy, and quality-of-life measures in individuals with Parkinson disease. Physiotherapy Canada. 2. Mathias S, Nayak USL, Isaacs B. Balance in the elderly patient: The „Get-up and Go" test. Arch Phys Med Rehabil 1986; 67:387-89. - See more at: http://www.rheumatology.org/I-Am-A/Rheumatologist/Research/Clinician-Researchers/Timed-Up-Go-TUG#sthash.bkcheame.dpuf 3. Medley A, Thompson M. The effect of assistive devices on the performance of community dwelling elderly on the timed up and go test. Issues Aging 1997; 20:3-7. - See more at: http://www.rheumatology.org/I-Am-A/Rheumatologist/Research/Clinician-Researchers/Timed-Up-Go-TUG#sthash.bkcheame.dpuf 4. Huang, S. L., Hsieh, C. L., Wu, R. M., Tai, C. H., Lin, C. H., & Lu, W. S. (2011). Minimal detectable change of the Timed "Up & Go" Test and the Dynamic Gait Index in people with Parkinson disease. Physical Therapy, 91(1), 114-121. 5. Bennie, S., Bruner, K., Dizon, A., Fritz, H., Goodman, B., & Peterson, S. (2003). Measurements of balance: Comparison of the timed" Up and Go" test and functional reach test with the berg balance scale. Journal of Physical Therapy Science, 15(2), 93-97.	1. Köpke, S. (2006). The Tinetti test. *Zeitschrift für Gerontologie und Geriatrie*,*39*(4), 288-291 2. Panella, L., Tinelli, C., Buizza, A., Lombardi, R., & Gandolfi, R. (2008). Towards objective evaluation of balance in the elderly: validity and reliability of a measurement instrument applied to the Tinetti test. *International Journal of Rehabilitation Research*, *31*(1), 65-72. 3. Cipriany-Dacko, L. M., Innerst, D., Johannsen, J., & Rude, V. (1997). Interrater reliability of the Tinetti Balance Scores in novice and experienced physical therapy clinicians. *Archives of physical medicine and rehabilitation*,*78*(10), 1160-1164. 4. Cipriany-Dacko, L. M., Innerst, D., Johannsen, J., & Rude, V. (1997). Interrater reliability of the Tinetti Balance Scores in novice and experienced physical therapy clinicians. *Archives of physical medicine and rehabilitation*,*78*(10), 1160-1164. 5. Franchignoni, F., Tesio, L., Martino, M. T., & Ricupero, C. (1998). Reliability of four simple, quantitative tests of balance and mobility in healthy elderly females. *Aging Clinical and Experimental Research*, *10*(1), 26-31.

5	Any studies using or testing this measure across diverse groups? Which diverse groups?	**Parkinson Disease patients** Leddy, A., Crowner, B., & Earhart, G. (2011). Functional gait assessment and balance evaluation system test: reliability, validity, sensitivity, and specificity for identifying individuals with parkinson disease who fall. *Physical Therapy, 91*(1), 102-113 12p. doi:10.2522/ptj.20100113 **Community-dwelling elderly** Steffen, T. M., Hacker, T. A., & Mollinger, L. (2002). Age-and gender-related test performance in community-dwelling elderly people: Six-Minute Walk Test, Berg Balance Scale, Timed Up & Go Test, and gait speeds. *Physical therapy*,*82*(2), 128-137. **Elderly in residential care facilities** Conradsson, M., Lundin-Olsson, L., Lindelöf, N., Littbrand, H., Malmqvist, L., Gustafson, Y., & Rosendahl, E. (2007). Berg balance scale: intrarater test-retest reliability among older people dependent in activities of daily living and living in residential care facilities. *Physical Therapy*, *87*(9), 1155-1163. **Stroke patients** Hiengkaew, V., Jitaree, K., & Chaiyawat, P. (2012). Minimal Detectable Changes of the Berg Balance Scale, Fugl-Meyer Assessment Scale, Timed "Up & Go" Test, Gait Speeds, and 2-Minute Walk Test in Individuals With Chronic Stroke With Different Degrees of Ankle Plantarflexor Tone. *Archives Of Physical Medicine & Rehabilitation, 93*(7), 1201-1208 8p. doi:10.1016/j.apmr.2012.01.014	**Parkinson Disease patients** Balash, Y., Peretz, C., Leibovich, G., Herman, T., Hausdorff, J. M., & Giladi, N. (2005). Falls in outpatients with Parkinson's disease. *Journal of neurology*, *252*(11), 1310-1315. Schenkman, M., Ellis, T., Christiansen, C., Barón, A. E., Tickle-Degnen, L., Hall, D. A., & Wagenaar, R. (2011). Profile of functional limitations and task performance among people with early-and middle-stage Parkinson disease. *Physical therapy*, *91*(9), 1339-1354. **Community-dwelling elderly** Bischoff HA, Stahelin HB, et al. (2003). Identifying a cut-off point for normal mobility: A comparison study of the timed "up and go" test in community-dwelling and institutionalized elderly women. *Age and Ageing 32*(3):315-20. **Children without physical disabilities ages 3 to 9 years old** Williams, E., Carroll, S., Reddihough, D., Phillips, B., & Galea, M. (2005). Investigation of the timed 'Up & Go' test in children. *Developmental Medicine & Child Neurology, 47*(8), 518-524 7p. **Patients after hip surgery** Kristensen MT, Foss NB, Kehlet H. Timed "Up and Go" Test as a predictor of falls within 6 months after hip fracture surgery. Phys Ther. 2007.87(1):24-30. **Community-dwelling and institutionalized elderly women** Bischoff HA, Stahelin HB, et al. Identifying a cut-off point for normal mobility: A comparison study of the timed "up and go" test in community-dwelling and institutionalized elderly women. Age and Ageing. 2003;32:315-320	**Parkinson Disease patients** Kegelmeyer, D., Kloos, A., Thomas, K., & Kostyk, S. (2007). Reliability and validity of the Tinetti Mobility Test for individuals with Parkinson disease. *Physical Therapy, 87*(10), 1369-1378 10p. doi:10.2522/ptj.20070007 **Multiple Sclerosis patients** Tesio, L., Perucca, L., Franchignoni, F. P., & Battaglia, M. A. (1997). A short measure of balance in multiple sclerosis: validation through Rasch analysis. *Functional neurology*, *12*(5), 255-268. **Amyotrophic Lateral Sclerosis patients** Kloos, A. D., Dal Bello-Haas, V., Thome, R., Cassidy, J., Lewis, L., Cusma, T., & Mitsumoto, H. (2004). Interrater and intrarater reliability of the Tinetti Balance Test for individuals with amyotrophic lateral sclerosis. *Journal of Neurologic Physical Therapy*, *28*(1), 12-19. **Community-dwelling elderly** Raîche, M., Hébert, R., Prince, F., & Corriveau, H. (2000). Screening older adults at risk of falling with the Tinetti balance scale. *The Lancet*, *356*(9234), 1001-1002.

	DESCRIPTION OF MEASURE	Measure 1	Measure 2	Measure 3
6	Structure of measure • List all domains if there are any • How many scales or scores are there of your concept? • If there are sub-scales, is there also a summary score?	Domain: • Balance Scores/Scores: • 14 programmed tasks scored on the five point ordinal scale with a range of 0 to 4. No Subscales Summary Score: 41-56 = low fall risk 21-40 = medium fall risk 0 –20 = high fall risk	Domain: • Functional mobility Scores/Scores: • Time No Subscales Summary Score: ⩽14 seconds indicates high fall risk	Domain: • Balance 9 tasks and Gait 7 tasks Scores/Scores: • Programmed tasks scored on three point ordinal scale with a range of 0 to 2. Maximum points 28. No Subscales Summary Scores: ⩽18 indicates high fall risk 19-23 indicates moderate fall risk ⩾24 indicates low fall risk
7	Number of items: • For each domain that is scored separately • Total across domains	N/A	N/A	Yes Balance 9 tasks Gait 7 tasks
8	Specific response choices of items • Number of choices • Labels for choices if any	Each test performed is rated on a 0-4 scale. After the tests are completed, the scores are added up to achieve a total score which provides the relative fall risk for the client.	No specific response – this is a timed test on how well a patient gets up from the chair, walks a small distance and sits back down. That time is what determines the fall risk in the patient.	A score of 0 represents the most impairment, while a 2 would represent independence of the patient. Added scores form a balance assessment score.
9	Time frame allocated to complete the measure	20 minutes	The cut-off time to complete TUG - 13.5 seconds	10 to 15 minutes

10	Method of administration: • Self- or interviewer- administered • If the interviewer - by telephone or in person.	Interviewer administered – in person task performance exam.	Interviewer administered – in person task performance exam.	Interviewer administered - in person task performance exam.
	NATURE OF THE SAMPLES ON WHICH IT HAS BEEN TESTED	Measure 1	Measure 2	Measure 3
11	Source and type of subjects (e.g., inpatients, outpatients, community dwelling, students, church members, list of HMO members, etc.)	Elderly in numerous settings – science center for elderly, Inpatient acute care hospitals, and elderly home. Berg, K. O., Maki, B. E., Williams, J. I., Holliday, P. J., & Wood-Dauphinee, S. L. (1992). Clinical and laboratory measures of postural balance in an elderly population. *Archives of physical medicine and rehabilitation*, *73*(11), 1073-1080.	Elderly in numerous settings including within the community, acute care settings and rehabilitation settings. Whitney, J. C., Lord, S. R., & Close, J. C. (2005). Streamlining assessment and intervention in a falls clinic using the Timed Up and Go Test and Physiological Profile Assessments. *Age and ageing*, *34*(6), 567-571. Nocera, J. R., Stegemöller, E. L., Malaty, I. A., Okun, M. S., Marsiske, M., Hass, C. J., & National Parkinson Foundation Quality Improvement Initiative Investigators. (2013). Using the timed up & go test in a clinical setting to predict falling in Parkinson's disease. *Archives of physical medicine and rehabilitation*, *94*(7), 1300-1305.	Elderly patients diagnosed with Parkinson's Disease Kegelmeyer, D. A., Kloos, A. D., Thomas, K. M., & Kostyk, S. K. (2007). Reliability and validity of the Tinetti Mobility Test for individuals with Parkinson disease. *Physical Therapy*, *87*(10), 1369-1378.
12	Sample size	70	60 in original study.	149
13	Sample characteristics: • Age range and mean • % female/male • Race/ethnicity or % minority SES indicators (education, income)	1. 79.36 SD 6.73 2. 69.64 M/27.192 F 3. Avg Edu: 10.66 yrs, 28.13 married, 32.97 living at home	1. 64.6 SD 8 2. No breakdown 3. No data available.	1. 68.8 SD 11.04 2. No breakdown 3. No data available
14	Has the measure been used or tested in the diverse group you are interested in? Provide reference.	Yes Qutubuddin, A. A., Pegg, P. O., Cifu, D. X., Brown, R., McNamee, S., & Carne, W. (2005). Validating the Berg Balance Scale for patients with Parkinson's disease: a key to rehabilitation evaluation. *Archives of physical medicine and rehabilitation*, *86*(4), 789-792.	Yes Huang, S. L., Hsieh, C. L., Wu, R. M., Tai, C. H., Lin, C. H., & Lu, W. S. (2011). Minimal detectable change of the Timed "Up & Go" Test and the Dynamic Gait Index in people with Parkinson disease. *Physical Therapy*, *91*(1), 114-121.	Yes Kegelmeyer, D. A., Kloos, A. D., Thomas, K. M., & Kostyk, S. K. (2007). Reliability and validity of the Tinetti Mobility Test for individuals with Parkinson disease. *Physical Therapy*, *87*(10), 1369-1378.
15	Has it been used or tested in a group similar to the diverse group you are interested in? State group and provide reference	Yes in Multiple Sclerosis: Fjeldstad, C., Pardo, G., Frederiksen, C., Bemben, D., & Bemben, M. (2009). Assessment of postural balance in multiple sclerosis. *International Journal Of MS Care, 11*(1), 1-5 5p.	Yes in Multiple Sclerosis: Forsberg, A., Andreasson, M., & Nilsagård, Y. E. (2013). Validity of the Dynamic Gait Index in People With Multiple Sclerosis. *Physical Therapy, 93*(10), 1369-1376 8p. doi:10.2522/ptj.20120284	Yes in Amyotrophic Lateral Sclerosis Kloos, A. D., Dal Bello-Haas, V., Thome, R., Cassidy, J., Lewis, L., Cusma, T., & Mitsumoto, H. (2004). Interrater and intrarater reliability of the Tinetti Balance Test for individuals with amyotrophic lateral sclerosis. *Journal of Neurologic Physical Therapy*, *28*(1), 12-19.
16	Is the sample in the original publication very different from the one you are interested in? How?	Yes – The original publication tested general elderly versus elderly specifically with Parkinson's Disease.	Yes – The original publication tested elderly without Parkinson's Disease.	Original publication was a conceptual paper.
	VARIABILITY	Measure 1	Measure 2	Measure 3
17	Possible score range	0-56	6.5-20.3	0-24
18	Observed score range	43-49	14.8(3.7)	12–28
19	Mean (SD)	46	10.6	23.25±3.75
20	Ceiling or floor effects (% highest or % lowest score)	10% lowest, 35% highest	None	Floor effect exists for those in later Hoehn & Yahr stages (eg, stages 4 and 5)
21	Skewness statistic	P = 0.035 – significantly skewed to the left.	None Evident	None Evident

