

Uniwersytet Medyczny  
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Poznan University of Medical Sciences



Wydział Nauk o Zdrowiu  
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# PIEŁĘGNIARSTWO POLSKIE

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W szczególności chcielibyśmy zwrócić Państwa uwagę na kilka artykułów, a mianowicie na dwie prace, autorstwa Katarzyny Bajor i wsp. Obie dotyczą wiedzy na temat grypy. Pierwsza z nich – oryginalna – przedstawia wyniki badań przeprowadzonych wśród studentów, druga – poglądowa – omawia przegląd piśmiennictwa światowego i krajowego dotyczący wiedzy na temat grypy. Kolejny artykuł, który chcielibyśmy Państwu zarekomendować, to praca autorstwa Anny Bielawskiej i wsp., która porusza bardzo istotne zagadnienie stanu odżywienia pacjentów w starszym wieku hospitalizowanych na oddziale chirurgicznym. Polecamy również interesujący artykuł na temat wypalenia zawodowego u pielęgniarek onkologicznych (Małgorzata Kołpa i wsp.). W tym numerze przedstawiamy również sprawozdanie z X Studenckiego Sympozjum Naukowego: Wrocławskich Dni Zdrowia Publicznego.

Mamy nadzieję, że wszystkie prace wzbudzą zainteresowanie wśród personelu medycznego, badaczy, studentów kierunków medycznych i przedstawicieli innych, pokrewnych dziedzin.

Oprócz życzeń przyjemnej i owocnej lektury składamy Państwu serdeczne życzenia wesołych świąt Bożego Narodzenia oraz szczęśliwego Nowego Roku 2018, sukcesów, radości i zdrowia.

*Dr hab. Krystyna Jaracz, prof. UM  
Redaktor Naczelna*

## EDITOR'S NOTE

Dear Readers,

on behalf of the Editorial Board, I am pleased to recommend you the next issue of the "Polish Nursing". It contains 7 original papers and 3 reviews. The papers are devoted to different aspects of nursing care, nursing profession and prophylaxis, and discuss important clinical problems.

In particular, we would like to draw your attention to a few papers. Two of them, authored by Katarzyna Bajor and colleagues, deal with knowledge about influenza. The original paper presents results of the study carried out among students. The review paper describes the current knowledge about influenza on the basis of the analysis of national and world scientific literature. The next manuscript we would like to recommend you is a paper by Anna Bielawska and colleagues. It presents original data on the nutritional status of elderly patients hospitalised in a surgical ward. Furthermore, we encourage you to read the interesting paper concerning the professional burnout among oncology nurses (Małgorzata Kołpa and colleagues). In this issue we also present a report from The Tenth Student Scientific Symposium: Wrocław Public Health Days (Natalia Maria Kurczak).

We hope that all papers will find their readership among health professionals, researchers, students of medical universities, as well as representatives of other related fields.

Wishing you a pleasant and fruitful reading, we as well would like to wish you a Merry Christmas and a Happy New Year 2018, full of success, joy and health.

*Assoc. Prof. Krystyna Jaracz, PhD  
Editor in Chief*

# ROLE OF AGE AND EXTRAVERSION LEVEL IN SHAPING THE SELECTED SOCIAL SKILLS IN MIDWIFERY STUDENTS

## ROLA WIEKU I POZIOMU EKSTRAWERSJI W KSZTAŁTOWANIU WYBRANYCH KOMPETENCJI SPOŁECZNYCH STUDENTEK POŁOŻNICTWA

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### ABSTRACT

**Aim.** The aim of the study was to characterize midwifery students in terms of the level of selected social skills, such as empathy and the ability to work with emotions, assertiveness in a conflict situation and communication skills. The study was also an attempt to determine the role of age and extraversion level in shaping these competencies.

**Material and Methods.** The study group consisted of 228 purposefully selected students of Midwifery. Midwives' Social Competence Questionnaire was used to assess social skills. The level of extraversion was assessed by using the NEO Five-Factor Inventory.

**Results.** Depending on the study year, the midwifery students significantly differed in relation to the level of communication skills. These differences were not observed in the context of empathy and assertiveness in a conflict situation. Students' age significantly correlated with the level of their communication skills. In addition, this relationship was observed particularly in respondents with low and medium level of empathy. The level of extraversion played the key role in shaping communication skills and assertiveness in a conflict situation.

**Conclusion.** Our results suggest the need for using individualised education forms, which will enable efficient acquisition of social skills by midwifery students, especially interpersonal communication skills and assertive behaviour.

**KEYWORDS:** empathy, midwifery, communication, extraversion, social skills.

### STRESZCZENIE

**Cel.** Celem pracy była charakterystyka studentek położnictwa pod względem poziomu kompetencji społecznych, takich jak: empatia i umiejętność pracy z emocjami, asertywność w sytuacji konfliktów oraz umiejętności komunikacji. Przeprowadzone badanie było także próbą określenia roli, jaką pełni wiek oraz poziom ekstrawersji w kształtowaniu tych kompetencji.

**Materiał i metody.** Grupę osób badanych stanowiło celowo wybranych 228 studentek położnictwa. Do oceny kompetencji społecznych wykorzystano Kwestionariusz Kompetencji Społecznych Położnych (KKSP). Natomiast Kwestionariusz Osobowości NEO-FFI był zastosowany do oceny poziomu ekstrawersji.

**Wyniki.** Studentki położnictwa istotnie statystycznie różniły się w zależności od roku studiów pod względem poziomu umiejętności komunikacyjnych. Takich różnic nie odnotowano w przypadku empatii oraz umiejętności asertywnego rozwiązywania konfliktów. Wiek studentek istotnie korelował z poziomem ich umiejętności komunikacyjnych. Dodatkowo, omawiana zależność była szczególnie obserwowana u badanych z niskim oraz przeciętnym nasileniem empatii. Kluczową rolę w nabywaniu kompetencji komunikacyjnych i asertywnych miało nasilenie ekstrawersji.

**Wnioski.** Uzyskane dane wskazują na konieczność stosowania zindywidualizowanych form kształcenia, co umożliwi efektywne nabywanie kompetencji społecznych przez studentki położnictwa, zwłaszcza umiejętności w zakresie komunikacji interpersonalnej i zachowań asertywnych.

**SŁOWA KLUCZOWE:** empatia, położnictwo, komunikacja, ekstrawersja, kompetencje społeczne.

### Introduction

Apart from necessary knowledge and skills strictly assigned to the particular specialisation, in the training of health professionals more attention is being paid now to developing social skills necessary for efficient functioning of the interpersonal relationship with a patient.

Such skills are also necessary for practising as a midwife. In accordance with their assumptions, curricula in higher education, both for the first-cycle degree programme (three-year Bachelor's degree) and second-cycle degree programme (two-year Master's degree), compulsorily improve a number of skills necessary for

establishing good relationships and maintaining a good contact with a patient. Therefore, a midwife is supposed to master not only substantive and practical skills that are well-established and typical of the profession but also social skills as well [1, 2]. It is a complex scope of abilities that enable individuals to undertake activities in order to deal with certain, sometimes difficult, situations. Social skills were defined for the first time in 1959 by Robert White as *"specific human skills contributing to the effective interaction with the environment"* [3]. Different social skills need to be developed for effective functioning in diverse conditions in the workplace. A proper level of skills in this area may be reached either through a social training or during theoretical and practical classes run at university [4].

Important social skills include good interpersonal communication skills. It is a dynamic process of exchange of information between individuals, that is particularly important in medicine, especially in terms of developing good patient-health professional relationship and treatment efficiency [1, 5, 6, 7, 8].

Assertive behaviour constitutes another important element of social skills, closely related to communication skills. The first definition of assertiveness was coined by Salter [9] who described it as an ability to express both positive and negative emotions. At present, it is believed that assertiveness is an ability to pursue one's own interests while respecting the rights of others [10]. Lazarus emphasised that assertive skills concern the ability to initiate, sustain, and conclude conversations [11]. In addition, it is emphasised that, on the one hand, assertiveness may be developed with experience over a person's life or learned through appropriate training, but, on the other hand, there are indications emphasising genetic background of assertiveness and its correlations with temperament traits [12]. Assertive skills are important in effective resolution of conflicts that are frequently encountered in medical practice and most often concern conflicting objectives of healthcare personnel and patients [12, 13, 14, 15]. Therefore, it is important that health professionals are able to prevent conflicts or seek to solve them, when necessary. Assertive skills of expressing needs, beliefs, and opinions, without being aggressive or insulting, are crucial for effective resolution of conflicts [16].

Apart from communication skills and assertive resolution of conflicts, it is also important to have an appropriate level of empathy and ability to work with emotions. A number of definitions of empathy can be found in the literature devoted to this issue. A lot of them focus on describing the ability to recognise feelings of other

people [15, 17, 18]. Empathy is one of the important factors for understanding behaviours of other people as well as establishing satisfactory relations and ties with others [19]. Many publications on empathy and its importance in medical practice have focused mostly on the functioning of physicians [20, 21] and nurses [22, 23]. However, there is a lack of research on social skills of midwifery students. It is also difficult to find data allowing for characterisation of midwifery students in terms of communication skills as well as assertiveness in resolving conflicts and empathy.

Social skills cannot be discussed without referring to personality traits. Although social skills have a behavioural nature and can be learned over a person's life, the process of acquiring them (e.g. a learning process), using them in everyday life and monitoring them is closely dependent on the already established important personality traits [24, 25, 26]. Therefore, an analysis of acquiring social skills needs to refer not only to the aspects associated with life experience but also to personality dispositions. Extroversion is one of the key personality traits that can be treated as a regulator for acquiring and using social skills. Extraversion constitutes one of the Big Five personality traits and is related to sociability and maintaining positive relationships with others [27, 30]. It seems that too little attention has been drawn to the mechanisms that explain the role of extraversion in shaping social skills while the main focus has been placed on the correlation between the level of extraversion and group-working skills [28, 29].

The main aim of the study was to characterise midwifery students in terms of the level of social skills, such as empathy, assertiveness in resolving conflicts, and communication skills. An empirical study was also conducted to define the role of age and extraversion level in shaping of the aforementioned skills. The following research questions were formulated with reference to the study objectives:

1. What is the level of extraversion and other selected social skills such as empathy, assertiveness in resolving conflicts, and communication skills among midwifery students?
2. Are there any differences between students of various years of study (1st, 2nd, and 3rd) in terms of the level of extraversion and the remaining social skills (empathy, assertiveness in resolving conflicts, and communication skills)?
3. How do age and extraversion level influence the process of acquiring the social skills in question (empathy, assertiveness in resolving conflicts, and communication skills)?

## Material and Methods

### Characteristics of the study participants

The study group comprised 300 purposively selected first-cycle students of Midwifery at Warsaw Medical University. In accordance with the procedure, 100 first-year students (Group 1), 100 second-year students (Group 2), and 100 third-year students (Group 3) were qualified to the study. In the end, 228 correctly completed questionnaires were returned (76 from each year of study). In the case of the remaining 72 questionnaires, answers to certain questionnaire items were found missing, which made it impossible to sum up the results correctly. Therefore, they were excluded from the next part of the statistical analysis. The study was performed between October and November 2015. The inclusion criteria encompassed the following: (1) female gender of the study participants, (2) being a first-, second-, or third-year student of the first-cycle degree programme in Midwifery, (3) providing free consent to the participation in the study. In addition, measurement of age of the study participants was introduced as a controlled variable.