	RELIABILITY	Measure 1	Measure 2	Measure 3
22	Types of reliability reported and coefficients: Internal consistency (Cronbach's alpha), Test-retest (Pearson correlation, Spearman correlation)	Internal Consistency: Cronbach's Alpha: 0.96	Excellent Inter-rater reliability – 0.98-0.99 Correlation coefficients ranged from 0.71-0.99	Excellent interrater reliability 5 raters (ICC = 0.87; 95% CI = 0.8-0.93) Excellent interrater reliability with experienced raters (n = 2; ICC = 0.84; 95% CI = 0.69-0.92) Excellent interrater reliability with student raters (n = 3; ICC = 0.89; 95% CI = 0.8-0.94)
	INTERPRETABILITY	Measure 1	Measure 2	Measure 3
23	Direction of a high score (what does the high score mean?)	The lower score indicates a higher risk for falling.	The high score indicates a higher risk for falling.	The lower score indicates a higher risk for falling.
	VALIDITY			
	Content Validity	Measure 1	Measure 2	Measure 3
24	Evidence of content validity in the original publication? Describe	Not evident.	Not evident	Not evident
25	Evidence of content validity in one of the other publications? Describe	Parkinson's Disease: Excellent correlations with the Timed Up and Go (TUG) (r-0.78) (Brusse et al., 2005)	Nothing directly noted	Parkinson's Disease: Adequate correlations with the Comfortable gait speed (r= 0.52) (Kegelmeyer et al, 2007)
	Criterion Validity (gold standard to compare to)	Measure 1	Measure 2	Measure 3
26	Evidence of criterion validity in the original publication? Describe	The authors suggest the presence of criterion validity, however, also mention about that there is no 'gold' standard to compare these results to.	None Evident in the original publication.	The authors mention about no 'gold' standard, however, did compare it to the Berg Balance Scale for validity measurement.
27	Evidence of criterion validity in one of the other publications? Describe	Brusse, et al (2005) compares this exam to multiple other balance 'type' of tests and it scored >0.50 with a p>0.05 significance level. Brusse, Kevin J, Zimdars, Sandy, Zalewski, K.R., & Steffen, T.M. (2005). Testing functional performance in people with Parkinson disease. *Physical therapy, 85*(2), 134-141	Bennie, et al (2003) compares the TUG to the BBS and found significant correlation between the two, r = -0.47p = 0.044 Bennie, S., Bruner, K., Dizon, A., Fritz, H., Goodman, B., & Peterson, S. (2003). Measurements of balance: Comparison of the timed" Up and Go" test and functional reach test with the berg balance scale. *Journal of Physical Therapy Science*, *15*(2), 93-97.	Found correlation between the Tinetti and the UPDRS – r = -0.40 p < 0.05 and comfortable gait speed r = 0.52 p <0.01. Kegelmeyer, D. A., Kloos, A. D., Thomas, K. M., & Kostyk, S. K. (2007). Reliability and validity of the Tinetti Mobility Test for individuals with Parkinson disease. *Physical Therapy*, *87*(10), 1369-1378.
	Construct Validity Known groups, convergent, convergent/ discriminant, factorial	Measure 1	Measure 2	Measure 3
28	Evidence of any type of construct validity in the original publication? Describe	There were mixed results of convergent/divergent validity of with ranges of 0.47-0.67.	None Evident	None Evident
29	Evidence of any type of construct validity in one of the other publications? Describe	Ditunno, et al (2007) found significantly similar results at 3/6/12 months ranging from 0.78-0.92. Ditunno, J. F., Barbeau, H., Dobkin, B. H., Elashoff, R., Harkema, S., Marino, R. J., ... & Deforge, D. (2007). Validity of the walking scale for the spinal cord injury and other domains of function in a multicenter clinical trial. *Neurorehabilitation and neural repair, 21*(6), 539-550.	Convergent Validity when measured against BBS, FGS, CGS: 0.78/0.69/0.67 Brusse, K. J., Zimdars, S., Zalewski, K. R., & Steffen, T. M. (2005). Testing functional performance in people with Parkinson disease.*Physical therapy*, *85*(2), 134-141.	None Evident
	RESPONSIVENESS, SENSITIVITY TO CHANGE	Measure 1	Measure 2	Measure 3
30	Evidence of responsiveness or sensitivity to change in the original publication? Describe	There was no evidence of responsiveness in the original publication.	No evidence of responsiveness	No evidence of responsiveness

31	Evidence of responsiveness or sensitivity to change in one of the other publications? Describe	No other publications surrounding Parkinson's Disease located as being published. Responsiveness/Sensitivity were found with other disease processes such as stroke and vestibular diseases.	No evidence of responsiveness geared towards Parkinson's disease specifically. Only responsiveness geared towards community dwelling older adults and osteoarthiritis.	Sensitivity = 76% Specificity = 66% Kegelmeyer, D. A., Kloos, A. D., Thomas, K. M., & Kostyk, S. K. (2007). Reliability and validity of the Tinetti Mobility Test for individuals with Parkinson's disease. *Physical Therapy*, *87*(10), 1369-1378.
	TRANSLATIONS	Measure 1	Measure 2	Measure 3
	Is the measure available in the language(s) you are interested in?	Yes - Projekt współfinansowany przez Unię Europejską ze środków Europejskiego Funduszu Społecznego *(2015).* Skala Równowagi Berga. Retreved from: http://www.ump.gwsh.eu/pliki/fizjoterapia/metody_biomechaniczne/7%20-%20Skala%20Rownowagi%20Berga.pdf	None found.	Yes. Bosacka M, Bączyk G (2014) The role of clinimetrics in nurse's work with a patient after stroke. *Pielgniarstwo Polskie, 3*(53):244–249.
	What is the quality of the translation (adequacy of methods of translation)?	Unable to determine.	Unable to determine.	Only abstract was translated to Polish. Authors of the articles are of Polish decent.
	PRACTICALITY	Measure 1	Measure 2	Measure 3
32	Any statistics on reading level?	Yes	Yes	Yes
	ACCEPTABILITY FOR YOUR POPULATION	Measure 1	Measure 2	Measure 3
33	Perceived burden if noted, your estimate of perceived burden for your population	Perceived burden is the interview questions and testing that occurs during this examination.	Perceived burden is the testing that occurs during this examination	Perceived burden is the testing that occurs during this examination
34	"Real" burden – length of time needed, convenience of method of data collection	Real burden includes a time range of 6-30 minutes in one sitting with a mixture of interview questions and various timed movements to help determine the balance status. Collection of data includes written.	Real burden includes a time range of 0+ seconds to the amount of time it takes for the client to complete the examination. Collection of data includes the timing of the completion of exercises.	Real burden including the two different sets of exercises with one set testing balance and one set testing gait. Collection of data includes the measurement of the individual exercises and assigning a number of 0 to 2 determining the effectiveness of the person completing the exercise. The timing range for completion 10-15 minutes.
	SCORING MANUAL, SCORING RULES	Measure 1	Measure 2	Measure 3
35	Is there a manual or guide on how to create scores from the questionnaires?	Yes there is a guide within the exam itself on how to score the participants on a scale of 1-4. Once all of the scores are collected, they are added to create the final score. The final score then is compared to the ranges to provide the risk of falls for the tested population.	Yes there is a guide on the procedures that need to be completed and when to time it.	Yes a guide is evident within the assessment on what exercises need to be completed and how.

Source: author's own analysis

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PSYCHOLOGICAL FUNCTIONING OF PATIENTS WITH INFLAMMATORY BOWEL DISEASES: CROHN'S DISEASE AND ULCERATIVE COLITIS

PSYCHOLOGICZNE ASPEKTY FUNKCJONOWANIA OSÓB Z CHOROBAMI ZAPALNYMI JELIT – CHOROBĄ LEŚNIOWSKIEGO-CROHNA I WRZODZIEJĄCYM ZAPALENIEM JELITA GRUBEGO

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ABSTRACT

The most common inflammatory bowel diseases are Crohn's disease (CD) and ulcerative colitis (UC). The impaired digestive system function due to ulceration or other GI tract epithelium dysfunctions causes unpleasant symptoms that can affect patients' emotional state.
The present paper contains a review of the latest empirical findings and literature about the correlations between people's emotional states and their experience of living with a disease. Patients' responses to health problems are described.
High neuroticism, low self-esteem and negative perception of reality increase the risk of depression in somatic diseases and inhibit the healing process. Individuals with a more positive attitude towards fighting their disease, motivated and hopeful with respect to prognosis and recovery achieve better outcomes.

KEYWORDS: ulcerative colitis (UC), Crohn's disease (CD), emotional states.

STRESZCZENIE

Najczęściej występujące choroby zapalne jelit to choroba Leśniowskiego-Crohna (ChLC) oraz wrzodziejące zapalenie jelita grubego (WZJG). Zaburzone funkcjonowanie układu trawiennego spowodowane występowaniem owrzodzeń lub innych dysfunkcji nabłonka przewodu pokarmowego powoduje nieprzyjemne objawy u pacjentów, które wpływają na ich stan emocjonalny.
W niniejszej pracy dokonano przeglądu najświeższych wyników badań oraz publikacji naukowych dotyczących korelacji między stanem emocjonalnym człowieka a sposobem przeżywania choroby. Opisano reakcje pacjentów w obliczu zagrożenia zdrowia.
Wysoka neurotyczność, niska samoocena oraz negatywne postrzeganie rzeczywistości sprzyjają występowaniu depresji w chorobach somatycznych i pogarszają proces leczenia. Lepsze efekty terapeutyczne osiągają osoby pozytywnie nastawione do procesu walki z chorobą, zmotywowane oraz mające nadzieję na dobre dalsze rokowania i wyleczenie.

SŁOWA KLUCZOWE: wrzodziejące zapalenie jelit, choroba Leśniowskiego-Crohna, stan emocjonalny.

Introduction

Chronic inflammatory bowel diseases include Crohn's disease (CD), ulcerative colitis (UC) and indeterminate inflammatory bowel diseases. These conditions are characterized by the presence of segmental lesions in the gastrointestinal tract, such as abscesses, ulcers, inflammatory lesions, anal fistulae and rhagades of unknown aetiology. As these are autoimmune diseases, a significant role is played by genetic factors, with positive history findings in some patients suffering from CD. Similarly, with respect to monozygotic twins, both siblings are affected in 50% of cases. Besides genetic predispositions, there are important external factors, such as viruses, bacteria, and smoking, as well as unhealthy diet and lifestyle [1, 2].

In the majority of patients, inflammation occurs towards the terminal segment of the intestine, but mouth and other parts of the GI tract can also be affected. In CD, inflammatory lesions usually occur in the colon, caecum, stomach, oesophagus, segments or the whole length of the ileum, with all mucous membrane layers involved, while in UC usually only the colon is involved. The disease usually starts at a young age, with 30 years being a typical age of onset.

Diagnosis is based on GI endoscopy with biopsy for histopathological examination, and a GI scan. The mucosa in CD shows characteristic cobblestone appearance on endoscopy or lower gastrointestinal series. Laboratory findings include elevated ESR, ischaemia, leucocytosis, and high CRP levels in 95% of patients.

More detailed diagnostics of affected intestinal segments involve imaging, with the preferred method being CT or MRI enterography. Diagnosis should be based on physical examinations combined with detailed history including lifestyle and coexisting symptoms (headaches, skin lesions, ophthalmological problems, and other diseases, e.g. primary sclerosing cholangitis – PSC) [2–4].

Treatment includes topical anti-inflammatories (salicylic acid derivatives), followed by oral or intravenous glucocorticosteroids. Supplementary treatments include immunosuppressants, e.g. azathioprine, mercaptopurine derivatives. In later stages of treatment, monoclonal antibodies and biologic agents should be considered.

There is no causal treatment; pharmacotherapy is symptom-driven. Diarrhoea and vomiting are treated with antidiarrheals and bile acid sequestrants, such as cholestyramine.

A definitive indication for surgery is ileus, perforation or peritonitis. These are conditions for which surgery is a lifesaving procedure. Affected segments are sometimes resected; the size of lesions can be reduced over time. Unfortunately, sooner or later surgery is unavoidable. Patients with multiple intestinal resections or large lesions and those resistant to pharmacotherapy are given enteral nutrition with formulas specifically designed for patients with inflammatory bowel conditions, while in clinical cases of complications from bowel resections some patients require temporary or permanent parenteral nutrition in the home setting [2–4].

Patients should be placed in the care of the treatment team that includes, apart from the treating physician, a dietician and a psychologist. Patients with chronic, non-specific bowel inflammation, due to accompanying symptoms, such as diarrhoea, vomiting, and abdominal pain are at risk of malnutrition due to abnormal intestinal absorption and also have increased risk of depression. Patients with UC are 40% more likely to suffer long bone fractures, peritonitis, and toxic megacolon [1, 5].

Low stress tolerance threshold as a risk factor in somatic bowel diseases

One of the risk factors contributing to the inflammatory bowel disease is stress. Stress has negative effects on digestion and peristalsis. When dealing with prolonged stress, the body responds a number of defence reactions that can cause organ dysfunctions.

The first stage of response to stress is the release of corticotrophin from the hypothalamus, followed by the release of ACTH from the anterior lobe of the pituitary gland and elevation of cortisol secreted by the adrenal cortex. Prolonged high cortisol levels result in decreased immunity as evidenced by the low natural killer cell, cytotoxic T cells and macrophage counts [3, 6].

A gut-associated lymphoid tissue (GALT), present in the GI tract, along with the mucosa is part of the immune system. Immunoglobulin A, responsible for the initial contact with the pathogen, provides protection against food-related antigens and neutralizes toxins. This is the body's first line of defence, and the mechanism is part of the acquired immune system. Abnormal immune response negatively affects GI tract function due to impaired activity of mucosa upon contact with pathogens [7].

Intestinal bacteria ensuring the integrity of intestinal epithelium are involved in the process of regulating the acquired immune system and eliminate pathogens in the body. Prolonged stress and increased tension cause imbalance in the natural gut flora. The result is dysbiosis and growth of pathogenic bacteria in the intestines. The dominant species are Escherichia coli and Bacteroides; there is an overrepresentation of gram-negative and anaerobic bacteria. Gut dysbiosis leads to increased intestinal permeability, which significantly increases the risk of inflammatory bowel diseases and secondary symptoms, such as interloop abscesses.

There is a strong correlation between the severity of bowel inflammation and increased psychological stress. Individuals with low self-esteem, neurotic traits or exposed to stressors are at a much higher risk for a variety of diseases, particularly inflammatory bowel conditions [6–9].

Emotional responses in patients with inflammatory bowel diseases

Being ill is a challenging condition, pushing patients out of their established comfort zone. This leads to the activation of compensatory mechanisms in order to adjust to the new situation. Inflammatory bowel diseases are associated with worsening of the quality of life, chiefly due to uncomfortable somatic symptoms. In addition, frequent tests and, initially, the diagnostic procedures themselves, such as colonoscopy and proctoscopy, cause intense stress, anxiety and fear of uncertain future in patients. At this stage of the disease patients usually have low self-esteem and self-approval, emotional lability and resistance to lifestyle changes. Patients can also experience a sense of guilt, blaming themselves for having neglected their health in the past [9, 10].