The Jonckheere-Terpstra test for ordered alternatives used for independent samples demonstrated a statistically significant correlation between the age of the study participants and the year of study ( $Z = 11.25$ ;  $p < 0.01$ ). As expected, students starting university education were the youngest ( $19.5 \pm 1.70$  years) and those on the third year were the oldest ( $21.5 \pm 1.50$  years). The mean age of the second-year students amounted to  $20.6 \pm 1.00$  years.

### Research tools

Midwives' Social Competence Questionnaire (in Polish: Kwestionariusz Kompetencji Społecznych Położnych, KKSP), developed by Tomal and Jaworski was used in the study (Midwives' Social Competence Questionnaire (KKSP) was developed by A. Tomala and M. Jaworski and then assessed by M. Panczyk with the use of psychological parameters for the purpose of a diploma thesis by the first author of the present study). It comprised 26 statements grouped according to three subscales:

- Subscale One – “Communication skills” – comprised 14 statements that allowed for the assessment of the level of communication skills on a 5-point Likert scale (1 – strongly disagree, 2 – disagree, 3 – difficult to say, 4 – agree, 5 – strongly agree). The higher the score, the better the communication skills. The following statement was a sample item in the subscale: “*I can communicate important information in a way that is clear and comprehensible for a patient.*” Cronbach's alpha reliability coefficient for the study group amounted to 0.90.
- Subscale Two – “Empathy and ability to work with emotions” – included 6 statements that allowed for assessing the level of empathy and ability to work with emotions. As before, a 5-point Likert scale was used to assess the level of the features (with 1 meaning “strongly disagree” and 5 meaning “strongly agree”). A sample statement was as follows: “*I can understand annoyance/irritation of a patient waiting in the admission room or for a gynaecologist.*” The higher the score, the better the empathy and ability to work with emotions. Cronbach's alpha reliability coefficient for the study group amounted to 0.66.
- Subscale Three – “Assertiveness in a conflict situation” – consisted of 6 statements allowing for assessment of the level of assertive behaviour in a conflict situation. The study participants used a 5-point Likert scale (with 1 meaning the lowest level and 5 meaning the highest level of a particular feature) to assess their own personality dispositions. The following statement is a sample statement used in this particular subscale: “*In a conflict situation I care about mutual agreement between both sides.*” Cronbach's alpha reliability coefficient for the study group amounted to 0.65.

NEO Five-Factor Inventory (NEO-FFI) was used to measure extraversion level [30]. The questionnaire was developed by P.T. Costa and R.R. McCree and Polish adaptation was made by Bogdan Zawadzki, Jan Strelau, Piotr Szczepaniak and Magdalena Śliwińska. The questionnaire comprised 60 statements that allow for characterisation of the main personality traits included in the Big Five personality traits. It was also helpful in assessing the level of personality traits such as neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. Questionnaire reliability was satisfactory. The authors observed high internal consistency for each of the five scales. Cronbach's alpha coefficient was between 0.81 and 0.86 [30]. It needs to be emphasised that, for the validity of psychological assessment, the study participants filled in the entire questionnaire but only the extraversion part was used for further analysis.

### Statistical analysis

The overall score for each of the three subscales included in KKSP was normalized and standardized, which helped to develop sten scores. The results thus obtained for KKSP subscales and extraversion scale were analysed for consistency with normal distribution with the use of the Kolmogorov-Smirnov test. In addi-

tion, the following parameters of descriptive statistics were established: mean (M) with the 95% confidence interval and standard deviation (SD). Due to the fact that conditions for ANOVA were not met, the assessment of differences between the groups was performed using the non-parametric Kruskal-Wallis rank test. Effect size was calculated using eta-squared ( $\eta^2$ ) for statistically significant differences. Spearman's rank correlation coefficient (Spearman's rho) was applied to assess correlations between selected pairs of quantitative variables (age, scores obtained in KKSP subscales, extraversion level). In addition, a linear regression technique with least square estimation was used to analyse the influence of age and extraversion on the level of assertiveness and communication skills. The regression model parameters and standard errors were estimated and standardized beta coefficient ( $\beta_{\text{stand.}}$ ) was calculated to determine the influence of predictors on the dependent variable. All statistical analyses were performed using IBM® SPSS Statistics 21 software. The significance level of  $\alpha < 0.05$  was set as sufficient.

## Results

### Characteristics of study participants in terms of level of extraversion

Students of different years of study did not vary in terms of extraversion level. See **Table 1** for detailed data. Mean level of extraversion among midwifery students was significantly higher than that of the entire Polish population [30].

**Table 1.** Characteristics of students in terms of level of extraversion

Psychological trait	Year of study	M±SD	Mean ranks	95% confidence interval for the mean		H	p
				Lower limit	Upper limit		
Extraversion	1st	43.0±3.71	120.64	42.18	43.87	1.21	0.547
	2nd	42.2±4.28	108.96	41.23	43.19		
	3rd	42.6±4.10	113.90	41.68	43.55		

M±SD – mean ± standard deviation, H – Kruskal-Wallis test, p – probability value, 1st – first year of study (Group 1); 2nd – second year of study (Group 2); 3rd – third year of study (Group 3)

Source: author's own research

### Characteristics of study participants in terms of level of selected social skills

The respondents from particular years of study were characterised with respect to social skills such as communication skills, empathy, and assertiveness in

a conflict situation. The Kruskal-Wallis rank test demonstrated that students from particular groups differed in terms of communication skills ( $H = 35.40$ ;  $p < 0.001$ ;  $\eta^2 = 0.187$ ;  $p < 0.001$ ) (**Table 2**). A more detailed *post hoc* analysis with multiple comparisons of the mean ranks showed that the first-year students (Group 1) had a much lower level of communication skills compared to the second-year (Group 2) and third-year students (Group 3) ( $Z = -5.00$ ;  $p < 0.001$  and  $Z = -5.29$ ;  $p < 0.001$ , respectively). However, the second-year (Group 2) and third-year students (Group 3) had a similar level of communication skills ( $p > 0.05$ ). A comparison of the level of empathy and ability to work with emotions as well as assertiveness in a conflict situation between particular years of study did not show any statistically significant differences ( $p > 0.05$ ). See **Table 2** for detailed data.

**Table 2.** Analysis of intensity of selected social skills of midwifery students ( $n = 228$ )

KKSP Subscales	Year of study	M±SD	Mean ranks	95% confidence interval for the mean		H	p
				Lower limit	Upper limit		
Communication skills	1st	4.3±2.20	77.79	3.78	4.78	35.40	0.001
	2nd	6.1±1.71	131.28	5.67	6.45		
	3rd	6.2±1.41	134.43	5.83	6.48		
Empathy and ability to work with emotions	1st	5.6±1.87	114.91	5.20	6.05	1.79	0.408
	2nd	5.7±1.84	121.45	5.29	6.13		
	3rd	5.3±1.82	107.14	4.87	5.70		
Assertiveness in a conflict situation	1st	5.6±1.91	115.28	5.19	6.06	1.14	0.566
	2nd	5.22±2.35	108.45	4.69	5.76		
	3rd	5.6±1.69	119.78	5.26	6.03		

M±SD – mean ± standard deviation, H – Kruskal-Wallis test, p – probability value, 1st – first year of study (Group 1); 2nd – second year of study (Group 2); 3rd – third year of study (Group 3)

Source: author's own research

Subsequently, the respondents were divided into three subgroups: low, medium, and high level of the social skills. The division was performed on the basis of mean values and standard deviation (M – mean, SD – standard deviation) and produced the following subgroups (**Table 3**).

Subgroup A – low level of the social skills; level of variables  $< (M - SD)$ .

Subgroup B – medium level of the social skills; level of variables ranging  $M \pm SD$ .

Subgroup C – high level of the social skills; level of variables  $> (M + SD)$ .



**Table 3.** Respondents' division (n = 288) into subgroups in terms of level of variables

KKSP Subscales	Subgroup A	Subgroup B	Subgroup C
	low level n (%)	medium level n (%)	high level n (%)
Communication skills	38 (16,7%)	156 (68,4%)	34 (14,9%)
Empathy and ability to work with emotions	35 (15.4%)	158 (69.3%)	35 (15.4%)
Assertiveness in conflict	16 (7.2%)	178 (80.5%)	27 (12.2%)

n – group size, % – percentage of subjects

Source: author's own research

### Correlations between age and extraversion, and social skills

A significant correlation was found between students' age and the level of communication skills (Spearman's  $\rho = 0.25$ ;  $p < 0.001$ ). However, no correlations were observed between age and the level of empathy and ability to work with emotions ( $p > 0.05$ ) as well as assertiveness in a conflict situation ( $p > 0.05$ ). In addition, the analysis demonstrated that the correlation between age and communication skills was stronger among students with low empathy levels and low ability to work with emotions. A slightly weaker correlation, but also statistically significant, was found among students with medium empathy levels and medium ability to work with emotions. In the case of students with high empathy levels no correlation between age and communication skills was found (**Table 4**).

**Table 4.** Correlations between age and extroversion, and level of empathy

Subgroups categories in terms of empathy and ability to work with emotions	Relationship between age and level of communication skills	
	Spearman's rank correlation	p
Low level of empathy	0.391	0.020
Medium level of empathy	0.239	0.002
High level of empathy	0.146	0.403

Source: author's own research

Subsequent analyses showed a correlation between age and the level of communication skills among students with high levels of assertiveness in a conflict situation. A slightly weaker correlation, but also statistically significant, was found among students with medium levels of assertiveness in a conflict situation. In the case of students with high levels of assertiveness no such correlation was found (**Table 5**).

**Table 5.** Correlations between age and extroversion, and level of assertiveness skills

Subgroup categories in terms of assertiveness skills	Relationship between age and level of communication skills	
	Spearman's rank correlation	p
High level of assertiveness	0.365	0.050
Medium level of assertiveness	0.208	0.007
Low level of assertiveness	0.257	0.150

Source: author's own research

Regression analysis did not show any significant influence of predictors (age and extraversion levels) on empathy levels and ability to work with emotions ( $F = 1.835$ ;  $p < 0.162$ ). It was, however, observed that the extraversion levels had a positive impact on the level of assertiveness in a conflict situation ( $\beta_{\text{stand.}} = 0.347$ ;  $p < 0.001$ ), while no influence of age on this variable was observed ( $F = 15.634$ ;  $p < 0.001$ ; **Table 6**). In addition, no statistically significant interaction was found between age and level of extraversion that would exert any influence on the level of assertiveness in a conflict situation ( $F = 0.05$ ;  $p > 0.05$ ). The last regression model analysed in the present study demonstrated that both age ( $\beta_{\text{stand.}} = 0.192$ ;  $p < 0.003$ ) and extraversion levels ( $\beta_{\text{stand.}} = 0.155$ ;  $p < 0.018$ ) had a significant influence on the level of communication skills of the respondents ( $F = 7.423$ ;  $p < 0.001$  – **Table 6**). At the same time, no statistically significant interactions were observed between age and level of extraversion that would exert any influence on the level of communication skills ( $F = 0.56$ ;  $p > 0.05$ ).