The defence mechanisms typically mobilized against the emerging threat are automatic, habitual ways of reducing unpleasant emotional tension, such as fantasizing about the disease, revaluation, externalization of negative emotions or general changes in emotional profile that sometimes precede the disease process. Moreover, diagnosis may be repressed or its validity questioned as a way to conceal anxiety. Patients may

exhibit emotional responses inadequate for the progress of the disease. Emotional responses may result in enhanced motivation to fight the disease and resolve to actively participate in the treatment or in low mood and lack of energy [11, 12].

The disease affects three areas of life: reactivity and behaviour, emotionality, and personality. Patients are often forced to give up their career or life plans because the disease impairs their ability to perform their job or play the role of parent, guardian or partner. Patients become insecure and the fact that their way of living may need to change is a source of intense psychological stress [13, 14]. Worsening of health upsets the equilibrium of life. Values that were central for the individual may now become marginalised; patients may feel abandoned and hurt by their social circle. It should be mentioned, however, that the disease may have a positive impact by enhancing social contacts, giving the patient a new appreciation of his/her achievements and life before falling ill, as well as satisfaction with the current level of functioning. The reaction to a disease process, diagnosis, symptoms of a given condition depend on personality, character traits and the environment in which the individual was raised and currently lives. Still, most patients associate the disease with loss and the traumatic experience of diagnosis. At the beginning patients often show apathy, decreased activity, and they withdraw from social contacts and professional career. Then, once they come to terms with the diagnosis, patients often require more interest and care from friends and family. Due to changes in behavioural reactivity, patients expect compassion and comforting. Chronic illness is associated with personality changes, inhibited emotional expression and often reduction of interests [15,16]. Additionally, patients often complain of headaches, insomnia, loss of appetite, which leads to attention deficits, increased anxiety, higher excitability threshold, loss of previous tolerance for other people's behaviour and depression. There may be an increase in the embarrassing symptoms associated with stress and depressed mood, such as diarrhoea and vomiting. Support from experienced medical staff and therapists are very important for the way patients deal with the disease [17, 18].

Patients' adjustment to their new health status

The process of adjustment to and acceptance of a disease depends on personality and attendant's psychological status. Adjustment to the disease is considered not to be dependent on the stage of the affliction, but primarily on the length of time, number of complications and personality traits. Patient's clinical status may deteriorate due to stress and emotional lability during the initial stage of the disease. High neuroticism, emotional withdrawal and failure to engage in coping activities increase the probability of this type of the somatic response [8, 12].

Deterioration in the functioning of a previously healthy body is a significant stressor, which is why coming to terms with limitations resulting from the disease or with disability and the need to depend on other people significantly enhance the treatment process. Traits that are very important when dealing with a chronic somatic disease include the ability to control emotions, stable mood, resistance to emergent stimuli and willingness to overcome adversity.

In a previously published study, the purpose was to establish the emotional approach of patients and its effects on treatment (which was the same in all subjects). The study included 41 patients with CD and 34 with UC. Patients were aged from 18 to 75 years; 35 subjects had active disease and 40 were in remission. The results of previous studies have shown that patients during a relapse phase demonstrate stronger neurotic traits than healthy individuals. A positive correlation was found between low agreeableness, maladjustment to the disease and high neuroticism and low disease acceptance. Participants tended to perceive reality in a negative light. No such behaviours were seen in patients during remission: on the contrary, their different attitude towards the disease had a positive impact on their health [8, 14].

There are 5 different types of behaviour that patients demonstrate in the course of the disease process while adjusting to their new circumstances:

- Responsive-combative behaviour – patients believe that the disease will become milder and therefore, they have little impact on everyday functioning, but at the same time they are motivated to fight and overcome the disease;
- Projective-aggressive behaviour – patients demonstrate negative emotions, such as self-loathing and aversion towards others, including the medical staff; the dominant feelings are aggression, suspicion, spitefulness;
- Resignation-passivity – characterized by complete consent to patient care provided by the medical staff; patients want to be dependent on those who take care of them;
- Rationalization of the disease – patients repress the fact that they are sick;
- Partial or complete denial – repressing the disease from consciousness, negative attitude towards treatment and suggested therapy, disbelief towards and rejection of the diagnosis [15].

According to Shontz [19], patients go through the following stages when facing their disease:

- The moment of diagnosis, accompanied by shock, disbelief and temporary detachment from the situation;
- Encountering the problem – at this stage patients start to understand the situation and the fact that their health has deteriorated, are pessimistic about treatment and prognosis, demonstrate helplessness and refuse treatment;
- At the third stage of adjustment patients repress the existence of the disease, suppress negative emotions by denying undisputable facts at the cost of later being less well adjusted to living with the disease;
- Reorientation towards reality is the final phase of adjustment. Patients start to see their disease in a new light, they mobilize their strength to fight and start treatment. Values that have previously been ignored now become important, patients establish better relations with others, their outlook on life changes [19].

Among the many adaptive responses of the body to the dysfunctions caused by the disease, literature describes the cognitive effort patients make to gather information about the course of their affliction, its signs and symptoms, and potential complications. They rely on the knowledge of the medical staff, who become the primary source of trusted information. At this point it is vital that the medical staff pay close attention to symptoms reported by the patient, while the patient in turn is expected to accept the changes his/her body has already undergone or will undergo in the course of treatment [14].

Another strategy patients use to shield themselves from negative emotions is a positive reappraisal, whereby they find positives in their condition. Some patients compare themselves to people in worse situations and find consolation in that tactic. Others yet use relaxation techniques to draw their attention away from negative environmental stimuli. The abovementioned behaviours give patients a sense of being in control of the disease and their bodies, which translates to better responses to treatment [17, 18].

Quality of life of patients with inflammatory bowel disease

One possible outcome of inflammatory bowel disease is the need for parenteral nutrition, which is associated with a long list of contraindications and dietary restrictions that must be observed to avoid mistakes leading to complications. Being unable to ingest food orally is highly stressful to patients, lowering their quality of life and often leading to mood swings and depression. Patients with non-specific inflammatory bowel conditions are also at risk for malnutrition due to impaired absorption of nutrients in the course of the disease [20].

Studies have shown that people who are lonely are worse at coping with the disease and have a much lower quality of life compared to those who can rely on their family or support group. Personality plays a significant role in the disease process. Traits such as neuroticism and a pessimistic view of the world increase susceptibility to mental diseases. Available data show that people living in cities cope with the disease better than those in rural areas [20]. This can likely be attributed to better access to healthcare and paramedic services, and a more accepting attitude in urbanized areas for the dysfunctions of the human body.

Many patients (between 50 and 70%) report experiencing pain in the course of inflammatory bowel disease. In addition, 20% of patients experience pain even during remission. Pain carries significant information for the human body and may signal a potential health problem. Visceral pain causes stimulation of the sympathetic nervous system; the sensation is highly unpleasant, the pain can often be chronic, diffuse and difficult to locate precisely. It tends to be accompanied by symptoms such as nausea, vomiting, and dizziness. The body's defence response in the form of chronic pain also causes significant cellular stress and affects nitrogen metabolism [21].

The experience of each individual should be considered subjectively due to variation in excitation thresholds and resistance to pain. There is a theory that pain is experienced as being worse when people are alone compared to being in a group. Sometimes a small discomfort causes incommensurably intense sensations due to the body's prolonged exposure to unpleasant symptoms [6, 9, 10, 21, 22, 23, 24].

Conclusion

The scope of this paper goes beyond the course of the disease itself, its diagnosis and treatment, to analyse the emotional experiences of and psychological approaches to patients. A number of emotional issues associated with health impairment are identified that can disrupt everyday functioning and require the presence and assistance of qualified individuals trained in paramedic procedures. There is a positive correlation between the psychological approach to patients and a positive attitude towards the disease on the one hand, and a better prognosis and more effective treatment on the other.

Patient's cooperation with the treating team is crucial. Psychologists play a significant role in the course of somatic diseases, and in the case of IBD a dietician

also needs to be involved. A diet suited to the patient's condition can help avoid persistent discomforts such as diarrhoea, bloating, headaches, nausea, and vomiting. Talking to a psychologist may change the perception of the disease. There is a definite need for support groups and organisations for people suffering from a given ailment. People have a chance to discuss their disease-related experiences, share practical advice on how to cope with everyday life, and find in fellow patients the empathy that can sometimes be missing in relationships with healthy people. Each patient should receive multidisciplinary specialist care to ensure the highest quality of health services and proven treatment efficacy.

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MAPPING THE HEALTH NEEDS AND PRIORITIES OF REGIONAL POLICY – NEW CHALLENGES. SELECTED THEORETICAL AND PRACTICAL CONTEXTS

MAPOWANIE POTRZEB ZDROWOTNYCH I PRIORYTETY POLITYKI REGIONALNEJ – NOWE WYZWANIA. WYBRANE KONTEKSTY TEORETYCZNO-PRAKTYCZNE

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ABSTRACT

Mapping the health needs in Poland, to the extent and in such a form as described, is a new process. However, it is not the initiative to identify health needs itself which is new, but its current form. The article focuses on the presentation of the most significant information (taken from available materials) concerning mapping of health needs and defining priorities of regional policy relating to health, among others based on the current regulations. It also presents an exemplary set of diagnosed priorities of the regional health policy in a selected voivodeship.

KEYWORDS: mapping the health needs, priorities of regional policy.

STRESZCZENIE

Tworzenie map potrzeb zdrowotnych w takiej formie i zakresie jak opisywany jest w Polsce procesem nowym. Novum nie stanowi jednak sama inicjatywa identyfikacji potrzeb zdrowotnych, a jej obecna forma. W artykule skupiono się na prezentacji najistotniejszych informacji (zaczerpniętych z dostępnych materiałów), dotyczących mapowania potrzeb zdrowotnych oraz określania priorytetów polityki regionalnej dotyczącej zdrowia, m.in. w oparciu o bieżące uregulowania prawne oraz prezentację przykładowego zestawu zdiagnozowanych priorytetów regionalnej polityki zdrowotnej wybranego województwa.

SŁOWA KLUCZOWE: mapowanie potrzeb zdrowotnych, priorytety polityki regionalnej.

Introduction

Maps of health needs already exist in some European countries [1]. In Poland, their development results form a statutory duty, and the main legal acts in this area are:

- The Act of 27 August 2004 on healthcare services financed from public funds (Journal of Laws of 2015, item.581, as amended) [2];
- The Act of 22 July 2014 amending the Act on healthcare services financed from public funds and some other acts (Journal of Laws of 2014, item1138) [3];
- Regulation of the Minister of Health of 26 March 2015 on the scope of content of health needs maps (Journal of Laws of 2015, item 458) [4].

According to the Act of 2014, developing the first maps of health needs covers an area of hospital treatment, and the deadline for drawing them up has been set set for 1.04.2016 [1].

Regional Map of Health Needs

According to the Act (Journal of Laws of 2015, item 581 as amended), for each of the 16 provinces a Regional Health Needs Map should be prepared, which includes specifics of health needs, characteristic of the inhabitants of the particular region [2].

Maps of regional nature, owing to the fact that they are a kind of analytical and prognostic tool [5], may be a valuable instrument to support the decision-making processes in broadly defined healthcare [1, 5]. The content of Regional Health Needs Maps has been strictly defined and consists of three main parts:

1. *demographic and epidemiological analysis*, containing ordered information on the number and structure of the population based on the data from a particular district, age and gender. This section must also include data concerning population, fertility rate, number of births, deaths (according to causes), mortality rate (including perinatal), population density, hospital

incidence and morbidity, which have been included in the records;

2. *analysis of the status and use of resources*, which contains information about the number of service providers with regard to the appropriate division. It must include, among others, data on the number of medical entities such as hospital services and twenty-four hour medical services other than hospital ones, the number and types of hospital wards, the assessment of provided health services (according to ICD-10), and medical procedures (according to ICD-9), the migration of beneficiaries or the analysis of medical staff resources (doctors, nurses and midwives);
3. *forecasts of health needs* – this part must include the data which were characterised in the first part, but in a prospective way (the number and structure of population, gender, age, number of births and deaths, fertility rate), as well as the number of hospital and non-hospital beds, the rate of man-days of hospitalisation, predicted demand for medical services along with the evaluation of predicted health needs and evaluation of the sensitivity of the adopted assumptions [4, 6, 7].

Detailed preparation of the above mentioned components will be used to determine the actual demand for medical services [8].

The procedure of developing Health Needs Map

Regional Health Needs Maps are created on the basis of the above mentioned regulations. They are supposed to take into account the range of health needs identified for specific communities, covering the area of the administrative division of the country.

The first Regional Maps are supposed to concern hospital treatment services. They will be drawn up by the Minister of Health and will include 5 year-period, divided into two stages:

- map prepared to 04.01.2016 for the period 30.06.2016–31.12.2018
- map prepared to 31.05.2018 for the period 2019–2021 [6].

Each successive period of the map functioning will be 5 years long. Particular provincial governors cooperating with the Regional Council for Health Needs will prepare them. The detailed composition of the Provincial Council is established in the Article 95a.1, while the organisation of work of the Council is determined by the Article 95a.2–5 [2, 3].

The procedure of developing Health Needs Map assumes (under the Act) six basic steps:

1. Preparing by the National Institute of Public Health – National Institute of Hygiene (NIPH-NIH) (based on demographic and epidemiological data and data from the register of medical entities) the project of the Regional Map.
   - submission of the project to the provincial governor – to 15.10 of the year preceding by 1 calendar year the first year of being in force.
2. Preparation of the relevant Regional Map by the provincial governor (on the basis of the Project).
   - handing over the Map to the National Institute of Public Health – National Institute of Hygiene (NIPH-NIH) to 01.02 of the year preceding the first year of the Regional Map being in force.
3. Development of the National Health Needs Map by NIPH-NIH (based on the Regional Maps).
   - handing over the National Health Needs Map (together with the Regional Maps) to the Minister of Health (for approval) to 01.04 of the year preceding the first year of the Map being in force.
4. Approval of the National Health Needs Map by the Minister of Health (possible correction of the maps by the Minister of Health before approval)
   - time of approval: to 01.06 of the year preceding the first year of the Map being in force.
5. Publication of the approved Maps on the Public Information Bulletin (BIP) website of the Ministry of Health and provincial offices.
6. Monitoring the validity of the Maps by NIPH-NIH and handing over the results to the Minister of Health.
   - reporting the results: each year to 30.06 for the previous year [2, 3, 6].

Priorities of regional policy

Priorities of regional policy are developed by the provincial governor in cooperation with the Provincial Council for Health Needs. The main message of this process is "the state of health of citizens and achieving the health effects of the highest value." These priorities are set for the period for which the Regional Health Needs Map is valid [3].

Below are presented the priorities of the regional policy of the Kuyavian-Pomeranian Voivodeship. The presented material is only part of the document (as a sample and informative material) published on the website of the competent provincial office, as indicated in the list of references of this article. It is the attachment No. 1 to the Regulation No. 316/2016 of the Kuyavian-Pomeranian provincial governor from July 29,

2016 PRIORITIES FOR REGIONAL HEALTH POLICY IN KUYAVIAN-POMERANIAN VOIVODESHIP. In point 2 of the Document: Strategy and implementation, the following priorities were presented:

1. Improving the availability and quality of services concerning prevention, diagnosis and
2. treatment of cardiovascular diseases.
3. Improving the availability and quality of services concerning prevention, diagnosis and treatment of cancer.
4. Improving the availability and quality of services concerning prevention, diagnosis and
5. treatment of respiratory diseases.
6. Improving the availability and quality of services concerning prevention, diagnosis and treatment of diseases of osteoarticular and muscular system.
7. Improving the availability and quality of services concerning prevention, diagnosis and treatment of people with mental and behavioural disorders.
8. Improving the availability and quality of services concerning reducing the negative effects of injuries and defects causing significant limitations in social and professional functioning.
9. Improving the availability and quality of services concerning prevention, diagnosis and treatment of other diseases.
10. Improving the quality, effectiveness and accessibility of healthcare for elderly and dependent people.
11. Improving the quality and accessibility of healthcare for mothers and the population of children and adolescents.
12. Improving the efficiency and organisation of the healthcare system by supporting scientific research, technological development, innovations and access to quality services.
13. Support for the training of medical staff in the context of adaptation of resources to the changing needs of society [9].

All the above presented priorities of regional health policy have been, in the aforementioned document, developed in a detailed way by specifying the field of medicine, time and method of implementation, presenting measures of evaluation (for all the analysed cases they have been identified in relation to 2014), and justification [9].

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STRESS AND OCCUPATIONAL STRESS – SELECTED THEORETICAL CONTEXTS

*STRES I STRES ZAWODOWY – WYBRANE KONTEKSTY TEORETYCZNE**

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* Artykuł zawiera obszerne fragmenty pracy doktorskiej nt. Cechy wypalenia zawodowego i nasilenie stresu u personelu naziemnego i pilotów Bazy Lotnictwa Taktycznego w Łasku napisanej na UMK w Toruniu, Collegium Medicum w Bydgoszczy, pod kierunkiem prof. dr. hab. med. Aleksandra Gocha.

ABSTRACT

Stress is a state of overload of the mental regulation system, which occurs in an emergency situation, difficulties or inability to achieve aims, objectives and values which are important for the person. Individual mechanisms of coping with stress, aimed at ensuring the psychological and behavioural stability of a person, are also important. These mechanisms are individual for people with different temperament and personality traits. In a stressful situation internal strategies for coping with stress are triggered, which can be either constructive or nonconstructive. These strategies are essential for resolution of conflict situations, internal stress tolerance and evaluation of different professional situations as more or less stressful [1].
The article deals with (on the basis of collected literature) issues related to the explanation of basic concepts related to stress, also occupational stress. It also presents basic models of occupational stress and the ways of managing stressful situations on the organizational ground.

KEYWORDS: stress, coping with stress, occupational stress.

STRESZCZENIE

Stres to stan obciążenia systemu regulacji psychicznej, który powstaje w sytuacji zagrożenia, utrudnień lub niemożności realizacji ważnych dla jednostki celów, zadań i wartości. Istotne są również indywidualne mechanizmy radzenia sobie ze stresem, które mają na celu zapewnienie jednostce stabilności psychicznej i behawioralnej. Mechanizmy te są indywidualne dla ludzi o różnych cechach temperamentu i osobowości. W sytuacji stresowej ludzie uruchamiają wewnętrzne strategie radzenia sobie ze stresem, które mogą mieć charakter konstruktywny lub niekonstruktywny. Strategie te mają istotne znaczenie dla rozwiązywania sytuacji konfliktowych, wewnętrznej tolerancji stresu i oceną różnych sytuacji zawodowych jako bardziej lub mniej stresujących [1].
W artykule zostały poruszone (na podstawie zgromadzonego piśmiennictwa) kwestie związane z wyjaśnieniem podstawowych pojęć związanych ze stresem, również stresem zawodowym. Zaprezentowano także podstawowe modele stresu zawodowego oraz sposoby zarządzania sytuacjami stresowymi na gruncie organizacyjnym.

SŁOWA KLUCZOWE: stres, radzenie sobie ze stresem, stres zawodowy.

Introduction

In scientific literature, the term „stress" appeared in the 1950s, and the first author defining stress was Hans Selye. He described it as a „non-specific response of the body to any demands placed on it" [2]. According to Lazarus and Folkman, stress should be viewed as a transaction between the body and the environment [3]. Stress is defined in a similar way by the Polish researcher – Janusz Reykowski. He perceives it as a relationship between the entity and his or her environment [4].

In the history of research on stress, its biological concepts can also be found. In this stream of research, studies were conducted among others by: Hans Selye and Walter Cannon. The latter, in the 1930s, defined a state of dynamic balance of physiological processes occurring in the body and gave it the name of homeostasis. He also found that for this very desirable balance, stress is an unfavourable factor. In a stressful situation a man can trigger one of two reactions, which are aimed at stopping the crisis and returning to homeostasis. These reactions are "fight" or "flight". An individual makes a choice which of the options will sooner lead to the desired state of balance [2].

Stress is one of the most deeply examined conditions and at the same time one of the most unknown and surprising phenomena that are parts of our contemporary everyday life. Stress is a negative feeling that has always accompanied the man in different life situ-

ations. It is beneficial, as it informs the individual about the threat and allows them to cope with a difficult situation. However, chronic, increasing stress disrupts the emotional state and may contribute to the occurrence of diseases [5]. It has been shown that the presence of chronic stress adversely affects the brain, leading to cognitive disorders, and mood disorders, which is one of the causes of depression. Studies confirm that chronic stress with the lack of physical activity is the main cause of cardiometabolic diseases and psychiatric disorders in today's society. Therefore, prevention of these disorders includes elimination of stress by, among others, strengthening constructive strategies to cope with it, which are as important as physical exercise [6].

Stress can also be divided based on the effects it produces. In this division eustress and distress should be distinguished. Eustress is so-called positive stress, which motivates to action and stimulates. This type of stress accompanies exciting experiences and evokes intense emotions. Distress, on the other hand, affects people negatively. It is the main cause of disorders of the autonomic nervous system and, affecting the stress axis, leads to the development of somatic diseases. It also causes behavioural disorders resulting from inadequate reactions to a current stressor. The most dangerous kind of stress for health is chronic stress, the one that requires the man to adapt to exceptional conditions, which are far from well-known and accepted standards in a longer period of time. Traumatic stress is a kind of destructive stress, disabling considerably the person's normal activity. It appears usually after a trauma, most often connected with the sense of immediate threat to life. Post-traumatic stress develops in about 50% of people who have experienced a traumatic situation, its consequences are significant functional disorders, cognitive disorders (mainly concentration, memory), agitation, panic attacks and sleep problems [7].

Stressors

Stress is triggered by many factors and can vary in strength, intensity and duration. It is caused, among other things, by: a sense of threat to life, health, self-esteem or job loss. It is also brought on by a sense of loss of control over the course of events or the appearance of obstacles, leading to difficulties in the normal, everyday activity and loss of values that are necessary to life. A particular type of stress is chronic stress whose appearance may be due to an illness or job loss, but it may be also connected with performing professional duties. Then we can talk about occupational stress. A factor causing stress is called a stressor. Any external stimulus which may change the established order can become a stressor, A sense of inability to meet demands is also a stressor. The stronger it is and the longer the time of its influence on the human body, the stronger is the experienced stress.

Based on their source, stressors can be divided into three categories: frustrations, conflicts and coercion. Frustrations occur while a person who is pursuing their aim faces difficulties. Frustrations are the body's negative reaction to emerging obstacles. They can be caused, among others, by: discrimination, death of a loved one or lack of job satisfaction [8]. Conflict situations constitute the second category of stressors. A person seeking to achieve their goal, moves away from it, cannot clearly identify it or knows that they must make a choice between two bad or positive possibilities, and thus, cannot find a way out. The last category of stressors is coercion, whose sources are both external and internal factors. In the workplace coercion may be seen in the form of, e.g expectations of high efficiency, punctuality, carrying out specific, not always pleasurable activities.

Coping styles

In stressful situations, a man uses various strategies to cope with it, depending on their experience, knowledge and intellect, cognitive constructs as well as personality traits and temperament. They also depend on the type of a stressful situation, or defence mechanisms triggered in it. Some of these strategies are more constructive, others less.

Lazarus defines stress in a so-called transactional model. He believes that a person in a stressful situation assesses their own capabilities and strives to meet the demands of the environment or tries to calm their own emotions. Coping is, in his opinion, a kind of an active struggle with the reality and with crisis situations. Lazarus and Folkman believe that coping "is a constantly changing cognitive and behavioural effort, aimed at specific external and/or internal requirements, which are perceived to be burdening or beyond the capability of the man." Researchers believe that when a person considers the situation stressful, a remedial strategy may be triggered. Lazarus lists four such strategies: searching for information, direct action, refraining from action and intrapsychic processes. Remedial methods proposed by the researcher are not, however, a way to combat stress. They do not change anything in a stressful situation itself. However, the measures which he proposes help to calm down, improve mood and reduce negative emotions. Focusing on the scientific theories by Lazarus and Folkman we can meet two functions of coping with stress – emotional and task-oriented. Controlling emotions reduces unpleasant tension and relieves other negative emotional states. In order to mo-

tivate a person to action, emotional arousal can play an important role. In the case of the task-oriented function, in other words - instrumental, it is aimed at solving the problem by changing the threatening environment or its adverse effects [3, 9].

The results of the research on remedial strategies are also significant The first of them is a preventive strategy, which is used before the onset of danger. Using it, one can prepare for the upcoming threat by adapting to the crisis situation which is expected in the nearest future. However, this strategy may require a lot of commitment. Another strategy of defending oneself, hiding, assumes avoiding threat and waiting until it passes. As the last one, the escape strategy can be mentioned. It is used when other ways of dealing with threat have been exhausted. It is a sign of helplessness that may result either from the situation (e.g. situations of direct threat because no options are available), or from individual characteristics, when people themselves declare that they are helpless in a particular situation. This strategy leads to avoiding confrontation with a threatening factor in order to improve one's sense of security [10].

Different strategies of coping with stress may be used by the same person depending on situational factors and may prove to be effective in a particular case. However, a person shows some particular tendencies to react in a difficult situation.

Occupational stress

At the end of the 20th century researchers Cooper and Marschall distinguished six groups of job stressors. Following the theory developed by them, stress at work can be caused by factors related to work (bad working conditions, overload, time pressure), factors related to a performed role (sense of responsibility for employees, role conflicts), bad relationships at work (conflicts with superiors, co-workers), factors associated with professional development (lack of job security, lack of promotion or climbing the career ladder too fast), factors connected with the organisational structure and atmosphere in the organisation and non-organisational sources of stress (family and financial problems, life crises of an employee) [11].

Most studies concern long-term consequences of stress at work, which can lead to occupational burnout, reduce involvement of employees in professional activities and decrease efficiency, as it was mentioned earlier [12, 13, 14, 15]. Contemporary research is focusing on creating models of occupational stress, which should cover all factors that are significant in its development, which in turn, may be important for the development of suitable prevention systems.

Models of occupational stress

The transactional model of stress developed by Cox assumes that the occurrence of stress is simultaneously influenced by two aspects, namely situational factors and individual characteristics of the person. Both social demands put on an individual and their aspirations as well as working conditions and the health status of an employee contribute to the occurrence of a stressful situation. It is the interaction between the components that causes stress and leads to an emotional and behavioral reaction, and consequently also to a physiological response. The occurrence of such an interaction results in appearance of strong emotions, which can seriously disrupt or even paralyse the person's activity. Sometimes they also affect private lives of employees and cause problems also in the areas of life that are not related to work [16].

The concept of occupational stress by Kalimo assumes that stress is a state of mental tension caused by a discrepancy between requirements of the environment and possibilities of a man. According to his theory, a person subjectively perceives this discrepancy and identifies it with threat, such as health, life or integrity of their own self. Kalimo in his theory also mentions stressors that threaten the above-mentioned values. The group of the most common stressors includes: physical work overload leading to employees' exhaustion, mental overload, monotony of work and routine of performed tasks, unfair treatment by the employer, unclear definition of tasks or complex and conflict tasks, time pressure and lack of recognition and support from third parties. Interestingly, Kalimo believes that the experience of stress is subjective by nature – the same situation will be perceived by some people as a threat, whereas for others it will be still comfortable. It is a person's own experience and possessed knowledge, physical strength and support from the environment that will decide whether stress will be destructive for the individual [after: 10].

Methods of stress management in an organisation

An employer's objectivity is very important at work. Employers frequently deny messages from people they do not like or consider to be inconvenient. In addition to this, there is often a situation of abuse. Therefore, supervising an employer would certainly play a very important role in any organisation by determining both positive and negative qualities of the manager. Nowadays, employers and their ways of management are considered as one of the main factors that affect stress in employees.

More and more attention is paid to comfort and proper atmosphere at work, and also to the need to resolve conflicts at work in a constructive way as well as rapidly assess and eliminate their sources. Not only does it have a social dimension, but also a material one. In crisis situations, where a conflict between groups of employees or employees and managers is apparent, hiring professional external companies with experience in group conflict resolution pays off. This can prevent the most dramatic forms of the conflict, such as a strike of a group of employees, where stiffening positions often prevents any negotiations and constructive conversation.