**Table 6.** Influence of age and extroversion on assertiveness and communication skills

Predictor	b	t	p	$\beta_{\text{stand.}}$	95% confidence interval for $\beta_{\text{stand.}}$	
					Lower limit	Lower limit
Influence of age and extraversion on assertiveness						
Intracapt	-2.893	-1.410	0.160			
Age	0.052	0.665	0.507	0.042	-0.082	0.165
Extraversion	0.172	5.550	<0,001	0.347	0.224	0.470
Influence of age and extraversion on communication skills						
Intracapt	-2.635	-1.246	0.214			
Age	0.237	2.971	0.003	0.192	0.065	0.319
Extraversion	0.076	2.393	0.018	0.155	0.027	0.282

b – regression coefficient,  $\beta_{\text{stand.}}$  – standardized regression coefficient, t – value of the test statistic, p – probability value

Source: author's own research

## Discussion

One of the key findings of the present paper was the fact that there was a significant correlation between the age of midwifery students and the level of their communication skills. This correlation was particularly evident among students with low or medium level of empathy. No such correlations were found, however, in the case of high level of empathy. It needs to be emphasised that medical literature has very often indicated empathic behaviour as an important part of proper communication between health professionals and patients since it encourages the development of a good therapeutic relationship. Therefore, empathic attitude has been desired and required [31, 32]. The present study also showed that empathy was of crucial importance for developing communication skills in relation to age. Nevertheless,

the present results may have suggested that the initial level of empathy might have been significant for the process of learning communication skills. At present, it would be difficult to explain the mechanisms of the process. Thus, it would be advisable to continue the research that would facilitate a more detailed analysis of relationships between age and level of empathy with respect to the development of social skills of midwifery students.

It is worth emphasising that the present results demonstrated that the level of empathy of students was moderate and comparable, regardless of the duration of studying. One of the reasons for this is a particular social role of a midwife who is supposed to have a high level of empathy, pro-social attitude and teamwork skills as well as to be open to the needs of other people [33]. The nature of the study itself constituted another factor that could explain the lack of differences in terms of empathy among the respondents. Midwifery students were asked to fill in the questionnaire at the beginning of the academic year, which could have impeded the process of finding differences associated with the duration of studying and the number of practical classes they had already attended. A study conducted at the end of the academic year would help to verify the influence of these two factors. Perhaps a longitudinal study with three repeated measurements of the level of empathy in the very same student conducted during each year of study would provide a more complete overview of the level of personality traits discussed here and their change over time.

It needs to be noticed that results of studies analysing the level of empathy in medical students were ambiguous [34], which would emphasise the changing nature of empathy levels [35]. Studies covering various medical professions have demonstrated that the level of empathy had decreased, increased, or had not changed [36–38]. It is believed that disparity between expectations of students and the nature of work with patients in a healthcare unit is one of the key reasons for a significant drop in the level of empathy that has been observed in the course of medical education. This is associated with difficulties and problems encountered during practical classes, which could lead to confusion, frustration, decreased motivation, and lowered level of empathy in many cases [37–39].

Most analyses of the level of empathy among representatives of medical professions concerned students of medicine or nursing [34, 35]. An important study devoted to this issue was conducted by McKenn and Boyle among midwifery students in Australia [40]. The study included a group of 52 midwifery students and the Jefferson Empathy Scale was used for measurement.

The results demonstrated that prospective midwives had a moderate level of empathy ( $M = 109.9$ ;  $SD = 20.9$ ), which was consistent with the present findings.

Interestingly, no differences were found with respect to the level of empathy between students of different years of study, which would go against the conclusions drawn by McKenn and Boyle [40]. The lowest level of empathy in the Australian study was observed among the first-year students ( $M = 101.0$ ;  $SD = 28.5$ ) and the highest one was found among the third-year students ( $M = 119.9$ ;  $SD = 12.6$ ). McKenn and Boyle [40] suggested that the level of empathy in students was related to gaining clinical experience in the course of direct contacts with patients. In this case, clinical practice only began in the second year of study; McKenn and Boyle associated an increase in the level of empathy in the course of study with the process of gaining experience in working with patients during practical classes.

Because of the lack of a greater number of studies on the assessment of the level of empathy among Polish midwifery students, the present findings provided new valuable data. Particular attention should be given to the lack of change in the level of empathy throughout the course of studies despite the fact that as soon as in the first year of study on their courses in psychology, sociology, and educational sciences students learned how to deal with emotions [41]. In addition, at the same time students had 360 clinical practice hours when they were given the opportunity to acquire relevant practical skills in that regard [42].

The present study results showed differences between midwifery students with respect to their interpersonal communication skills. The lowest level of communication skills was observed among the first-year students and in the following years it was increasing proportionally. This might have been associated with the process of acquiring relevant social skills that were developing in line with the increasing number of classes and experiences during the course of study, starting from the first year of the programme [41, 42]. However, it should be noticed that only a small percentage of Polish studies has analysed communication skills of midwifery students. It may be assumed that this was largely caused by a limited access to or even a lack of specific research tools tailored to this particular group of students. Therefore, it was difficult to refer the present findings to the results obtained by other researchers. One of the few reports concerning midwifery students of a Master's degree programme analysed the level of preparation for future employment. A study by Gotlib and Pakuła [43] assessed communication skills with the use of one statement: *"I can communicate effectively with others."* It was demonstrated that students had

a relatively high self-assessment with respect to their communication skills (median amounted to 4 on a five-point scale, with 5 representing the highest score).

A need for development of communication skills in medical students is now being extensively discussed and proposed in the medical literature. This results from the fact that the ability to communicate appropriately is one of the key elements of taking an effective history and conducting effective treatment. Good communication between health professionals and patients is an essential element of healthcare system from the patient's point of view as well; it allows patients to meet their vital needs related to treatment and health protection. It needs to be emphasised that it is important in the context of an office of a physician or other health professional [44]. Good communication skills are also of great importance for the practice of midwives.

It should be noted that the receiver of the message (patient) receives it and interprets it on the basis of her own experience and knowledge. Therefore, in order to develop a good therapeutic relationship, midwives are supposed to use appropriate language, make sure that they are well understood and that they understand messages sent out by patients. One of the common complaints made by patients is that healthcare personnel uses incomprehensible terminology. Members of a therapeutic team use medical jargon for precise communication but persons from outside of the medical environment perceive it as not understandable and hermetic [1–3].

Assertiveness in a conflict situation constituted another social competence analysed in the present study. The present findings demonstrated that midwifery students did not differ in that regard. It should be noted that no Polish analyses of assertiveness of midwifery students in a conflict situation had been reached, which would indicate a need for further studies in that regard. A slightly similar study that might constitute a source of knowledge about problem-solving and conflict handling skills was conducted among midwifery students by Gotlib and Pakuła [43]. Students responded to the following statements using a five-point scale: *"I am a conflict-free person"* (Median=4), *"I have the ability to convince others to change their views"* (Median=3), *"I am a good listener"* (Median=5), *"I never run away from problems"* (Median=4), *"I am assertive"* (Median=4).

Interesting data, compliant with the present findings, were provided by a study conducted in Turkey by Altun [45]. It aimed to evaluate the perception of one's own communication skills by 218 nursing and midwifery students. The Problem-Solving Inventory (developed by Heppner and Petersen [46]) was used in the study and it was observed that midwifery students had a higher lev-

el of problem-solving skills. No differences were found between particular years of study.

Regression analysis also provided some interesting data, suggesting that the level of extraversion played a key role in acquiring communication skills, along with age. However, only the level of extraversion was important for the development of assertiveness. Age had no impact on the level of assertiveness among the study participants. These results could constitute an important guidance on how to develop the desired social skills in relation to specific personality traits of students. A more personalised approach to the process of developing these skills that would include an individualised level of extraversion (understood as a tendency to experience positive emotions and engage in social interactions with ease) could increase the effectiveness of future functioning as a midwife [30]. The level of extraversion might be crucial for the development of assertiveness and communication skills and it may also help to acquire social skills faster [27–29]. This will be of particular importance to students with a low level of extraversion, who tend to be more reserved in social interactions and passive in interpersonal relationships. According to Costa and McCrae, such persons may more often experience difficulties in trying to be assertive [30].

It should also be noted that the present study has certain methodological limitations. These include, among others: the cross-cutting nature of research, lack of analysis of changes related to time and experience gained, and intensity of variables associated with social skills. The limitations also result from the selection of study participants; real data might have been simplified due to focusing only on Bachelor's degree students, without taking into account Master's degree students. In addition, a limited number of publications on the present issue pose difficulties, which emphasises a pilot and exploratory nature of the present study and makes it impossible to compare the present findings with other results. Nevertheless, the present outcomes allow us to outline the problem of social skills in midwifery students and encourages to continue the research.

The present findings shed new light on the issue of developing social skills in medical professions, with particular reference to the need for developing and strengthening those skills among midwifery students. The data obtained in the present study demonstrated a need to individualise forms of training, thus allowing students to effectively acquire these skills, particularly competence related to interpersonal communication and assertive behaviour. When developing curricula, consideration should be given to teaching methods that will provide the opportunity to acquire necessary skills not only to students who establish social relationships

with ease but also to those more reserved in social interactions.

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# ANALYSIS OF HEALTH CONDITION OF ELDERLY PATIENTS HOSPITALIZED IN A SURGICAL WARD

## ANALIZA STANU ODŻYWIENIA OSÓB W PODESZŁYM WIEKU HOSPITALIZOWANYCH NA ODDZIALE CHIRURGICZNYM

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### ABSTRACT

**Introduction.** Ageing of the population is a serious problem of the modern world. This process is often associated with abnormal nutritional status which affects the health of elderly people. Therefore, it is very important to assess the nutritional status of the elderly.

**Aim.** The objective of the research was to assess the nutritional status of the elderly patients hospitalized at the surgical ward.

**Material and Methods.** The study involved 55 patients (27 women and 28 men) at the Department of General, Oncological and Colorectal Surgery of the J. Strus Multidisciplinary Municipal Hospital. Respondents were hospitalized for diagnostic reasons or were expecting surgery. The MNA (Mini Nutritional Assessment) form was used to conduct the research.

**Results.** Analysis of the results indicated that 47% of the respondents (N = 26) were at risk of malnutrition and 53% (N = 29) had proper nutritional status. Abnormal nutritional status concerned mainly women. All subjects at the age of 85 years and over belonged to the group with malnutrition. Co-morbidities, such as cancer and depression, also had a negative impact on nutritional status.

**Conclusions.** 1) There is a justified need of monitoring the nutritional status of the elderly as plenty of them are at risk of malnutrition. 2) Nutritional status of the elderly is influenced by many, both external and internal factors. 3) The risk of malnutrition increases with patients' age.

KEYWORDS: nutritional status, malnutrition, the elderly.

### STRESZCZENIE

**Wstęp.** Starzenie się społeczeństwa to poważny problem współczesnego świata. Z procesem tym często wiąże się nieprawidłowy stan odżywienia, a to z kolei ma negatywny wpływ na stan zdrowia osób w podeszłym wieku. W związku z tym bardzo ważna jest ocena stanu odżywienia osób starszych.

**Cel badań.** Celem badań była ocena stanu odżywienia osób starszych hospitalizowanych na oddziale chirurgicznym.

**Materiał i metody.** Badaniem objęto 55 chorych (27 kobiet i 28 mężczyzn), przyjętych na Oddział Chirurgii Ogólnej, Onkologicznej i Kolorektalnej Wielospecjalistycznego Szpitala Miejskiego im. Józefa Strusia w Poznaniu. Badane osoby były hospitalizowane w celach diagnostycznych lub oczekiwały na zabieg operacyjny. Do przeprowadzenia badania zastosowano kwestionariusz MNA.

**Wyniki.** Analiza uzyskanych wyników wyłoniła 47% (26 osób) z ryzykiem niedożywienia i 53% (29 osób) z prawidłowym stanem odżywienia. Nieprawidłowy stan odżywienia dotyczył głównie kobiet. Wszystkie osoby w wieku 85 lat i więcej znalazły się w grupie ryzyka niedożywienia. Negatywny wpływ na stan odżywienia miały również choroby współistniejące, takie jak choroba nowotworowa i depresja.

**Wnioski.** 1) Istnieje uzasadniona potrzeba monitorowania stanu odżywienia osób starszych, ponieważ u wielu z nich występuje ryzyko niedożywienia. 2) Na stan odżywienia osób w podeszłym wieku wpływa wiele czynników zarówno zewnętrznych, jak i wewnętrznych. 3) Ryzyko niedożywienia wzrasta wraz z wiekiem pacjentów.

SŁOWA KLUCZOWE: stan odżywienia, niedożywienie, osoby starsze.

### Introduction

The problem with ageing population is present all over the world, especially in Western Europe. From one year to another the percentage of elderly people increases causing a great challenge for the health care system. The nutritional status disorders are a significant problem of the elderly as the deficiency or excess of energy, protein and/or the other nutrients have a negative im-

act on the construction and functions of the organism, as well as the results of planned treatment [1, 2, 3]. Nutritional disorders at the late age involve mainly protein malnutrition, protein and energetic malnutrition, obesity, as well as vitamin and mineral deficiencies. According to results of different studies, obesity and malnutrition in the elderly people induces deterioration of health condition and increases mortality [4].



Malnutrition predestines to many negative effects in the organism. Primary consequences of this state include: reduced body weight, weakened muscle strength, reduced activity, impaired immunity, loss of muscle mass of the heart, reduced mass of pancreas, disorders in circulatory and respiratory systems, weakened renal flow and glomerular filtration, anemia and osteoporosis. Secondary consequences include: increased susceptibility to infections, wound healing disorders, prolonged hospitalizations, risk of complications, death after surgical intervention and increased costs of treatment [5, 6]. What is more, malnutrition is often associated with cognitive disorders and reduction of functional status [7]. Additionally, obesity significantly reduces the quality of life at the late age. Obese patients experience pain and discomfort. Their mobility decreases which often results in reduced muscle mass and strength as well as arthritis. Furthermore, abnormal nutritional status affects the psychosocial well-being, which is often manifested with anxiety and depression [8].

Assessment of nutritional status is extremely important in patients of all ages, but especially in the elderly.

For the needs of the nutritional status evaluation different research methods can be used, e.g.:

1. Medical interview and examination,
2. Anthropometric measurements (BMI-Body Mass Index, measurement of arm circumference, WHR-Waist to Hip Ratio),
3. Biochemical measurements (measurement of albumin, pre-albumin and transferase levels),
4. Survey methods in the form of validated nutritional status questionnaires (MNA- Mini Nutritional Assessment, NRS 2002- Nutritional Risk Screening, SGA- Subjective Global Assessment, MUST- Malnutrition Universal Screening Tool, MST- Malnutrition Screening Tool, SNAQ- Simplified Nutrition Assessment Questionnaire) [9, 10, 11, 12].

## Material and Methods

The survey was conducted between January and April 2015 and involved 55 patients, including 27 women (49% of respondents) and 28 men (51% of respondents) between 60 and 89 years of age. Patients were hospitalized at the Department of General, Oncological and Colorectal Surgery of the J. Strus Multidisciplinary Municipal Hospital in Poznan. The majority of the respondents were hospitalized for surgical reasons in the area of a digestive system (80%) and the others were undergoing the diagnostics of this area.

All respondents consented on participation in the survey and the investigating procedure obtained bioethics committee approval.

Nutritional status assessment was performed with the use of the MNA questionnaire (Mini Nutritional Assessment questionnaire), which consists of 18 questions where the maximum score is 30. Results between 24 to 30 points describe proper nutritional status, 17 to 23.5 show the risk of malnutrition and the score lower than 17 points is typical for malnutrition.

MNA consists of two parts. The first, screening, includes 6 questions which refer to: a reduced number of meals and body mass reduction during the last 3 months, the ability to move, psychological stress, or presence of acute somatic disease in the last 3 months, neuropsychological deficit and BMI. The maximum score is 14; the result of 11 or less shows malnutrition and in such a case the second part of the questionnaire should be done.

The second part, assessment, consists of 12 questions referring to: taken drugs and meals during the day, the frequency of consumption of specific foods and liquids, the occurrence of bedsores or skin ulcers as well as the subjective perception of their own health and nutritional status. The maximum score is 16 [13, 9].

The self-study screening (part 1) was performed in all respondents. Assessment (part 2) was performed in 26 patients.

The calculations were performed with Statistica 10 produced by StatSoft and StatXact8 produced by Cytel. The level of significance was agreed for  $\alpha = 0.05$ . The result was statistically significant when  $p < \alpha$ .

The Mann-Whitney test or Kruskal-Wallis test were used to compare the variables measured on the ordinal scale. Relationships between variables were calculated with the RS Spearman's rank correlation coefficient.  $\chi^2$ , modified  $\chi^2$  with Yates correction and Fisher-Freeman-Halton tests were used to examine the relationship between categorical variables.

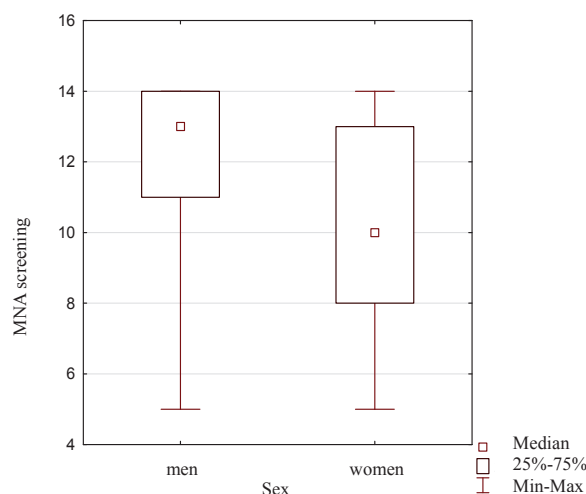
## Results

The study involved 55 patients (49% women and 51% men) divided in 3 age groups: early senility (60–74 years of age) – 69%, late senility (75–85 years of age) – 24% and longevity (> 85 years of age) – 8%. 34 respondents (61%) were married, 14 (25%) were widows /widowers and 7 (12%) were single. Most of respondents lived in the city – 89%. 49% of the respondents lived with their spouses, 25.5% with their families and 25.5% alone.

The most frequent co- morbidities included hypertension (56.4%) and cancer (31%).

### A. Analysis of the MNA screening questionnaire

A Analyzing the relationship between the sex and the number of points obtained, statistically significant differences were observed ( $p = 0.007118$ ). It was observed that more women than men received a smaller number of points (**Figure 1**).

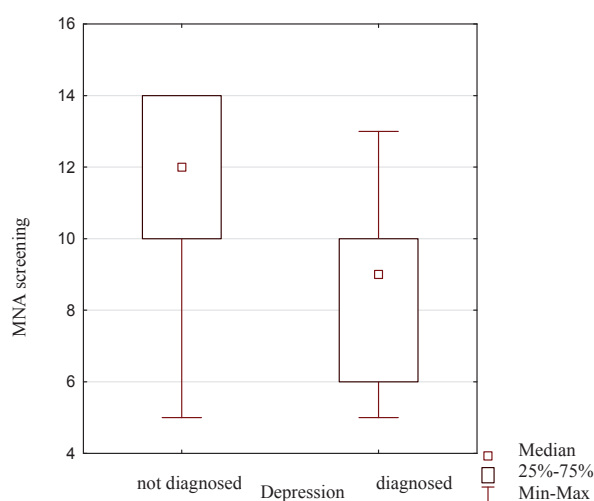


**Figure 1.** Relationship between the scores obtained and the sex of the respondents

Source: author's own research

The impact of the place of residence (village or city), the number of people in the household and the level of education on the number of points obtained showed no statistical significance ( $p = 0.923839$  vs.  $p = 0.1142620$  vs.  $p = 0.0552$ ).

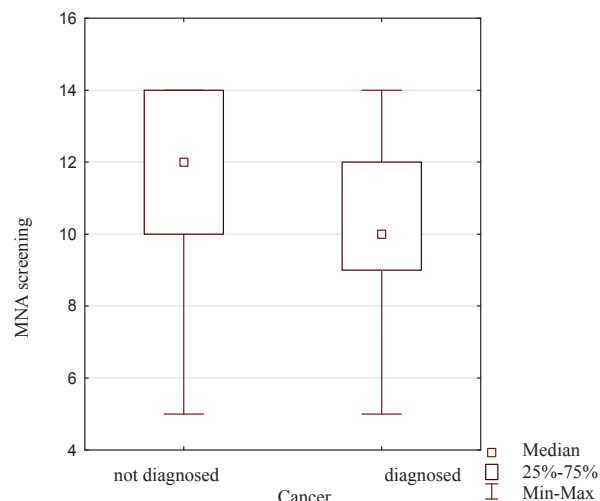
The analysis of the effects of co-morbidities on the result showed that there was no correlation ( $p > 0.05$ ) between hypertension, diabetes mellitus and hypothyroidism. However, statistical significance was observed when analyzing the impact of depression on the number of points obtained ( $p = 0.003099$ ). People with depression received a significantly smaller number of points than those who were not diagnosed (Figure 2).



**Figure 2.** Relationship between obtained points and depression

Source: author's own research

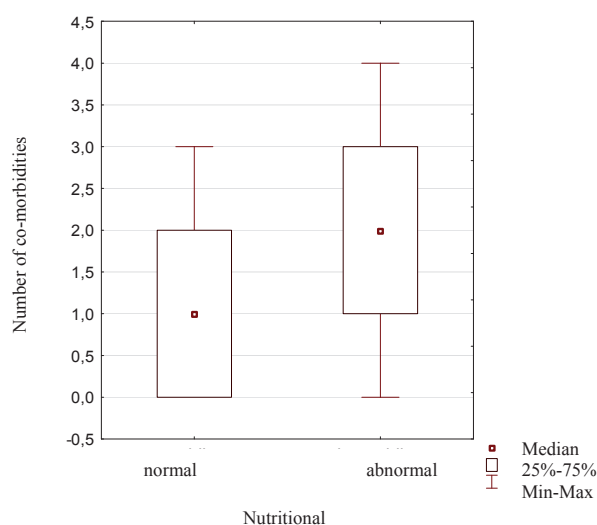
The statistical relationship was also found with respect to the influence of cancer on the number of points obtained ( $p = 0.030379$ ). Patients who were diagnosed with cancer received a smaller number of points than those without cancer (Figure 3).



**Figure 3.** Relationship between obtained scores and diagnosed cancer

Source: author's own research

In case of the relationship between nutritional status and the number of coexisting diseases, the significance level was  $p = 0.03896$ , suggesting a statistically significant difference. It was observed that in each person with abnormal nutritional status or at risk of malnutrition, there was at least one co-morbid disease. Similarly, no co-morbidities were found in the study group with normal nutritional status (Figure 4).