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FEATURES OF PROFESSIONAL AND LANGUAGE PREPARATION OF FUTURE DOCTORS TO USE MEDICAL TERMINOLOGY

ОСОБЛИВОСТІ ПРОФЕСІЙНО-МОВЛЕННЄВОЇ ПІДГОТОВКИ МАЙБУТНІХ ЛІКАРІВ ДО ВИКОРИСТАННЯ МЕДИЧНОЇ ТЕРМІНОЛОГІЇ

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ABSTRACT

It has been proved that professional and language preparation of future doctors to use medical terms is referred to as an element of vocational training of students in medical universities. It implies gaining theoretical knowledge of the Latin language and vocational and practical skills to use Latin medical terminology in studying other disciplines. We examined the peculiarities of professional and linguistic preparation of future doctors to use medical terminology in Latin. They specify: the need to broaden students' knowledge of the history of using the Latin language; awareness of the importance of the Latin language for the professional activity of a modern physician; interdisciplinary integration of science and the use of the Latin language; teaching vocational vocabulary to medical students as a tool of communication in professional activities.

KEYWORDS: future doctors, Latin language, medical terminology, peculiarities, professional and language education of students.

АНОТАЦІЯ

Доведено, що професійно-мовленнєва підготовка майбутніх лікарів до використання медичної термінології визначається як складова професійної підготовки студентів у вищих медичних навчальних закладах, що передбачає опанування студентами теоретичними знаннями з латинської мови та професійно-мовленнєвими практичними вміннями використовувати латинську медичну термінологію у процесі вивчення фахових дисциплін. Досліджено особливості професійно-мовленнєвої підготовки майбутніх лікарів до використання медичної термінології, якими визначено: необхідність розширення знань студентів з історії застосування латинської мови; усвідомлення студентами важливості знань латинської мови для професійної діяльності сучасного лікаря; міждисциплінарна інтеграція у вивченні та використанні латинської мови; навчання фахової лексики студентів-медиків як засобу спілкування в професійній діяльності.

КЛЮЧОВІ СЛОВА: майбутні лікарі, латинська мова, медична термінологія, особливості, професійно-мовленнєва підготовка, студенти.

Постановка проблеми

Динамічні трансформації у сучасному суспільстві зумовлюють зміни в системі охорони здоров'я, а відтак – і в медичній освіті. Лікарі XXI століття покликані враховувати на лише потребу в удосконаленні медичного обслуговування, а й використовувати прогресивні методи лікування, сучасну лікувально-діагностичну апаратуру, ознайомлюватися з новітніми досягненнями в медичній галузі шляхом опрацювання спеціальної медичної літератури, яка здебільшого видається іноземною мовою. Відтак актуалізується проблема вдосконалення підготовки майбутніх лікарів у напрямі навчання медичної термінології, яка є загальновизнаною в усьому світі у вигляді латинських назв ліків, медичних інструментів, окремих органів і частин тіла людини та фізіологічних процесів, які відбуваються в організмі за наявності або відсутності певних хвороб тощо. Студенти, які здобувають фах лікаря, покликані оволодіти латинською медичною термінологією, щоб компетентно її використовувати в майбутній професійній діяльності.

Аналіз останніх досліджень і публікацій

Аналіз останніх досліджень і публікацій свідчить, що різні аспекти професійної підготовки майбутніх лікарів досліджувалися науковцями в Україні (Л. Войтенко, М. Мруга, М. Тимофієва, Б. Шахов) та зарубіжними дослідниками з Великої Британії Е. Бріджес (E. Bridges), К. Моррис (C. Morris), Д. Ньюбл (D. Newble), Канади – В. Костільйола (V. Costigliola), Італії – Дж. Керр (J. Kerr), А. Керрер (A. Karrer), Німеччини – Ґ. Вальтрауд

(G. Waltraud), А. Шведлер (A. Schwedler), США – Б. Спорн (B. Sporn), Д. Вернон (D. Vernon), Франції – Д. Жак (D. Jaques) та ін. Проблеми професійного спілкування та професійно-мовленнєвої підготовки фахівців медичної галузі були предметом наукових пошуків Н. Альохіної, Л. Кайдалової, М. Мусокранової та ін.

Дослідження окремих проблем професійно-мовленнєвої підготовки майбутніх лікарів було розпочато нами раніше [1] і в даній статті дослідження буде продовжено і поглиблено.

Мета статті

Визначення особливостей професійно-мовленнєвої підготовки майбутніх лікарів до використання медичної термінології.

Методологія

Методологічною базою дослідження є праці українських та закордонних науковців. Зокрема, методологічний аналіз професіоналізації майбутнього медичного працівника у вищому навчальному закладі проводився нами раніше [2]. Досягнення мети дослідження передбачає використання методів: системно-структурного аналізу, порівняння та узагальнення.

Виклад основного матеріалу

Використання спеціальних медичних термінів є обов'язковою ознакою професійної діяльності лікарів (написання і читання рецептів, визначення і характеристика хвороб, органічних та фізіологічних змін в організмі пацієнтів тощо). Оскільки від правильного використання лікарями медичної термінології залежить точність встановлення діагнозу певного захворювання, доцільність вибору лікарських засобів для допомоги хворим людям та надання їм необхідної та ефективної медичної допомоги, відтак науковці зосереджують увагу на проблемі урахування особливостей професійно-мовленнєвої підготовки майбутніх лікарів до використання латинської медичної термінології у майбутній професійній діяльності [3].

Важливою специфічною ознакою підготовки майбутніх лікарів до використання медичної термінології є ознайомлення студентів медичних університетів з історичними аспектами використання латинської мови. Ми враховували наукові розвідки вчених, які досліджували типологію мови и мовленнєве мислення. Так, С. Кацнельсон наголошує на значущості знання латинської мови у різні історичні періоди і зазначає, що латиною написані праця таких видатних мислителів, як голландський філософ Спіноза, англійський учений І. Ньютон, польський астроном М. Коперник, французький фізик, філолог, фізіолог Р. Декарт, російський учений М. Ломоносов, чеський педагог Я. Коменський, гуманіст епохи Відродження, англійський філософ Ф. Бекон, ботанік К. Лінней, професор риторики і політики, церковний діяч і письменник, ректор Києво-Могилянської академії Ф. Прокопович, український поет і філософ Г. Сковорода, акушер і ботанік М. Максимович-Амбодік, брати Шумлянські, М. Мудров та ін. Відомий хірург М. Пирогов написав і захищав докторську дисертацію латинською мовою, нею ж написаний і його класичний твір із топографічної анатомії та оперативної хірургії. Аж до XIX століття вчені різних країн свої наукові праці продовжували писати латиною [4].

Стосовно використання латинської мови в освіті, то слід зазначити, що в навчальних закладах багатьох країн світу були обов'язковими дисциплінами саме латинська та старогрецька мови. А в медичних університетах викладання більшості фахових дисциплін здійснювалося латинською мовою аж до XIX століття.

Заслуговує на увагу той факт, що в українській мові також використовуються латинізми, що бере початок з X-XI ст. і набуває розвитку в XVI-XVII ст. і пов'язане з періодом культурно-просвітницького руху, розквіту науки і літератури в історії України. Проводячи паралелі із сучасними євроінтеграційними процесами, зазначимо, українські студенти того часу здобували освіту в західноєвропейських університетах, використовуючи саме латинську мову. На теренах українських навчальних закладів (наприклад, у Києво-Могилянському колегіумі) латинська мова також була основною дисципліною, а вихованців зобов'язували постійно спілкуватися латиною: і під час навчання, і в побуті.

На основі аналізу наукових історичних джерел у наших публікаціях узагальнювалося, що латина ще в першій половині XIII ст. стала мовою канцелярій Галицько-Волинської держави. На східнослов'янські терени латинська мова проникає шляхом посередництва польської культури (XVI-XVII ст.) й стає невід'ємною частиною наукового, духовного, адміністративного та культурного життя України. До XVIII ст. серед закарпатських українців в Угорщині, де латина мала статус офіційної мови.

Таким чином, сучасні студенти-медики, усвідомлюючи наукову цінність і значущість латинської мови у підготовці майбутніх фахівців на різних історичних етапах розвитку науки, мають змогу переконатися, що професійно-термінологічна грамотність сучасного фахівця медицини, що формується в процесі вивчення латинської мови, водночас підвищує загальнокультурний рівень майбутнього лікаря.

Оскільки динамічні глобалізаційні процеси у світі охоплюють всі сфери життєдіяльності людини, відтак комунікативні аспекти взаємодії фахівців з різних країн передбачають використання професійної термінології, яка відзначає специфіку діяльності представників

різних професій. Знання сучасної наукової термінології багатьох наук, полегшує розуміння та спілкування людей у науковій сфері, переклад наукової літератури з однієї мови на іншу. У медичній галузі основою такої термінології є латинська мова. Тому характерною особливістю професійно-мовленнєвої підготовки майбутніх лікарів до використання медичної термінології є спрямування студентів на усвідомлення важливості знань латинської мови для професійної діяльності сучасного лікаря. Латинські найменування лікарських засобів використовуються як офіційні в багатьох національних фармакопеях, у Міжнародній фармакопеї (Pharmacoroea Internationalis), у виданнях ВООЗ. Латинською мовою виписуються рецепти, які можуть прочитати лікарі у будь-якій країні. Нині вагомим аргументом для підняття престижності латинської мови в професійно-мовленнєвій підготовці майбутніх лікарів слугує наказ Міністерства охорони здоров'я України № 360 від 07 серпня 2015 року, в пункті 1.9 якого передбачено: «Назва лікарського засобу, формоутворюючих та коригуючих речовин, його склад, лікарська форма, звернення лікаря до фармацевтичного працівника про виготовлення та видачу лікарських засобів пишуться латинською мовою. Використання латинських скорочень дозволяється тільки відповідно до прийнятих у медичній і фармацевтичній практиці» [5].

Досліджуючи витоки і розвиток медичної термінології на грецько-латинській основі, Є. Загрекова зазначає, що цей феномен окреслюється як «система систем». Медична термінологія складається з великої кількості окремих термінологічних підсистем медичних, медико-біологічних і деяких інших наук і галузей знань, пов'язаних із медициною [6]. На думку науковців, латинська та старогрецька мови – це своєрідний будівельний матеріал, основне джерело розвитку й поновлення термінологічних систем різних галузей науки, в тому числі медицини та фармації. З цього невичерпного джерела міжнародної грецько-латинської скарбниці терміноелементів отримують назви нові лікарські препарати й наукові відкриття. Приваблює латина своєю лаконічністю та досконалістю морфологічної структури, своїм лексичним багатством, виразністю, рухомою словотворчою структурою. Одним словом перекладаються багатослівні українські терміни, які характеризують як назви хвороб і патологічні стани, так і способи обстеження та лікування, назви операцій тощо. Наприклад, розділ геронтології (лат. gerontologia) вивчає особливості перебігу захворювань у людей похилого та старечого віку; а геріатрія (лат. geriatria) охоплює методи їх лікування та запобігання. Тут доречно навести вислів видатного римського письменника та оратора Ціцерона: «Non tam praeclarum est scire Latine, quam turpe nescire», що означає: «Не так почесно знати латину, як ганебно не знати її».

Важливим аспектом професійно-мовленнєвої підготовки майбутніх лікарів до використання медичної термінології, що визначаємо як третю особливість цього процесу, є міждисциплінарна інтеграція у вивченні та використанні латинської мови. Майбутні лікарі починають опановувати нові для них поняття і медичні терміни з першого курсу навчання у медичному університеті в процесі вивчення багатьох дисциплін, оскільки використовують анатомічних, гістологічних і фармацевтичні терміни як на заняттях з анатомії людини, гістології, фармакології, так і на практичних заняттях з латинської мови.

Науковці розподіляють медичні терміни на такі основні групи, що складають основу медичної термінології:

1. Анатомічна та гістологічна номенклатури, до яких входять всі назви відомих на даний час анатомічних і гістологічних утворень. Вони є невід'ємною частиною медичної освіти, оскільки всі анатомічні терміни вивчаються латиною паралельно на кафедрі анатомії людини та іноземної (латинської) мови.
2. Клінічна термінологія (гр. klinike techne – мистецтво лікування, догляд за лежачими хворими). Вона охоплює терміни різних клінічних спеціальностей, а також патологічної анатомії та фізіології, тобто тих дисциплін, які вивчають pathos (гр.) – біль, страждання. Сюди належать назви хвороб, патологічних процесів і станів, ознаки хвороб, симптоми, назви операцій, методів обстеження та лікування, медичних приладів, інструментів та ін. Ця термінологія використовується в клінічній практиці [7].
3. Фармацевтична термінологія, яка застосовується у процесі виготовлення, стандартизації, дослідження, збереження і видачі лікарських засобів, призначених для діагностики, профілактики й лікування захворювань. Відомо, що в європейській медицині протягом багатьох століть у назвах лікарських засобів традиційно вживається латинська мова.

Оскільки у світі зареєстровано сотні тисяч лікарських засобів, кількість яких постійно зростає, майбутні лікарі усвідомлюють значущість опанування основними правилами і закономірностями створення нових фармацевтичних понять. Студенти вивчають способи й засоби утворення однослівних і багатослівних фармацевтичних термінів, а також вчаться орфографічно й граматично правильно оформлювати латинську частину рецепта. Таким чином, дотримуючись логічності у розробці дидактичної структури дисципліни «Латинська мова», виокремлюються три провідні підсистеми медичної термінології: анатомо-гістологічна, клінічна та фармацевтична.

Важливою особливістю підготовки майбутніх лікарів до використання медичної термінології є навчання студентів професійної лексики. Засадничими мотивами опанування майбутніми лікарями професійною лексикою, а не лише знаннями певної кількості медичних термінів, є усвідомлення студентами потреби: вільно читати медичну літературу, яка видається у різних країнах, але основою якої є загальноприйняті медичні поняття і терміни латиною; порозумітися з лікарями, які працюють за різними методиками, у різних країнах, у провідних і провінційних медичних закладах, але володіють латинською медичною термінологією на фонетичному, лексичному, граматичному рівнях.

Професійно спрямована медична латинська мова є інтегрованим предметом, вивчення якого поєднує в собі цикли навчання фонетики, граматики, лексики, словотвору й орфографії класичної латинської мови, а також вивчення граматики, лексики та стилістики власне медичної латинської мови. Тому, на думку науковців, навчання латини має бути термінологічно спрямованим, інтегрованим зі спеціальними клінічними дисциплінами [8].