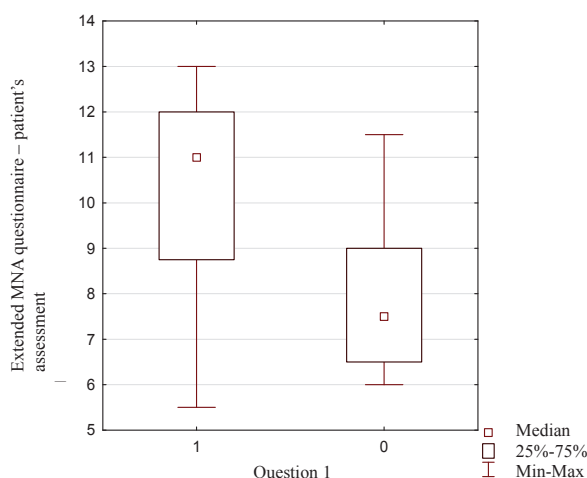
**Figure 4.** Relationship between obtained scores and the number of diagnosed co-morbidities

Source: author's own research

## B. Analysis of questions from the second part of the MNA questionnaire – Patients' Assessment

26 respondents who obtained 11 points or less from the screening test were qualified to the risk group of malnutrition and the second part of the MNA questionnaire was performed with them.

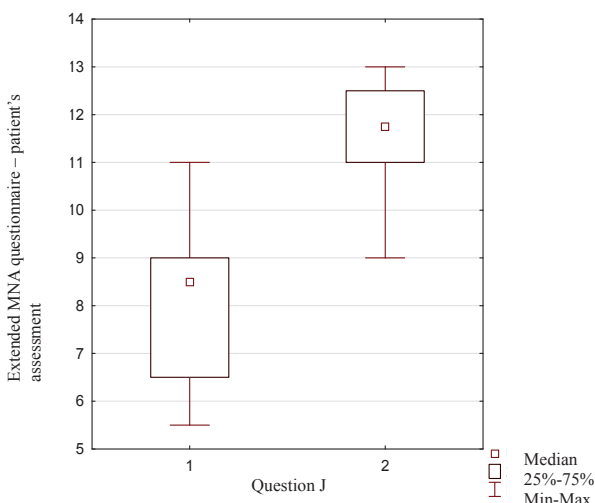
The result of the analysis of the question „I” concerning the occurrence of bedsores or skin ulcers indicates statistical differences  $p = 0.046838$ . Respondents with changes mentioned above received fewer points than people without these changes (Figure 5).



**Figure 5.** Relationship between obtained scores and the answers to the question „I” concerning the occurrence of bedsores and skin ulcers

Source: author's own research

Analysis of the question „J” concerning the number of full meals consumed daily revealed a statistically significant relationship ( $p = 0.000066$ ). Patients who daily ate three full meals were better nourished than respondents having two meals a day (Figure 6).

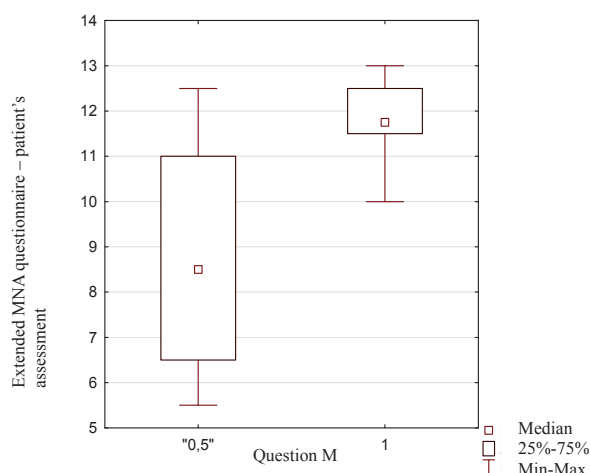


**Figure 6.** Relationship between obtained scores and the answer to the question „J” concerning the number of full meals consumed daily

Source: author's own research

Furthermore, statistically significant differences ( $p = 0.001797$ ) were found in relations to the question „M”, which concerned the amount of cups/glasses of fluid drunk a day.

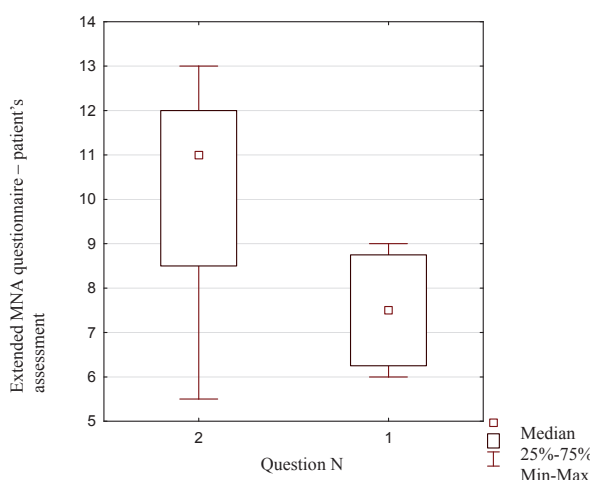
The respondents drinking more than 5 glasses a day obtained far better scores than patients who drank from 3 to 5 glasses a day (Figure 7).



**Figure 7.** Relationship between obtained scores and the answer to the question „M” concerning the amount of cups/glasses of fluid drunk a day

Source: author's own research

In the question „N”, the respondents were indicating the way of nutrition. The analysis of answers revealed statistically significant differences –  $p = 0.045521$ . Those who independently but with some difficulty consumed meals (4 persons) received fewer points than 22 persons who were fully independent of this activity (Figure 8).



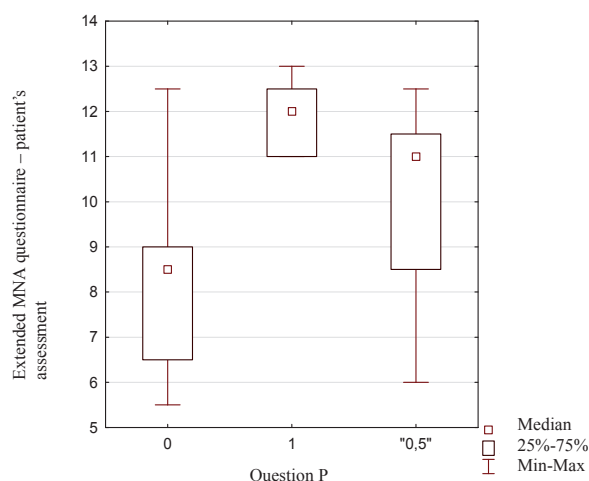
**Figure 8.** Relationship between obtained scores and the answer to the question „N” concerning the way of nutrition

Source: author's own research

The question „P” involved individual assessment of health condition in comparison with peers. The respondents had to choose from four answers with following scores: 0 – not as good, 0.5 – does not know, 1 – as good and 2 – better.

None of the respondents had stated that his/her health condition was better than their peers. The answer “not as good” was chosen by 9 subjects, 11 of the respondents were not able to assess their own health condition, and 6 subjects pointed the answer „as good”.

Analysis revealed statistically significant differences –  $p = 0.0312$ . Then it was checked by the Kruskal-Wallis ANOVA test, in which groups differed from each other. It turned out that the difference was between the group of respondents claiming that their health was not as good as their peers’ and the patients who said their condition was just as good. This last group obtained statistically more points (Figure 9).



**Figure 9.** Relationship between obtained scores and answers to the question „P” concerning assessment of individual health condition when compared with the peers

Source: author's own research

## Discussion

Improper nutritional status is a major problem among the elderly worldwide. In this respect, it is its accurate evaluation, which should accompany each senior health assessment. Assessment of nutritional status is important at each patient's admission to hospital, as it affects the course of treatment [14].

There are several questionnaires purposely created for the elderly patients. Their aim is to select patients with improper nutritional status or with the risk of malnutrition. These include, among others, the MNA questionnaire which was used for own research.

Thanks to analysis of results based on the MNA questionnaire it was possible to perform the assessment of nutritional status in the elderly patients admitted to the surgical ward.

The first part of the questionnaire (screening) allowed to select 53% (29 respondents) with proper nutritional status and 47% (26 respondents) with the risk of malnutrition. In the study of Kaminska M. and Brodowski J. in 120 patients of the healthcare center providing outpatient health services, 70% were well-nourished and 29.2% were at risk of malnutrition [15].

Considering the influence of sex on the nutritional status, a statistically significant relationship was observed in the own study. The nutritional status of the examined women was worse than men and therefore, they received fewer points. These results confirm the findings of Mirczak A. in a group of 203 people aged 65 years and over [42]. The studies showed that women are more likely than men to be in the middle and high risk of malnutrition (42.2% vs. 32.2%).

Moreover, nutritional status is influenced by patient's age. The older the man, the higher the risk of abnormal nutritional status. Malnutrition in old age is one of the great geriatric syndromes [17]. In this study, there was no statistically significant relationship between age and nutritional status. However, it can be observed that in the oldest age group (> 85 years) consisting of 4 subjects – all of them had recognized risk of malnutrition.

Another factor affecting the nutritional status are co-morbidities. In the analysis of numerous coexisting diseases influence on the nutritional status; a statistical relationship was found. The respondent with more co-morbidities; received fewer points than the one with fewer diseases.

The individual co-morbidities were analyzed. The investigation of a depression impact on nutritional status among the elderly showed a statistically significant relationship ( $p = 0.003099$ ). Patients diagnosed with depression received fewer points than those who did not experience depression. According to reports from literature, abnormal nutritional status in the elderly is influenced by many factors, including reduction of functional status and cognitive dysfunction [18].

Additionally, cancer has a significant impact on nutritional status. Rapid weight loss, especially in patients with diagnosed malignancies, is often noticeable. In 30-80% of such patients, the body weight is characteristically reduced [19]. In their own study, patients who had been diagnosed with cancer had fewer points than non-cancer patients.

The examination of the effects of other co-morbidities (including hypertension, diabetes, hyperthyroidism and hypothyroidism) revealed no statistically significant relationship. As Dudkowiak R. and Poniewierska E. re-

port, cases of diabetes or hypertension are often accompanied by overweight. In contrast, a body weight loss is a symptom of hyperthyroidism [20].

The place of residence and the number of people in the household are further factors affecting the nutritional status of the elderly. The patients who live with the family are better nourished than those who live alone or are residents of social care homes. This is confirmed by research conducted by Humanska M. and Kędziora-Kornatowska K. in a 100-person group, in which 54% were residents of social care homes (DPS). As many as 60% of the respondents were classified as at risk of malnutrition and 4% were malnourished [1]. With the use of the MNA scale, Guigoz Y.[18] found malnutrition in 2% of males living alone and 24% were at risk of malnutrition. In the own studies, the risk of malnutrition was diagnosed both in the group of people living independently and in the group of patients living with "someone". However, in people living alone, their nutritional status was often abnormal.

The place of residence is also associated with the number of meals served. It has been noted that people living in social care homes have more difficulty with the access to additional meals, compared to those living with families [1]. Söderström L. [21] observed that the risk of malnutrition was also related to certain eating habits, including consuming fewer meals during the day. In our own study it was found that patients who consumed 3 full meals a day were better nourished than those who ate 2 meals a day.

## Conclusions

1. There is a reasonable need to monitor the nutritional status of the elderly as many of them are at risk of malnutrition.
2. The nutritional status of the elderly is influenced by many external and internal factors.
3. The risk of malnutrition increases with age of patients.
4. The MNA questionnaire is a good tool for quick and accurate assessment of nutritional status in older people.