Висновки

Професійно-мовленнєва підготовка майбутніх лікарів до використання медичної термінології визначається як складова професійної підготовки студентів у вищих медичних навчальних закладах, що передбачає опанування студентами теоретичними знаннями з латинської мови та професійно-мовленнєвими практичними вміннями використовувати латинську медичну термінологію у процесі вивчення фахових дисциплін: анатомії людини, гістології, фармакології та ін. Особливостями професійно-мовленнєвої підготовки майбутніх лікарів до використання медичної термінології визначено: необхідність розширення знань студентів з історії застосування латинської мови; усвідомлення студентами важливості знань латинської мови для професійної діяльності сучасного лікаря; міждисциплінарна інтеграція у вивченні та використанні латинської мови; навчання фахової лексики студентів-медиків як засобу спілкування в професійній діяльності.

Подальші наукові розвідки у цьому напрямі вбачаємо в розробці експериментальних методик, які доцільно використовувати у професійно-мовленнєвій підготовці майбутніх лікарів до використання медичної термінології.

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THE IMPACT OF SHIFT WORK ON SELECTED AREAS OF HUMAN FUNCTIONING AND HEALTH – OVERVIEW OF RESEARCH

WPŁYW PRACY ZMIANOWEJ NA FUNKCJONOWANIE I ZDROWIE CZŁOWIEKA – PRZEGLĄD BADAŃ

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ABSTRACT

Professional work absorbs a big part of our lives. It is primarily a source of economic and social benefits. In some cases, however, work can have a negative and even harmful impact on health and well-being. The contemporary lifestyle, especially shift work, has changed a daily rhythm of life. Time schedule, different from the natural one, affects the human body, causing changes in hormones, body temperature, mood and brain functioning.
The aim of the study was to review epidemiological studies on the relationship between night shifts and the presence of some pathologies.

KEYWORDS: shift work, health status, health consequences.

STRESZCZENIE

Dużą część naszego życia pochłania praca zawodowa. Praca człowieka to przede wszystkim źródło korzyści ekonomicznych i społecznych. W niektórych sytuacjach praca może mieć jednak niekorzystny, a wręcz szkodliwy wpływ na zdrowie i samopoczucie. Współczesny styl życia, a w szczególności praca zmianowa zmieniły w wielu wypadkach dzienny rytm życia. Inny od naturalnego rozkład czasu pracy wpływa na organizm ludzki, powodując zmiany w hormonach, temperaturze ciała, nastroju oraz funkcjonowaniu mózgu.
Celem pracy był przegląd badań epidemiologicznych dotyczących związku między pracą w nocy a występowaniem wybranych patologii.

SŁOWA KLUCZOWE: praca zmianowa, stan zdrowia, konsekwencje zdrowotne.

Introduction

Shift work, without which it is impossible to imagine many types of industries, has been mentioned on the list of the most harmful or disruptive factors occurring in the workplace. In recent years, the attention has increasingly been directed towards the threats of night shifts. People with non-standard working hours often report their negative impact on health. The physiological problem of shift work results primarily from activities taken up at the time inconsistent with the normal circadian rhythm of most physiological functions. Biological rhythms, often called an internal biological clock, is an adaptive mechanism that allows to synchronize the internal environment of the man with the external environment. The main synchromesh of endogenous rhythms are light, temperature, cycles, phases of the moon, seasons and the availability of food. In the context of shift work the most important factors are: a day-night cycle and food. Biorhythms are a regulated daily cycle of activity and sleep, the rhythm of core body temperature, hormone secretion, changes in blood pressure, heart rate and urine output. They are normalized body processes and their detuning leads to serious health consequences. Already in the 90s of the 20th century, the study of working conditions in European countries showed a higher incidence of lesions among shift workers compared with those working daily.

Shift work at night is less effective and causes increased fatigue [1]. Analyzing the reports from various centers on the impact of shift work on workers' health, it can be concluded that the shift contributes to a significant deterioration in the quality of life, but also performance. Some believe that only 10% of the economically active tolerate shift work well [2]. In many publications

it is emphasized that night work and shifts should not be regarded as a factor of absolute pathological importance. There is a disease that can be solely attributed to changing working hours. However, one can cite a lot of evidence that night work and shifts are a factor of accelerating or intensifying the occurrence and course of many diseases and pathological conditions. It may primarily refer to sleeping disorders, digestive system, changes in the circulatory system – including ischemic heart disease and hypertension, metabolic disorders, immune system disorders, and neurotic disorders [1]. The negative impact on the hormonal regulation of the body is considered by some authors as a potential factor that may favor the development of hormone-dependent tumors, e.g. breast cancer [3]. Working in unusual varying times of the day can cause reproductive changes in the menstrual cycle, during pregnancy (spontaneous abortion, premature birth, low weight newborns), accelerating the onset of the menopause and reduced fertility. In addition to these health effects, the attention should also be paid to disturbances in the sphere of family and social life of shift workers, whose time schedule is contrary to the natural rhythm of their families [1, 3, 4].

According to the definition of the International Labour Organisation 1990, shift work is a method of working time organization, in which employees work in succession in the workplace, so that the plant can work longer hours. In the directive 2003/88/EC of the European Parliament and the Council of 4 November 2003 shift work was defined as this form of work organization whereby workers change at the same work stations according to a certain pattern, including rotation, and which may be continuous or discontinuous, entailing the need for workers to work at different time over a given period of days or weeks [5, 6, 7].

According to the Labour Code (art. 128. section 2), the concept of shift work means doing the job according to the agreed work schedules. The shift system does not comply with the standard 8-hour working time during the day, and includes the night shift, rotating shift work and / or irregular working hours. In practice, this usually means working in two shifts – 12-hour mode (usually day and night shift) or a three-shift system – eight hours of work (night afternoon and night shift) [8]. The type of work which comprises the night shift in Europe and North America is performed by approximately 15–20% of the economically active people, including about 23% of men [6]. Among the EU countries Slovenia takes the first place in terms of the shift frequency (31%). Poland ranks second (29.5%), and Slovakia – third (29.0%). And the least number of people employed as shift workers is in Denmark (4.4%) [9]. Shift work is a common phenomenon in many industries – mining, communications, hospitality, transportation and public services – police, fire and health services. The occurrence of shift work in the industry is subject to both: specific technological processes that often cannot be interrupted due to the nature of the product and the use of expensive equipment, whose effective application is associated with the continuous use.

Shift work and cardiovascular disease

The mechanism of the shift work influence on the formation of cardiovascular diseases is not completely understood. Shift work and night work – are forms of employment associated with the distortion of the physiological rhythm, stress and therefore, they harm the human body. Many authors emphasize that shift work may indirectly influence the formation of hypertension and coronary heart disease [10, 11]. Examples of data based on the observation of a group of 7095 people aged 39-62 suggest that those working 11 hours or more have a 67% higher risk of cardiovascular disease than those working 7–8 hours. The adverse effects of shift work apply to both men and women, as confirmed in the Nurses' Health Study, which was attended by 71 617 women aged 45–65. After the 10-year follow-up of women with no previously identified ischemic heart disease, 934 underwent myocardial infarction, and the risk was 45% higher in women who slept 5 hours per day compared to the ones sleeping 8 hours a day (12). Studies conducted in Finland, show that shift workers have a 30–50% higher risk of cardiovascular disease compared to personnel working on a day shift, but in this case there are certain differences between groups (Tenkanen, et al., 1997). The mechanism of cause and effect, presented in this study, is a disorder of the circadian rhythm (Tenanken et al., 1997). The risk of the incidence of coronary heart disease increases along with longer experience of shift work (Knutsson, 1989). However, shift workers also have elevated levels of other risk factors for coronary artery disease, including the diversification of the diet (Knutsson, 1989). Other authors argue that '(...) the work shift is an absolute risk factor for coronary heart disease (...), shift work seems to involve a 40% increase in the risk of coronary heart disease' (Nurminen and Karjalainen, 2001). The Finnish study on a sample of 1,806 men showed that shift work significantly strengthened the other risk factors for coronary heart disease, including smoking, physical inactivity and obesity. Due to this, it is essential to take into account epidemiological studies of growing risk factors related to the lifestyle, smoking and others (Knutsson et al., 1988; Nurminen and Karljalainen, 2001). Boggild et al. (2001) on a random sample of the Danish population were checking whether shift work was associated with other factors influencing heart dis-

ease. They found that in at least one group of shift workers a higher prevalence of almost all unfavorable factors of working environment appeared, which were the subject of analysis (both physical and psychosocial conditions). The exception to this rule were only: exposure to dust and quantitative requirements [12].

Shift work and gastrointestinal dysfunction

A number of studies indicate that circadian rhythm disorders caused by shift work can affect a higher incidence of symptoms (heartburn, dyspepsia, lack of appetite, abdominal pain) [1]. It is not clear, however, whether shift work influences a more frequent occurrence of gastric and duodenal ulcer. Still, it is emphasized that the irregularity of life associated with shift work is a factor unfavorable in treatment of ulcers [13]. It is worth noting that the disruption of circadian cycles in the secretion of melatonin, associated with shift work (the origin of the pineal and intestinal melatonin) may also affect the functioning of the stomach and intestines. Melatonin preferably influences the metabolism of the mucous membrane and the muscular work, and increases the digestive tract in experimental treatment of gastric ulcers in laboratory animals [14]. Peptic ulcer is determined by many factors and shift work seems to be one of several risk factors for this disease.

Shift work and sleep

Shift work (at night) is not to be missed when searching for the causes of occupational stress. It has a detrimental effect on health, negatively influencing the natural physiological process of the body, i.e. a dream. The change of circadian rhythm disorders leads to stress. It reduces the amount of secretion of melatonin, which is released by the pineal gland and activates the mechanism of sleep and wakefulness. On average, about 30% of adult life is sleep. The number of hours of sleep needed for the body regeneration is genetically coded and varies for each person. Depriving the man of sleep for several days can lead to disturbances in the reception of impressions, logical thinking, confusion, hallucinations, fatigue, and mental disorders [15].

On the next day after work people working at night experience problems with sleep, the reaction time to stimuli is prolonged and the risk of making mistakes increases. These people are more irritable and sleepy. There has been a decrease in concentration, problems in analyzing and assimilating new information, as well as decision-making. Decreased efficiency, especially mental, serves to increase the number of accidents at work. We conducted the study which compared impaired psychomotor skills in people with deficient sleep and people under the influence of alcohol. More than a dozen hours of the continuous standby corresponding reduction in the efficiency is observed at a concentration of 0.5 per mile of alcohol blood and more than 20 hours – at a concentration of 1 per mile of alcohol in the blood [16, 17, 18].

Knauth et al. showed that people working rotationally, on average sleep during the week 5–7 hours fewer, which in the long run gives chronic partial sleep deprivation. It can results in pathological sleepiness, anxiety, irritability, weakness at coping with difficult situations. There has also been a decline of concentration, difficulty in making decisions and analyzing the situation [19].

Shift work and cancer

Shift work and night work, disrupting circadian rhythms, can interfere with a number of physiological functions. This leads to the appearance of many pathologies. In the last few years a lot of attention was paid to these known but still studied pathologies. Analysis of work conditions suggested the influence of abnormalities in insulin secretion, and melatonin on the occurrence of certain malignancies [20]. Fluctuations of the melatonin level in the blood can influence the development of cancer, in particular breast and colon cancer, but ovarian, endometrial and prostate cancer are possible as well.

The impact of night work on the risk of breast cancer

The hypothesis of the relationship between breast cancer, night work and exposure to light at night was first formulated by Stevens in 1987 [21]. According to her, night work and exposure to light at night inhibit the synthesis of melatonin, and then increase the concentration of estrogen, which can lead to an increased risk of breast cancer. One of the first studies on the effects of shift work at night on the risk of breast cancer (Schernhammer et al.) have been conducted in the US in a large cohort of a population of 78 562 nurses – Nurses Health Study (NHS). In the course of a 10-year follow-up of this population (1988–1998), 2.441 cases of breast cancer were recorded. In the study, there was a statistically significant increased risk of breast cancer by 36% of nurses with at least 30 years of work experience including rotating night shifts [22]. During the follow-up cohort in Norway (the study of Lie et al.), numbering 44 835 nurses, there was 537 new cases of breast cancer. On the basis of this cohort, the case-control study comparing the performance characteristics in women with breast cancer and women with controls was conducted [23].

Colon cancer

The results of animal studies indicate that the antiproliferative activity of melatonin is not limited to breast

cancer cells but may also include other types of cancer, particularly colon cancer. Studies in rodents have shown that melatonin significantly inhibits the growth of cancer cell lines and colon cancer carcinogenesis induced by the chemical carcinogenic or mutagenic effects, i.e. 1,2-dimethylhydrazine) [24]. Furthermore, in the serum of patients with colorectal cancer lower levels of melatonin compared to healthy subjects were observed [25], which may suggest a link between low levels of melatonin and the development of colon cancer in humans. Schernhammer et al., in a cohort of 78 568 nurses (Nurses' Health Study I), showed a significant risk of developing colorectal cancer after 15 years of working in the night shift (increased by 35%). The analysis takes into account potential confounding factors, i.e. age, incidence of colorectal cancer in relatives, body mass index, alcohol consumption, smoking, physical activity and diet [26].

Endometrial cancer

Increased risk of developing endometrial cancer largely depends on the hormonal and metabolic factors that may be affected by reducing the secretion of melatonin associated with night shift work. Reduced levels of melatonin and its association with increased risk of endometrial cancer is not entirely clear. In 2007, Viswanathan et al. first published results of analysis of the incidence of endometrial cancer in a cohort study of 121 701 nurses (Nurses' Health Study I). During 16 years 515 cases of invasive endometrial cancer in a group of nurses who worked at night were diagnosed. Analysis showed a statistically significant increased risk of endometrial cancer in women working for 20 years and more in the system of night shift work. Risk was particularly high in obese women [27].

Impact of shift work on a woman's body

Disorders of the menstrual cycle are also mentioned as a result of shift work. Research by Gaworska-Krzeminska conducted in Poland in more than 2 thousand nurses showed that the menstrual cycle among nurses was significantly deregulated after shift work [30]. A similar statistical significance in the area of menstrual disorders as a result of shift work is confirmed by Chung et al. [28].

The results of the research by Burdelak et al. conducted in a population of nurses and midwives have shown an increased incidence of thyroid disease (21.2%) after working for 15 years in two shifts [29].

In research by Syrocka et al. thyroid diseases were the most frequently mentioned health problems by the respondents. Of the 37 women with various disabilities 18 (52.9%) suffered from hypothyroidism, 17.6% from hyperthyroidism and 14.7% from Hashimoto's thyroiditis, which is a worrying phenomenon [30].

Another very important area of family life is sex life and satisfaction with sex life

Some of the nurses surveyed in the study conducted by Syrocka said that after starting shift work these parameters have deteriorated. In terms of intimate life of more than 44% it was specified that shift work made it difficult to have love life [31]. Poorer satisfaction with sex life after starting shift work is experienced by 33.6% of respondents. There is little research on satisfaction with sex life among shift workers. In the publications of several researchers, for example Zużewicz et al., the problem of reduced sexual performance and libido as a result of long work shifts is only mentioned. This conclusion, however, is not confirmed by any detailed analysis and can also be caused by the natural aging process of the body [32]. In the publication by Iskra-Golec et al., the study by Bosch and de Lange was quoted. The researchers, however, only mentioned the increased frequency of complaints about sexual life of people working in two shifts, compared with working regularly [33].

Stress in shift work

Stress is a common consequence of shift work, long hours spent at work, work consisting in performing tasks that require interference with sleep habits and resulting fatigue. Increased risk of stress is associated with disruption of natural biological circadian cycles, shorter time and poorer quality of sleep during the day, and the conflict of professional and private roles. Fatigue can interact in two ways: on the one hand, it may predispose an employee to experience stress, on the other hand, it can enhance the impact of any pre-existing stressor. Stress and fatigue in most affect people working at night, with up to 75% of shift workers feeling sleepy during each night shift (Akerstedt, 1995, 1988, 1985). Research by Bristol Accord (Bristol survey) indicates that participants who are at high levels of occupational stress work at night more often than workers with low levels of work-related stress (Smith et al., 2000) [34–37]. In recent studies of nurses working at night, Kobayashi et al., (1999) found that cortisol levels and cell activity were at night time low, which suggested that night work was highly stressful and could be harmful to the immune system [38].

In a recent study on differences between employees working during the day and at night in terms of exposure to physical and psychosocial occupational hazards in the care of the elderly in Denmark, Nabe – Nielsen et al. (2009) found that, compared with those working in

the day, people who are constantly working at night are more likely to have reduced control at work, low social support from superiors, as well as physical and mental violence, and high physical requirements. Working at night, however, they were less exposed to generally high demands of work. These differences persisted after adjustment for age, position and place of work. The authors suggested, therefore, that these results indicated the importance of the properly considered characteristics of work in examining health effects of shift work.

In previous studies [39], Shields (2002) explored the characteristics of shift workers and compared the stress factors and health behaviors of shift workers and people working on one day shift. The four-year analysis indicated that in men working at night, on a rotating basis, or as part of an irregular schedule, the rate of chronic diseases increased. Older workers usually experience more difficulty in a situation when they have to tolerate disruption of the circadian rhythm, so they may have delayed reactions, be more drowsy and unable to deal with tasks that require precision and attention [40]. For example, in the case of truck drivers over the age of 55, the risk of fatal road accidents exponentially increases (Mayhew, 1993) [41]. Another stressor is also the occurrence of conflicts as regards private and professional roles; for example, women working in the rhythm of shifts may be more likely to experience sleep disturbances (Bohle, 1999). The growing popularity of 12-hour shifts may contribute, therefore, to increasing the prevalence of fatigue and thus, to an increased prevalence of stress (especially among those working overtime). The negative health consequences of working 12-hour shifts to a much greater extent seem to involve shifts in the night than in the daytime [42]. However, research on the negative effects of work in the system of 12 - hour shifts has been carried out to a minimum (Leka and Jain, 2010). Research by Bristol Accord shows that 30% of employees with a high level of occupational stress were often forced to stay at work for a long time or at times conflicting with the rhythms of labor (Smith et al., 2000). However, it should be noted that the effect of a 'healthy worker' may interfere with the results of a large part of studies on the influence of work in the night [43].

Shift work cannot be eliminated from the life of modern societies, and thus, it is impossible to completely eliminate the negative effects of this kind of work. These effects, considered in physiological, sociological and health terms, do not meet one of the criteria used in a modern definition of health, which is the total physical, mental and social development. If the adaptation of a man to work 'in a non-physiological rhythm' is impossible, if there is a presumption that this activity has a negative impact on the quality and length of life, particular attention should be focused on how to mitigate its negative effects and improve quality of life.

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THE DEVELOPMENT OF MEDICAL SIMULATION CENTERS IN POLAND – A STRONG OPPORTUNITY FOR MODERNIZATION OF NURSING EDUCATION

ROZWÓJ CENTRÓW SYMULACJI MEDYCZNEJ W POLSCE WIELKĄ SZANSĄ NA UNOWOCZEŚNIENIE KSZTAŁCENIA PIELĘGNIAREK W POLSCE

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ABSTRACT

Introduction. Simulation based Education becomes a modern tool for nursing education.
Aim. The aim of the paper is to analyze the emerging opportunities of medical simulation in nursing education secondary to the ongoing Ministry of Health project on development of medical simulation centers.
Medical simulation can improve the quality of nursing education through various methods. First of all, with the advancement of technology in patient simulators they can be used to closely mimic the clinical conditions. The Standardized Patient program can be a valuable asset in teaching patient-nurse communication skills.
In 2015, the Polish Ministry of Health through a EU grant is supporting the development of twelve Simulation Centers in Polish Universities. The fund will support the purchase of equipment and education of the instructors between 2016 and 2021.
Summary. There is a unique opportunity of improving the quality of nursing teaching secondary to the development of medical simulation centers. It is crucial to use these funds to take part in training both internally and in other centers.

KEYWORDS: simulation, medical education, manikin, phantom, standardized patient.

STRESZCZENIE

Wstęp. Edukacja połączona z symulacją medyczną stała się nowoczesnym narzędziem kształcenia pielęgniarek.
Cel. Celem pracy była analiza nowych możliwości wprowadzenia do edukacji w pielęgniarstwie symulacji medycznej.
Symulacja medyczna poprawia jakość kształcenia poprzez wiele modeli. W związku z rozwojem technologicznym symulatorów pacjenta można je wykorzystywać przede wszystkim do wiernego odwzorowania warunków klinicznych. Dodatkowo przez program Standaryzowanych Pacjentów możliwa jest praktyczna nauka komunikacji.
W roku 2015 Ministerstwo Zdrowia zainicjowało Program Unii Europejskiej POWER mający na celu wsparcie wyposażenia 12 Centrów Symulacji na Uczelniach Medycznych w Polsce na lata 2016–2021. Z tych pieniędzy zostanie sfinansowany zakup sprzętu symulacyjnego oraz kształcenie instruktorów symulacji dla wszystkich kierunków nauczania.
Podsumowanie. Powstała unikalna sposobność na poprawę jakości kształcenia pielęgniarek poprzez rozwój krajowej sieci centrów symulacji. Konieczne jest aktywne wykorzystanie dostępnych funduszy na szkolenia instruktorskie zarówno na bazie własnej jak i obcej.

SŁOWA KLUCZOWE: symulacja, edukacja medyczna, manekin, fantom, pacjent standaryzowany.

Simulation – definition

Simulation is the imitation of the operation of a real-world process or system over time [1]. Simulation is extensively used for educational purposes. The most common use is in aviation industry where it has become not only the necessary part of basic pilot training but also a mandatory part of the maintenance of the certification process. Perhaps the most obvious part of this were the air-crashes when simulation based-training became a true life-saver. In January 2009 in New York, an Airbus airliner was forced to land on the Hudson River secondary to the engine flameout caused by Canadian geese. Another mishap happened in Warsaw Airport when the landing gear could not lower secondary to a mechanical failure. In both cases nobody was hurt and the pilots confirmed that the prior training in a simulator helped in this process tremendously. Similarly, in any industry, where the stakes are very high, i.e. nuclear power plants, simulation plays a major role in education.

In medical education simulation concentrates on improvement of the healthcare quality which translates into improving the patient's outcome.

The aim

The aim of the paper is to analyze the emerging opportunities of medical simulation in nursing education secondary to the ongoing Ministry of Health project on development of medical simulation centers.

The Development of Simulation-based Education in Medicine

Initially, the medical simulation was treated skeptically as it was believed that nothing can simulate a human being with a reliable fidelity. The advances in technology have proved it wrong. The current patient simulators can mimic live patients to an unbelievable extent. With features like coughing, seizing, vomiting and bleeding profusely, they can cause a real level of stress in students [2].

Traditionally, medical simulation is still mistakenly identified as dealing solely with single-task trainers as CPR or intubation phantoms. Although these trainers present for several decades still have a role in the basic CPR training, medical simulation has now evolved into several advanced fields.

The most innovative field is virtual reality. It can be used in procedure training such as endoscopy or laparoscopic surgery. The picture on a screen is connected to haptic part and the movements of a simulated endoscope are extremely real. The maneuvering of the endoscope into i.e. a bowel wall on the screen will result in a tactile feedback of the hardware making it extremely authentic to the operator.

Also, the advanced software for computer simulation is now used for education training. In simulation of a mass casualty the decision-making process can be exercised like Virtual Hospital of Virtual Patient.

The true aspect of medical simulation is high-fidelity training with patient simulators. These are technically advanced manikins that can simulate almost all physiological and pathological conditions in the real-time. Also the vital signs as heart rate, respiratory rate, pulse oximetry, body temperature may be simulated on a patient's monitor. The simulators also have pupils reactive to the light, heart, lungs that can be auscultated, their pulses are palpable. The simulators can bleed with artificial blood, sweat, vomit and urinate. The students can perform various procedures on these patients, such as cardioversion, percutaneous pacing, intravenous access, not to mention inserting the endotracheal tube or tracheotomy. Some of the manikins can detect the diverse medications being injected and react accordingly. There are no clinical scenarios that could not be simulated in that manner. The simulation allows to present clinical scenarios safely, repeatedly and in a standardized way. It can guarantee that each student will see and manage the most common pathologies to become a competent nurse or a doctor. More advantages can be found in **Table 1**. However, it should be stated that simulation is not an equivalent to a real patient contact, however it can be an invaluable asset to education.

Table 1. Advantages of medical simulation

Advantages of medical simulation
The teaching standardization
Safety of patients during training
The use of real medical equipment in simulated conditions.
Practical teaching of invasive procedures (colonoscopy, bronchoscopy) without inadvertent damage
Making errors in simulated conditions
Scheduling of clinical activities based on students' needs not on patients' availability
Possibility of presenting unusual cases
Prompt feedback after the clinical scenario during a debriefing session
Standard and procedure validation in safe conditions

Source: author's own analysis

Simulation Scenarios

A disoriented patient, an acute coronary syndrome or acute arrhythmias are examples of clinical situations that may be practiced using simulation based learning. During the actual scenario, the instructor controls the patient's simulator in a control room behind one-way looking mirrors (**Figure 1**). The nursing students can examine the patient, perform an interview and even call a doctor using the phone in the room. The scenarios last usually around 15 minutes. The instructor may talk to the students using a speaker inside the manikin's head and listen using microphones in its ears (**Figure 2**). The entire clinical scenario is recorded and then played back during a debriefing phase.

Debriefing is considered to be the most important part of the simulation [3]. During this segment the instructor discusses freely what happened during the scenario and while playing back the recorded video pinpoints most important events during the encounter. The students then discuss the imperfections of their actions with the instructor.

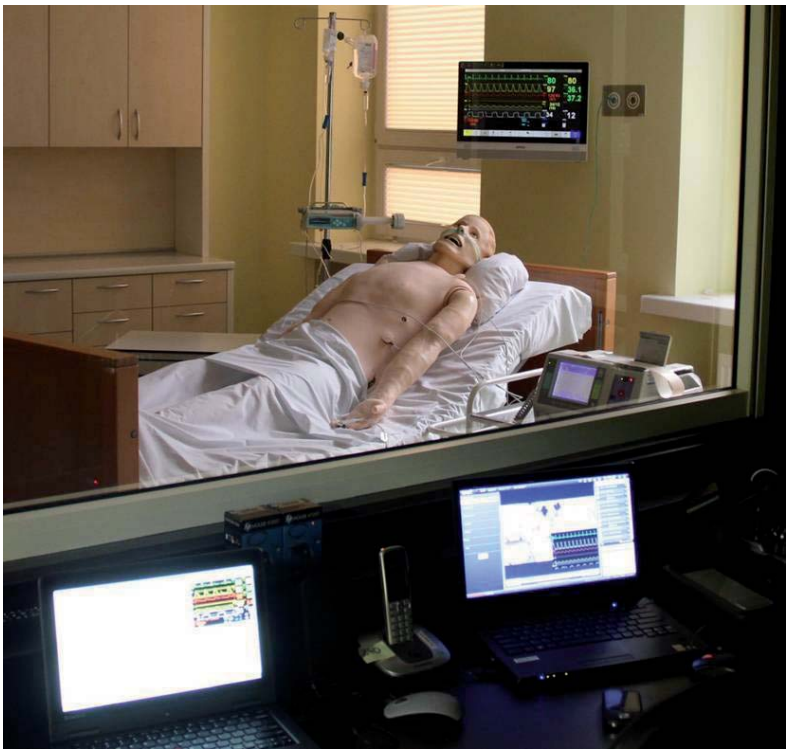

Figure 1. View from the control room through the one-way looking mirror into the sim lab.
Source: Medical Simulation Center

Figure 2. Interdisciplinary team (physician, nurse and paramedic) during a simulated scenario
Source: Medical Simulation Center

Standardized Patients

Standardized Patients are actors trained to play roles of real patients. The use of Standardized Patients has been utilized for over 30 years in the USA. In the emerging simulation market in Poland in the majority of Polish Universities there will be SP employed to interact with medical and nursing students. One of the possible uses is practicing communication skills with difficult patients [4]. Again, this can be done with an audio-video recording and debriefed afterwards.

Medical Simulation Centers

Designing a Medical Simulation Center from a scratch may be challenging. On one hand, those Centers have to be almost identical to clinical rooms, i.e. the Emergency Room or ICU room. On the other hand, they have to be universal in order to provide a number of various clinical activities in the same room. There are also rooms pertaining to simulation that normally are not present in hospital facilities, i.e. a control room or debriefing rooms. Additionally, there has to be an appropriate audio-video system for recording and archiving of the simulation scenarios. In each room there are microphones and cameras in certain locations. The video must be correlated with the real-time data from the manikin. After the simulation, the recorded session is then played back to the students in the debriefing room.