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# ANALYSIS OF FACTORS THAT INFLUENCE THE PREVALENCE OF PROFESSIONAL BURNOUT AMONG ONCOLOGY NURSES

## ANALIZA CZYNNIKÓW MAJĄCYCH WPŁYW NA WYSTĘPOWANIE WYPALENIA ZAWODOWEGO U PIEŁĘGNIAREK ONKOLOGICZNYCH

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### ABSTRACT

**Aim.** The purpose of the paper was to show the scale of professional burnout among nurses working on oncology wards.

**Material and Methods.** The research was conducted on a group of 100 nurses employed to work on the oncology wards of two hospitals in the Province of Lesser Poland. The research involved the use of the Maslach Burnout Inventory (MBI) and an authorial questionnaire.

**Results.** As many as 62% of diagnosed nurses were suffering from acute emotional exhaustion (EEX). 30% of respondents were found to have the highest level of depersonalization (DEP), while more than half (64%) of the nurses were experiencing a high sense of no personal accomplishment (PAR). The increase in the educational level related to the lower burnout coefficient on all MBI subscales ( $p < 0.05$ ). More frequent participation in different forms of postgraduate learning significantly lowered the burnout coefficient on the 'Emotional exhaustion' and 'Sense of no personal accomplishment' subscales - EEX and DEP ( $p < 0.05$ ) – the higher the satisfaction, the lower the burnout coefficient. The results on MBI subscales were not dependent on financial satisfaction ( $p > 0.05$ ).

**Conclusions.** The higher educational level and frequency of participation in postgraduate learning significantly lowers professional burnout.

**KEYWORDS:** professional burnout, nurses, oncology ward, MBI.

### STRESZCZENIE

**Cel.** Celem pracy było ukazanie skali wypalenia zawodowego wśród pielęgniarek pracujących na oddziałach onkologicznych.

**Materiał i metody.** Badania przeprowadzono w grupie 100 pielęgniarek zatrudnionych na oddziałach onkologicznych dwóch małopolskich szpitali. Posłużono się Kwestionariuszem Wypalenia Zawodowego Ch. Maslach (ang. Maslach Burnout Inventory, MBI) oraz autorskim kwestionariuszem ankiety.

**Wyniki.** Wyczerpanie emocjonalne (EEX) na wysokim poziomie stwierdzono u 62% badanych pielęgniarek. U 30% respondentek odnotowano najwyższy poziom depersonalizacji (DEP), a ponad połowa (64%) pielęgniarek odczuwała wysoki wskaźnik utraty osiągnięć osobistych (PAR). Wzrost poziomu wykształcenia wiązał się z niższym wskaźnikiem wypalenia we wszystkich podskalach MBI ( $p < 0,05$ ). Częstsze uczestnictwo w różnych formach kształcenia podyplomowego istotnie obniżało wskaźnik wypalenia w podskalach „wyczerpanie emocjonalne” oraz „poczucie utraty osiągnięć osobistych” ( $p < 0,05$ ). Wyniki podskal MBI nie zależały od satysfakcji z zarobków ( $p > 0,05$ ).

**Wnioski.** Wyższy poziom wykształcenia oraz częstsze uczestnictwo w kształceniu podyplomowym istotnie wpływa na obniżenie wypalenia zawodowego.

**SŁOWA KLUCZOWE:** wypalenie zawodowe, pielęgniarki, oddział onkologiczny, MBI.

### Introduction

Professional burnout concerns people who work in groups in the so-called helping professions, with a nurse being one of these professions. Everyday emotionally-loaded contact with a person, their family, specific work environment, lack of satisfaction from work, or salary, to a tremendous extent contributes to the occurrence of the professional burnout phenomena [1]. According to Ch. Maslach, the leading authority in the studies on

professional burnout, the above syndrome comprises three components [2–4]:

- 1) Emotional exhaustion on a professional level concerns the feeling of tiredness and fatigue without the prospect of recuperation. Often, a person lacks energy to begin the day and interact with people who need help.
- 2) Depersonalization manifests itself as a negative, cynical or extensive distancing in relations



with other people. Interpersonal relations lose their previous subjective dimension, and become impersonal and depersonalized. Depersonalization is a secondary result of emotional exhaustion. It is somehow a form of self-defence, protecting a person against contact with another person.

- 3) Lowered sense of personal accomplishment means a loss of the sense of one's own competence and a loss of working capacity. Persons who suffer from a lowered sense of personal effectiveness and practical effectiveness are also characterized by higher levels of depression and greatly increased difficulties in coping with the stress and requirements of the job.

Symptoms of professional burnout can be divided into four groups: physical symptoms, emotional symptoms, family symptoms, and social symptoms, as well as symptoms related to work, which intensify gradually according to working time. The consequence of the symptoms related to work are, among others: mental and physical exhaustion, the loss of working enthusiasm, withdrawal from professional problems, and also a lack of satisfaction from the work done [5, 6].

Care for oncology patients requires meeting specific prerequisites. Caretakers are expected to have not only high qualifications, but first of all empathy, understanding and the ability to give support [7]. It is the primary responsibility of a nurse to conduct interpersonal contacts with people. The contact with a patient can often involve experiencing strong emotions: frustration, aggression or fear, and that is why therapeutic interpersonal skills and the ability to cope with strong and unpleasant emotions are so important. It is the nurse who accompanies the patient during difficult moments of the treatment, and watches over him/her when in fear of, e.g. radiotherapy or chemotherapy. Another difficulty at work is the constant stress to which ill people are subjected, and which also affects the caring personnel [8].

According to Piness, an enormous influence on the occurrence of the professional burnout problem also comes from the working environment, filled with negative characteristics, bureaucracy, lack of interpersonal communication, and lack of necessary autonomy and equipment, which significantly deepens the problem. Conversely, a supportive environment is an environment which enables people with a high level of motivation to pursue their personal development [9].

The purpose of the present work was to determine the prevalence and severity of professional burnout among nurses working on oncology wards, as well as determining the factors which contribute to the above mentioned phenomena.

## Material and Methods

The research was conducted on a group of 100 nurses employed to work on oncology wards – hematology wards, radiotherapy wards, oncology surgery wards and clinical oncology wards of two hospitals in the Province of Lesser Poland. The research involved the use of the Maslach Burnout Inventory (MBI) and an authorial questionnaire. The research was conducted between November 2015 and January 2016.

The MBI questionnaire consists of 22 questions, divided into three sections, allowing for the examination of the burnout in each of three dimensions, being [2]:

- Emotional exhaustion (EEx),
- Depersonalization (DEP),
- Sense of no personal accomplishment (PA).

The results are calculated separately for each of the subscales. In the EE and DEP subscales, the higher the results, the more intense the sense of no personal accomplishment [2].

The authorial questionnaire is comprised of 8 questions regarding: age, education, specialization, years of experience, postgraduate education, financial satisfaction, performed work, and the ability to cope with mental stress.

For the results described, we used basic descriptive statistics and a Spearman's rank correlation coefficient. The correlations were considered significant at  $p < 0.05$ .

## Results

The average seniority in the profession amounted to 18.91 years (SD = 10,85) and fluctuated between 1 and 37 years. The biggest group comprised nurses aged 41–45 (26%), with secondary school education (46%) and without a specialization in any of the nursing fields (71%) (Table 1).

**Table 1.** Characteristics of the Group Under Research

Variable	%
Age Group	
25–30	17%
31–35	4%
36–40	12%
41–45	22%
46–50	26%
51–55	15%
56–60	4%
Education	
Secondary/Medical Secondary School	46%
Higher/Bachelor's Degree	40%
Higher/Master's Degree	14%
Specialty	
Yes	29%
No	71%

Source: author's own research

The results indicate that the nurses under the examination frequently participated in postgraduate forms of further studying – 33% participated more than once a year, an equal percent did that less than once a year, and only 2% studied less than once every 5 years.

It has been revealed that the nurses under the examination were content with their jobs, though they did not feel satisfied with their income. Only 1% expressed such satisfaction, 69% of the respondents were not pleased with their salaries, while 30% were only partially satisfied. The biggest percent of nurses, namely 47%, were satisfied, 39% were not fully satisfied with the job, and 14% felt no satisfaction at all.

As many as 62% of the nurses under the survey were diagnosed with acute emotional exhaustion (EEX). 30% of the respondents showed the highest level of depersonalization (DEP), and more than half (64%) of the nurses were characterized by a high level of the sense of no personal accomplishment (PAR) (Figure 1).

Then the analysis focused on the influence of such factors as: age, seniority, level of education, participation in postgraduate training, work satisfaction and financial satisfaction on professional burnout among the group in question.

A statistically significant relation between the respondents' age and the level of depersonalization ( $r = 0.21$ ,  $p = 0.036$ ) was observed. This relation is positive; which means that the older the age, the higher the result on that subscale, and so the professional burnout factor. The other correlation coefficients were not significant ( $p > 0.05$ ), hence age had no influence on the results in the remaining subscales.

The increase of the educational level corresponded to the lower burnout scores on all MBI subscales ( $p < 0.05$ ). Correlations with EEX and DEP are negative, i.e. the

higher the education, the lower the results on those subscales, hence the lower level of professional burnout. The correlation with PAR is positive, i.e. the higher the education, the higher the result on that subscale, which also means the lower level of burnout (Table 2).

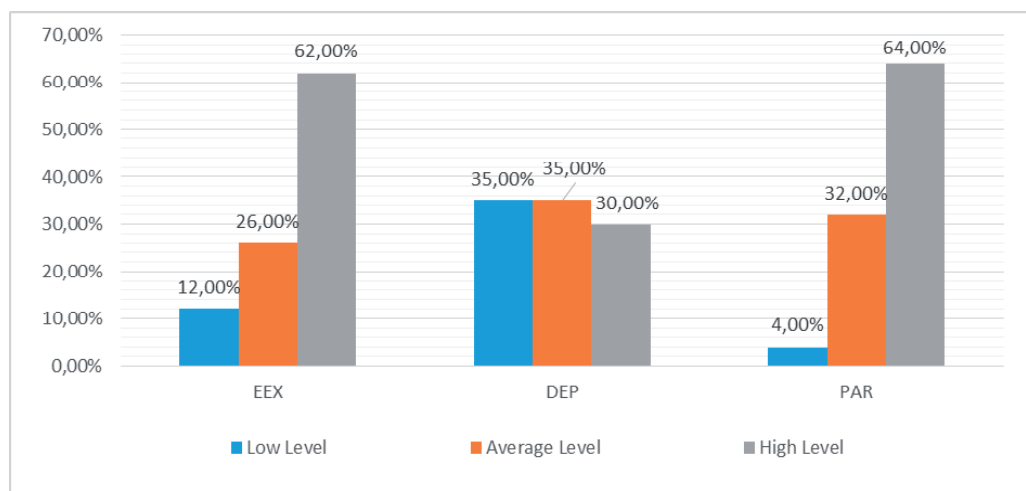
**Table 2.** Education in Correlation to Each of the MBI Subscales

MBI Sub-scale	Education	n	X	SD	Me.	Min.	Max.	Q1	Q3	p *
EEX	Secondary/Medical Secondary School	46	36,5	11,63	38	10	54	27,75	45	$r = -0,37$ $p < 0,001$
	Higher/Bachelor's Degree	40	26,98	11,97	26	0	50	20	37	
	Higher/Master's Degree	14	26,21	11,29	24,5	12	48	16,25	35,75	
DEP	Secondary/Medical Secondary School	46	11,54	5,53	11	1	25	9	14,75	$r = -0,285$ $p = 0,004$
	Higher/Bachelor's Degree	40	6,55	5,22	5	0	19	3	9,25	
	Higher/Master's Degree	14	9,86	5,76	8,5	3	22	6	13	
PAR	Secondary/Medical Secondary School	46	26,24	7,07	27	14	44	20,25	31,75	$r = 0,215$ $p = 0,032$
	Higher/Bachelor's Degree	40	28,05	7,7	27,5	12	48	22,5	34,25	
	Higher/Master's Degree	14	31,64	9,22	31,5	13	47	27	37,75	

n – sample number; X – arithmetic average; SD – standard deviation; Me. – median; Min. – minimum; Max. – maksimum; Q1 – the first quartile; Q3 – the third quartile; p – significance level

Source: author's own research

Years of experience had a significant influence on the sense of no personal accomplishment ( $p < 0.05$ ) – the longer the seniority, the lower the burnout severity. The remaining correlation factors are statistically insignificant ( $p > 0.05$ ) (Table 3).