Development of Medical Simulation Centers in Poland

Poland became a unique country in the world to have a national network of Simulation Centers in Medical Universities supported by a governmental grant. In 2015 the Polish Ministry of Health initiated a national development program of twelve Simulation Centers in major Medical Universities. It supports both medical and nursing simulation-based education. The program based on EU funds (POWR.05.03.00-00-0005/15-00) worth of 282 million Polish zlotys (around 68 million Euro) is designed to support the equipment and training for five years. No funds are given for construction works. After 2021 there should be twelve new Simulation Centers operating, providing at least 5% of the entire training through medical simulation at each of the Schools. This is an unusual opportunity to set the bar of simulation high in Poland. The grant will cover the cost of teaching instructors, the manikins purchase and even the operating costs of Simulation Centers for the entire period of five years.

National Database of Simulation Scenarios

Another innovative idea of the EU grant project is creating and maintaining an on-line base of simulation scenarios. The scenarios will be designed at each of the participating institutions and stored on a server. Every instructor from those Universities will have access to the database. Thus, every instructor will be able to print and use any scenario for the database for his or her simulation activities. The common format will make sure that it is universal and suitable for various kinds of simulators.

Summary

Medical simulation has become an integral part of nursing education. The ongoing project of the Ministry of Health carries an opportunity of modernizing nursing education. There is a need of using the funds for instructor training which is supported by the grant. Moreover, the active participation in nursing education conferences should be encouraged.

With the rapid development of Simulation Centers in Poland there is a unique opportunity for Universities to grow into a major European leader in this field.

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POSSIBLE APPLICATIONS OF ICNP® IN THE CARE OF A PATIENT WITH CROHN'S DISEASE – A CASE STUDY

MOŻLIWOŚCI ZASTOSOWANIA KLASYFIKACJI ICNP® W OPIECE NAD PACJENTEM Z CHOROBĄ LEŚNIOWSKIEGO-CROHNA – STUDIUM PRZYPADKU

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ABSTRACT

Introduction. Crohn's disease (CD) affects the whole gastrointestinal tract. The essence of the disease is an inflammation which may affect each segment of the gastrointestinal tract. The first symptoms appear mostly in young people between 15 and 25 years of age. Apart from the gastrointestinal tract symptoms, patients may develop symptoms relating to other systems and organs.
Aim. The aim of this study was to formulate a plan of nursing care of a patient with Crohn's disease with the use of the International Classification for Nursing Practice.
Material and methods. The research is based on an individual case study and the analysis of literature. The study was conducted in December 2015 at the Department of Gastroenterology and Hepatology, the University Clinical Centre of Medical University of Gdansk. Written consent of the patient was obtained for the study.
Results. In the process of providing nursing care to the patient, we used phrases that describe "ready" diagnoses and nursing interventions contained in the International Classification for Nursing Practice ICNP®. The plan of care includes the following nursing diagnoses: abdominal pain, impaired defecation, impaired skin integrity, nausea, lack of appetite, risk for being underweight, anxiety, lack of knowledge of disease, lack of knowledge of dietary regime, fatigue.
Conclusions. The proposed plan of nursing care for a patient with Crohn's disease based on the ICNP reference terminology fully reflects the key problems of the patient and the extent of interventions undertaken by nurses.

KEYWORDS: nursing diagnosis, classification, nursing care, Crohn's disease.

STRESZCZENIE

Wprowadzenie. Istotę choroby Leśniowskiego-Crohna (ChL-C) stanowi stan zapalny, który może obejmować każdy z odcinków przewodu pokarmowego. Pierwsze objawy pojawiają się głównie u osób młodych, między 15 a 25 rokiem życia. Poza symptomami ze strony przewodu pokarmowego u chorych pojawić się mogą również objawy wywodzące się z innych układów i narządów.
Cel. Celem niniejszej pracy było sformułowanie planu opieki pielęgniarskiej nad pacjentem z chorobą Leśniowskiego-Crohna, z wykorzystaniem Międzynarodowej Klasyfikacji Praktyki Pielęgniarskiej.
Materiał i metody. W pracy posłużono się metodą indywidualnego przypadku oraz analizą piśmiennictwa. Badanie zostało przeprowadzone w grudniu 2015 roku w Klinice Gastroenterologii i Hepatologii Uniwersyteckiego Centrum Klinicznego Gdańskiego Uniwersytetu Medycznego. Na jego przeprowadzenie uzyskano pisemną zgodę pacjenta.
Wyniki. W procesie pielęgnowania chorego wykorzystano frazy opisujące „gotowe" diagnozy i interwencje pielęgniarskie zawarte w Międzynarodowej Klasyfikacji Praktyki Pielęgniarskiej ICNP®. W planie opieki uwzględniono diagnozy pielęgniarskie: ból brzucha, zaburzona defekacja, zaburzona integralność skóry, nudności, brak apetytu, ryzyko niedowagi, niepokój, brak wiedzy o chorobie/ brak wiedzy o reżimie diety, zmęczenie.
Wnioski. Propozycja planu opieki pielęgniarskiej nad pacjentem z chorobą Leśniowskiego-Crohna, bazująca na terminologii referencyjnej ICNP, w pełni odzwierciedla kluczowe problemy chorego i zakres podejmowanych przez pielęgniarki interwencji.

SŁOWA KLUCZOWE: diagnoza pielęgniarska, klasyfikacja, opieka pielęgniarska, choroba Leśniowskiego-Crohna.

Introduction

Crohn's disease (CD) is among the group of non-specific inflammatory bowel diseases of unknown etiology. It typically affects young people, aged 15 to 25 years. The essence of CD are lesions in the intestinal mucosa, particularly the final section of the small intestine and the proximal section of the colon. Typically, the inflammation affects the entire tract. The relationship between genetic, environmental and immunological factors plays the main role in CD pathogenesis [1–7].

The nurses who provide care to CD patients are in charge of systematic assessment of the patient, prevention of complications, health education and supporting the patient and his or her family [8–12].

The aim of this study was to formulate a plan of nursing care for a Crohn's disease patient as per the International Classification for Nursing Practice (ICNP®).

Material and methods

The analysis of the literature in the paper is performed following the classic substance-related technique; the paper presents an individual case study, in which we utilized the interview technique, observation, analysis of medical records and measurements of vital signs. The study was conducted in December 2015 at the Department of Gastroenterology and Hepatology, the University Clinical Centre of Medical University of Gdansk. Written consent was obtained from the patient.

Case report

A man aged 21 was admitted to the Department following lack of response to outpatient treatment. The patient had received proctologist care for 4 years (he was diagnosed with grade 2 hemorrhoids) and had Baron's method rubber band ligation in 2013.

Over the past year there had been a decrease in patient's body weight in the range of 12–15 kg. Following each meal the patient experienced dyspeptic symptoms, so he changed his diet and eliminated the foods which cause excessive gas. For more than six months he had experienced pain in the lower abdomen, usually after defecation. The patient noted that the increase in the number of bowel movements increased, to approx. 5 times a day. It was very difficult to control his need for defecation because he felt strong, paroxysmal pressure. The patient very often felt pain after defecating. In recent months lack of appetite and fatigue intensified. Numerous lesions were visible around the anus and the scrotum, causing a burning sensation and skin sensitivity.

For several months, the patient had been supervised by the gastroenterological clinic. The patient was referred for a colonoscopy examination. In August, the suspicion of inflammatory bowel disease developed. The patient did not report intestinal diseases among the immediate family in his medical history interview. Prior to his hospitalization, the patient had received the following drugs for several months: sulfasalazine, encorton and folic acid. His health, however, did not improve. Since November 2015 the patient passed 1–2 stools with blood. The patient had a rectoscopy performed, which revealed numerous anal ulcers.

Vital signs within the normal range. Patient's body weight was 76.5 kg, height 185 cm (BMI: 22,21kg/ m 2). The patient was independent in terms of everyday activities. The patient lived with his parents, studied and worked.

Blood test revealed elevated levels of CRP, and magnetic resonance imaging of the pelvis revealed infiltrative and inflammatory lesions, thickened mucous membrane on the entire length of the intestines, the region around anus and scrotum. The patient was diagnosed with Crohn's disease. The patient was qualified for an ileostomy procedure and the recommended period of time was approx. 6 months, which was a source of anxiety for the patient.

The International Classification for Nursing Practice (ICNP®) was created to standardize the language of professional nurses and make communication more efficient. The current version of ICNP® is structured along seven axes and contains a list of about 900 diagnoses and over 1,000 interventions [13, 14].

Diagnosis 1. Abdominal Pain [10043953]
Interventions:
Administering Medication [10025444]
Ewaluacja odpowiedzi na zarządzanie bólem [10034053]
Evaluating Response To Pain Management [10009654]
Initiating Patient Controlled Analgesia [10010245]
Monitoring Pain [10038929]
Assessing Pain [10026119],
Positioning Patient [10014761]
Encouraging Rest [10041415]
Managing Pain [10011660]
Outcome: Abdominal Pain [10043953]

Diagnosis 2. Impaired Defecation [10022062]
Interventions:
Identifying Gastrointestinal Status Before Operation [10034167]
Monitoring Bowel Motility [10037211]
Assessing Bowel Status [10036475]
Assessing Bowel Continence [10030558]
Promoting Hygiene [10032477]
Managing Defecation [10041427]
Outcome: Impaired Defecation [10022062]

Diagnosis 3. Impaired Skin Integrity [10001290] (+ Anus [10002417] and Scrotum [10017603])
Interventions:
Administering Medication [10025444]
Treating Skin Condition [10033231]
Teaching About Self Care Of Skin [10033029]
Assessing Skin Integrity [10033922]
Assessing Self Care of Skin [10030747]
Skin Assessment [10041126]
Assessing For Sign Of Discomfort [10037295]
Skin Care [10032757]
Promoting Hygiene [10032477]
Maintaining Skin Integrity [10035293]
Outcome: Improved Skin Integrity [10028517]

Diagnosis 4. Nausea [10000859]
Interventions:
Administering Medication [10025444]
Teaching About Managing Nausea [10043687]
Assessing Nausea [10043694]
Positioning Patient [10014761]
Encouraging Rest [10041415]
Managing Nausea [10043673]
Outcome: No Nausea [10028984]

Diagnosis 5. Lack Of Appetite [10033399]; Risk for Being Underweight [10037586]
Interventions:
Evaluating Psychosocial Response To Instruction About Nutrition [10007111]
Monitoring Weight [10032121]
Monitoring Nutrition [10036032]
Teaching About Effective Weight [10033001]
Teaching About Eating Pattern [10032918]
Assessing Appetite [10038901]
Assessing Attitude Toward Nutritional Status [10002694]
Assessing Risk For Impaired Nutritional Status [10040921]
Weighing Patient [10033323]
Managing Nutritional Status [10036013]
Outcome: Lack Of Appetite [10033399]

Diagnosis 6. Anxiety [10000477]
Interventions:
Demonstrating Relaxation Technique [10024365]
Assessing Anxiety [10041745]
Assessing Psychological Response To Ostomy [10040398]
Promoting Positive Psychological Status [10032505]
Promoting Family Support [10036078]
Reporting status to interprofessional team [10042645]
Providing Privacy [10026399]
Providing Emotional Support [10027051]
Managing Anxiety [10031711]
Outcome: Reduced Anxiety [10027858]

Diagnosis 7. Lack Of Knowledge Of Disease [10021994]/ Lack Of Knowledge Of Dietary Regime [10021939]
Interventions:
Referring To Enterostomal Therapy Nurse [10040419]
Teaching About Disease [10024116]
Teaching About Nutrition [10024618]
Assessing Knowledge [10033882]
Assessing Knowledge Of Disease [10030639]
Assessing Family Knowledge Of Disease [10030591]
Counselling Patient [10031062]
Promoting Self Management Of Symptom [10038469]
Reinforcing Adherence [10024562]
Collaborating With Physician [10023565]
Providing Instructional Material [10024493]
Outcome: Adequate Knowledge [10027112]

Diagnosis 8. Fatigue [10000695]
Interventions:
Implementing Comfort Care [10039705]
Teaching Adaptation Techniques [10023717]
Assessing Fatigue [10026086]
Involving In Decision Making Process [10026323]
Managing Fatigue [10046289]
Outcome: Reduced Fatigue [10029390]

Discussion

The prevalence of CD is geographically diverse, with the highest rate of disease severity observed among people in highly developed Western Europe and North America. There are a number of factors that increase the risk of disease. They include: environmental factors associated with an increase in socio-economic status, such as changes in diet and hygiene (e.g. it is believed that lack of childhood exposure to microbes hinders the development of normal immune response) and a genetic predisposition [1–3].

Clinically, patients with gastrointestinal malfunction predominate. In 80% of patients the small intestine is affected, mucosal or watery diarrhea and abdominal pain are predominant symptoms. Patients may develop water and electrolyte imbalance, and shortages of essential nutrients. If the lesions are mainly located in the colon, the predominant symptom is diarrhea, and bloody stools are often observed. Abdominal pain involves the lower abdomen and the umbilical area. Very often there is concurrent sensation of urgency to defecate [1, 5, 7].

CD treatment usually involves pharmacotherapy (aminosalicylates, corticosteroids, immunosuppressive drugs, biological drugs), surgery (including right-sided hemicolectomy with an anastomosis of the small intestine from the colon, colectomy, stoma surgery) and new therapies (stem cell therapy, genetic therapy). The treatment is mainly causal in nature, and its goal is to induce remission, return to normal nutritional status and relapse prevention [1, 2, 4, 6].

The nurses who provide care to CD patients are in charge of systematic assessment of the patient, prevention of complications, health education and supporting the patient and his or her family [8-12]. What plays an important role is teaching the patient how to function in everyday life and how they should deal with persistent symptoms, which in turn contributes to ensuring patients' quality of life. It is important that the nurse's behaviour should be based on an individual and holistic approach to the patient in order to meet the patient's needs [8–12].

Nursing problems presented in this report correspond to those described in the cited literature, and

a plan of nursing care of patients with Crohn's disease based on the ICNP® reference terminology fully reflects the key problems of the patient, and the extent of interventions by nurses.

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