**Figure 1.** Sample burnout description for low, medium and high Maslach Burnout Inventory sub-scores

Source: author's own research

**Table 3.** Years of Experience Against the Results on the MBI Subscales

MBI Subscale	Correlation with Seniority			
	Correlation Coefficient	p	Direction of Correlation	Strength of Correlation
EEX	0,045	0,657	---	---
DEP	0,187	0,063	---	---
PAR	0,203	0,043	positive	weak

p – significance level

Source: author's own research

More frequent participation in different forms of postgraduate education significantly lowered the burnout on the “Emotional exhaustion” and “Sense of no personal accomplishment” subscales ( $p < 0.05$ ). The correlation coefficient for the DEP subscale is statistically insignificant ( $p > 0.05$ ), so the participation in postgraduate courses had no influence on that subscale (**Table 4**).

**Table 4.** Participation in Postgraduate Learning in Correlation with Each MBI Subscale

MBI Subscale	Postgraduate Participation in Postgraduate Learning	n	X	SD	Me, Min, Max,	Q1	Q3	p *
EEX	More than once a year	33	28,67	11,55	28	0	48	$r=-0,295$ $p=0,003$
	Less than once a year	33	27,82	12,2	24	8	54	
	Once every 2 years	27	35,96	12,19	37	6	54	
	Once every 5 years	5	36,4	10,33	37	20	47	
	Less than once every 5 years	2	54	0	54	54	54	
DEP	More than once a year	33	8,52	6,29	8	1	25	$r=-0,188$ $p=0,061$
	Less than once a year	33	8,64	5,87	7	0	24	
	Once every 2 years	27	10,56	5,25	11	0	22	
	Once every 5 years	5	12,4	6,47	13	3	21	
	Less than once every 5 years	2	9	5,66	9	5	13	
PAR	More than once a year	33	31,36	6,68	33	18	47	$r=0,296$ $p=0,003$
	Less than once a year	33	25,88	7,6	26	12	44	
	Once every 2 years	27	26,3	8,42	24	15	48	
	Once every 5 years	5	26,4	3,91	24	24	33	
	Less than once every 5 years	2	20,5	9,19	20,5	14	27	

n – sample number; X – arithmetic average; SD – standard deviation; Me, – median; Min, – minimum; Max, – maksimum; Q1 – the first quartile; Q3 – the third quartile; p – significance level

Source: author's own research

Satisfaction with work had a significant influence on the EEX and DEP subscales ( $p < 0.05$ ) – the greater the satisfaction, the lower the burnout coefficient. The correlation coefficient for the PAR subscale is statistically insignificant ( $p > 0.05$ ), so satisfaction from work had no influence on the results of that subscale (**Table 5**).

**Table 5.** Satisfaction From Work in Correlation to Each of the MBI Subscales

MBI Subscale	Satisfaction from Work	n	X	SD	Me.	Min.	Max.	Q1	Q3	p *
EEX	No	14	41,79	7,71	40,5	30	54	37	48	$r=-0,338$ $p=0,001$
	Not Full	39	31,77	12,53	31	6	54	23	43	
	Yes	47	27,68	12,15	27	0	50	18,5	38,5	
DEP	No	14	11,29	4,45	11,5	4	18	8,25	14,5	$r=-0,23$ $p=0,022$
	Not Full	39	10,13	6,11	9	0	25	5,5	13	
	Yes	47	8,04	5,85	8	0	22	3	12	
PAR	No	14	26	8,68	26	14	44	18,75	31	$r=0,187$ $p=0,062$
	Not Full	39	26,59	7,8	27	12	48	20	32,5	
	Yes	47	29,17	7,38	29	13	47	24	35	

n – sample number; X – arithmetic average; SD – standard deviation; Me. – median; Min. – minimum; Max. – maksimum; Q1 – the first quartile; Q3 – the third quartile; p – significance level

Source: author's own research

The results of the MBI subscales were not dependent on financial satisfaction ( $p > 0.05$ ).

## Discussion

Daily relations with a sick person in particular exposes a nurse to the professional burnout syndrome [10]. Emotional involvement and a heavily stimulated contact with a patient can in turn create a distance, making it difficult to maintain that contact along the patient-caretaker line. [1, 2].

Individual research shows that the nurses under the survey employed to work in oncology wards are professionally burned out; the majority of them present high and average levels of burnout on each of the MBI subscales. The most balanced results, though, concern the level of depersonalization: 35% had a low level or an average level, while 30% had a high level. Similar results were obtained by Dębska and Cepuch, who conducted research among nurses of primary health care. They claimed that the low and average results on the depersonalization scale are indicative of proper relations along the nurse-patient line [11]. Krukowska and Zuza-Witkowska had similar conclusions from conducting research on empathy and professional burnout among oncology nurses [12]. The diagnosed nurses received a high score in feeling no personal accomplishment (30.44%), a moderate score in emotional exhaustion (19.39%), and low in depersonalization (6.25%).

While performing analysis of the results of each subscale of burnout, researchers performed statistical calculations of the correlations between factors potentially contributing to the occurrence of that phenomena. There was a significant connection between the age of respondents and the level of depersonalization – the burnout coefficient increased with age, while seniority significantly influenced the result on the PAR subscale – the more years of experience, the higher the respondents' score on that subscale, which equals a lower burnout coefficient, and so a lower sense of no personal accomplishment. Different conclusions to that were drawn by Marcysiak et al. [10] in research on the relation between professional burnout and the ability to cope with stress. They claimed that age and seniority had no connection with the level of professional burnout. Instead, they observed a significant correlation between the ability to cope with stress caused by emotional experiences and the age of nurses under the survey – the lower age corresponded to the better coping ability in stressful situations.

Education had a significant influence on all MBI subscales – with a higher level of education came lower burnout among nurses. Moreover, the more frequent the participation in different forms of postgraduate education the nurses presented, the lower the level of burnout seemed to be present on both the Emotional exhaustion and the Sense of no personal accomplishment subscales. The results accurately fit in with the concepts of the authors dwelling on the subject of professional burnout, who believe that together with the increase in competence comes the decrease of the burnout syndrome. As stated by Wilczek-Rużyczka [1], the biggest risk of burnout among caring persons occurs when those persons are not professionally prepared and have taken on the job out of necessity. However, as Tomaszewska et al. [13] pointed out, analyzing the possibilities for the professional development of nurses, financial problems are a frequent factor impeding professional development in that group of employees.

The factor pointed out by the authors dwelling on the subject of burnout is salary. Taking into account satisfaction with earnings, the analysis shows that 69% of nurses feel no satisfaction with their salaries at all (only 1% of them are satisfied). The obtained results were used as the basis for calculations of correlation coefficients between the above variables, which turned out to be statistically insignificant. Therefore, the following conclusion can be drawn: nurses get satisfaction with giving aid to another person, and having an opportunity to accompany that person in the last moments of his/her life. One might even risk saying that nurses prefer helping others over financial satisfaction. Pagórski and

Markiewicz, who engaged in an analysis of the ways to motivate hospital employees, with a particular emphasis on nursing staff, proved that none of the respondents decided on being a nurse due to financial reasons [14]. Statistically significant correlations in this regard were shown, among others, by Cegła et al. [15], in research on the relation between the financial situation of nurses and the professional burnout syndrome. The researchers showed that in the group of nurses who considered their earnings to be very low, the level of burnout was the highest. Therefore, it has been confirmed that along with the increase of salary the decrease in the level of burnout comes.

## Conclusions

The majority of nurses working in oncology wards show a high level of burnout on each of the MBI subscales.

1. The higher level of education and frequent participation in postgraduate learning significantly lower the professional burnout syndrome.
2. The burnout syndrome is not related to financial satisfaction.

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# ASSESSMENT OF THE LEVEL OF KNOWLEDGE ON INFLAMMATORY BOWEL DISEASE IN PARENTS OF CHILDREN HOSPITALIZED IN THE CHILDREN'S MEMORIAL HEALTH INSTITUTE (IP-CZD)

## OCENA POZIOMU WIEDZY NA TEMAT NIESWOISTYCH ZAPALEŃ JELIT W GRUPIE RODZICÓW DZIECI HOSPITALIZOWANYCH W CENTRUM ZDROWIA DZIECKA

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### ABSTRACT

**Introduction.** Inflammatory bowel disease (IBD) is a group of autoimmune conditions that include Crohn's disease and ulcerative colitis. Due to an immunocompromised state, parents should have a high level of knowledge of available vaccinations, various therapies as well as possible complications that may develop in their children.

**Aim.** Assessment of knowledge on inflammatory bowel disease in parents of children hospitalized in the Children's Memorial Health Institute (IP-CZD)

**Material and Methods.** 45 parents of children hospitalized in the Department of Gastroenterology, Hepatology and Nutrition, Children's Memorial Health Institute (IP-CZD) between April and June 2015 (28 women); mean age: 43 years. An anonymous, voluntary survey: a questionnaire comprised 25 questions. Statistical analysis: STATISTICA 10.0, significance level at  $p < 0.005$ .

**Results.** Less than half of the respondents knew that osteoporosis was a recognised complication of inflammatory bowel disease. Over half of the respondents did not know that complications of IBD included also recurrent respiratory infections and that children with inflammatory bowel disease should avoid eating raw meat and eggs.

**Conclusions.** General knowledge of the disease among respondents was insufficient. It would be advisable to develop an educational campaign, introduce a larger number of consultations with dietitians and improve methods of communication.

KEYWORDS: bowel disease, Crohn's disease, ulcerative colitis.

### STRESZCZENIE

**Wstęp.** Nieswoiste choroby zapalne jelit (NZJ) to choroby autoimmunologiczne, do których zalicza się chorobę Leśniowskiego-Crohna oraz wrzodziejące zapalenie jelita grubego. Ze względu na stan obniżonej odporności rodzice powinni posiadać wysoki poziom wiedzy na temat możliwych szczepień, stosowania różnorodnego leczenia, jak i na temat ewentualnych powikłań choroby, jakie mogą dotknąć dziecko.

**Cel.** Ocena wiedzy rodziców dzieci hospitalizowanych w Instytucie „Pomnik – Centrum Zdrowia Dziecka” na temat nieswoistych zapaleń jelit.

**Materiał i metody.** 45 rodziców hospitalizowanych dzieci w Klinice Gastroenterologii, Hepatologii i Żywienia Instytutu „Pomnik – Centrum Zdrowia Dziecka” w okresie od kwietnia do czerwca 2015 r. (28 kobiet); średni wiek 43 lata. Anonimowe, dobrowolne badania ankietowe: kwestionariusz składający się z 25 pytań. Analiza statystyczna: STATISTICA 10.0, poziom istotności  $p < 0,005$ .

**Wyniki.** Mniej niż połowa ankietowanych wiedziała, że do powikłań nieswoistych chorób zapalnych jelit należy osteoporoza. Ponad połowa respondentów nie wiedziała, że do powikłań zaliczają się również nawracające zakażenia układu oraz że dziecko chorujące na nieswoiste zapalenie jelit powinno unikać spożywania surowego mięsa oraz jajek.

**Wnioski.** Ogólna wiedza ankietowanych w badanej grupie na temat choroby jest niewystarczająca, należałoby rozważyć zastosowanie programu edukacyjnego, większej liczby konsultacji dietetycznych czy też wdrożyć lepsze sposoby przekazywania informacji.

SŁOWA KLUCZOWE: choroby jelit, choroba Leśniowskiego-Crohna, wrzodziejące zapalenie jelita grubego.



## Introduction

Inflammatory bowel disease (IBD) is a group of autoimmune conditions that include Crohn's disease and ulcerative colitis [1]. In approximately 25% of all cases, the first manifestations of these diseases occur in persons below 20 years of age [2]. Apart from those two major and most common conditions, inflammatory bowel disease comprises also a number of similar conditions that need to be differentiated due to the further treatment and clinical picture [3].

Inflammatory bowel disease is believed to be caused by genetic, immunological, and environmental factors [4]. Psychological factors and nutrition patterns cannot be forgotten, though [2].

The aim of treatment of inflammatory bowel disease is to achieve remission and not complete recovery due to the chronic nature of the disease. Patients with IBD should be under constant care of a gastroenterologist, dietician and psychologist as well. In the case of children, it is of particular importance that their parents had a high level of knowledge and awareness of the disease, including knowledge of aetiology and causes of the disease as well as, first and foremost, dietary and nutritional recommendations, pharmacology, and the child's lifestyle [2].

Due to an immunocompromised state, parents should have a high level of knowledge of available vaccinations, various therapies as well as possible complications that may develop in their children [2].

## Aim

The study aimed to assess the knowledge of parents of children hospitalized in the Children's Memorial Health Institute (IP-CZD) about inflammatory bowel disease. The detailed aim of the study was to compare the level of knowledge of inflammatory bowel disease among two groups: parents of children receiving biological therapy and parents of children treated with other methods.

## Material

The study enrolled a total of 45 parents of children hospitalised in the Department of Gastroenterology, Hepatology and Nutrition, Children's Memorial Health Institute due to inflammatory bowel disease (children's mean age 14,5 years, min. 9, max. 17, SD = 2,24). In 100% of children the disease was diagnosed at least one year before the survey was conducted (date of diagnosis: 1999–2013). The study participants were divided into two groups: those whose children were receiving biological therapy (30 persons) and parents of children not receiving biological therapy (15 persons).

Mean age of the respondents was 43 years, the youngest person was 34 and the oldest one was 53. The study group comprised 28 women (62%) and 17 men (38%). The largest number of parents of children not receiving biological therapy had a secondary school degree (67%) and the largest proportion of those whose children were treated with Infliximab had a higher level degree (60%). The difference in the educational level between the groups was statistically significant and amounted to  $p < 0.0145$ .

## Methods

The study was performed between April and June 2015 in the Department of Gastroenterology, Hepatology and Nutrition, Children's Memorial Health Institute in Warsaw. A diagnostic survey carried out with the use of a questionnaire was used in the study. Participation in the study was voluntary. The anonymous questionnaire comprised 25 questions about inflammatory bowel disease, including 4 questions concerning attitudes and opinions towards the participants' own level of knowledge. The data were collected in the Microsoft Excel program. The statistical analysis of the results was conducted using STATISTICA 10.0. program (licensed to Warsaw Medical University). Two groups were compared in the study: parents of children receiving biological therapy and parents of children not receiving biological therapy. The significance level was established at  $p < 0.005$ .

## Results

The study demonstrated that parents of children with inflammatory bowel disease do not have sufficient knowledge of the factors affecting the development of the disease. Answers provided by both groups did not differ significantly except for a question about genetic factors ( $p < 0.0083$ ) and a question about past vaccinations and their influence on the development of the disease ( $p < 0.0016$ ). Parents of children receiving biological therapy demonstrated a better knowledge in the case of both questions.

The respondents demonstrated a high level of knowledge with respect to the question about the symptoms of inflammatory bowel disease. Statistically significant differences concerned answers to questions about the elevated body temperature ( $p < 0.038$ ), perianal lesions ( $p < 0.0001$ ), and nausea and vomiting ( $p < 0.0102$ ). Parents of children receiving biological therapy had a better knowledge concerning the issues above.

Less than half of the respondents knew that osteoporosis is a recognised complication of inflammatory bowel disease. Over half of the study participants did not know that complications also include recurrent

respiratory infections. There were no significant differences between the answers provided by both groups except for the questions about joint pain and oedema ( $p < 0.0012$ ) as well as ocular complications ( $p < 0.0441$ ). In both cases, parents of children receiving biological therapy demonstrated better knowledge.

See **Table 1** for a detailed comparison of results in both groups.

**Table 1.** Symptoms and signs of inflammatory bowel disease and factors affecting its formation and progress

	Patients treated with infliximab			Patients not treated with infliximab		
	Yes	No	I don't know	Yes	No	I don't know
Contribution of genetic factors to the development of the disease	66.6%	6.7%	26.7%	21.4%	35.7%	42.9%
Contribution of past vaccination to the development of the disease	3.6%	78.6%	17.8%	21.4%	21.4%	57.2%
Elevated body temperature as a sign of the disease	55.2%	24.1%	20.7%	14.3%	50%	35.7%
Perianal lesions as a sign of the disease	79.3%	13.8%	6.9%	20%	13.3%	66.7%
Nausea and vomiting as a sign of the disease	69%	17.2%	13.8%	28.6%	14.3%	57.1%
Joint swelling as a possible complication of IBD	83.3%	6.7%	10%	28.6%	14.3%	57.1%
Symptoms of/eye disease as a possible complication of IBD	41.4%	34.5%	24.1%	30.8%	7.7%	61.5%

Source: author's own analysis

Nearly three quarters of the respondents gave a correct answer that parents could not (without consulting a doctor) decide to discontinue steroid treatment of their children. Over half of the parents knew that in the case of overweight in a child on steroid therapy they were not supposed to change any instructions provided by a dietitian and attending doctor. More than half of the study participants had knowledge about the contribution of the Polish National Health Fund (NFZ) towards financing the biological therapy. The answers provided by both groups did not differ significantly.

More than 50% of the respondents had knowledge about physical activity of a child with inflammatory bowel disease. Over half of the study participants did not know whether their child could be vaccinated.

Only half of the study participants knew that a child with inflammatory bowel disease should avoid eating raw meat and eggs. Over 50% of the parents knew that their children absolutely could not drink Coca-Cola. The

answers provided by both groups did not differ significantly.

The question about consumption of milk by a child with inflammatory bowel disease proved to be statistically significant. Over half of the parents responded correctly that their children could drink milk. The parents of children receiving biological therapy demonstrated a higher level of knowledge with respect to this question.

Over half of the respondents did not provide the correct answer to the question about elimination diets. The parents did not know that such a diet may lead to nutritional deficiencies. Two thirds of the respondents did not know that deficiency of trace elements such as magnesium or potassium might aggravate diarrhoea in their child. The answers provided by both groups did not differ significantly.

Over half of the respondents did not know that in the case of fatty diarrhoea it was recommended to limit fat intake. Differences between answers provided by both groups were statistically significant ( $p < 0.0126$ ). More correct answers were provided by the parents of children receiving biological therapy.

See **Table 2** for statistically significant differences in detail.

**Table 2.** Detailed knowledge of nutrition principles for children with IBD

	Patients treated with infliximab			Patients not treated with infliximab		
	Truth	False	I don't know	Truth	False	I don't know
Consumption of milk	16.7%	70%	19.3%	6.4%	33.6%	60%
Children's fat intake	26.7%	13.3%	60%	6.7%	53.3%	40%

Source: author's own analysis

Nearly half of the respondents did not know that the consumption of juice and fruit purée irritated the inflamed intestines.

The next questions concerned Infliximab, a biologic drug. Over three-fourths of the study participants knew the group of medicines Infliximab belonged to. Statistically significant differences ( $p < 0.001$ ) in favour of the parents of children receiving biological therapy were observed with respect to the question about the route of administration of a biological drug.

Most parents provided correct answers to the open-ended questions about the biological drug infusion time and the post-infusion clinical observation period. The drug infusion normally takes about 2–3 hrs. and the post-infusion observation of a child should last a minimum of 2 hrs.

The parents had major difficulties with the question about adverse effects of the biological drug. Most respondents were not able to indicate possible reactions after taking Infliximab. There were no statistical differences between the groups except for the question about breathing difficulties ( $p < 0.0369$ ).

Less than half of the study participants assessed their knowledge of the child's disease as good. The Internet and a doctor constituted the main sources of knowledge of the study population about the disease. The answers provided by both groups did not differ significantly. Over half of the respondents did not provide any area of knowledge about their children's disease they would have liked to improve. No statistically significant differences in answers between the groups were found except for the question concerning the willingness to improve knowledge with respect to complications of the disease ( $p < 0.0042$ ), with parents of children receiving biological therapy being more interested in improving their knowledge about complications.

## Discussion

Not many publications on the assessment of parents' knowledge on inflammatory bowel diseases were found in the available Polish literature included in the Polish Medical Bibliography. The available publications have focused mainly on the evaluation of life quality of children and adolescents with inflammatory bowel disease [5, 6, 7, 8, 9, 10].

The world literature included in the PubMed and Scopus databases provides a larger number of publications as well as tools to measure the level of knowledge. The Knowledge Questionnaire, i.e. a questionnaire assessing the knowledge of adults with inflammatory bowel disease was developed by S.C. Jones in 1992 [11]. A study based on this questionnaire demonstrated certain mistakes in understanding the disease by patients, however a large proportion of patients wanted to have a better knowledge of inflammatory bowel disease. Similar results were obtained in the present study: the respondents expressed their willingness to improve their knowledge of nutrition, medication therapy, and new possibilities of treatment available to paediatric patients.

The CCKNOW score developed in 1999 by J.A. Eaden constitutes another research tool [12]. The Crohn's and Colitis Knowledge Score is a 24-item questionnaire assessing the knowledge of adult patients with Crohn's disease and ulcerative colitis. The questions were divided into five areas: 8 questions related to general knowledge, 4 human anatomy-related questions, 5 questions about drugs, 2 nutrition-related questions and 5 questions concerning complications. The study conducted in NHS facilities in eight regions of the UK demonstrated

a low level of knowledge of patients with IBD about the disease – median score on the CCKNOW was 9. At the same time, the respondents (127 study participants) did not assess their knowledge as poor [13]. These results correspond to the present outcomes, where parents of young patients with inflammatory bowel disease also presented a low level of knowledge, with a relatively good self-assessment.

A study carried out in Manchester among a group of 236 patients with IBD [14] is another one assessing the level of knowledge with the use of the CCKNOW questionnaire. In this case the score was only 7. The results of this study and the outcomes of the previous one of 1999 were similar, giving the mean score of 10 [12]. Both the original study and the one conducted in Manchester showed a poor level of knowledge with respect to fertility, surgical procedures and implications for pregnancy. The scope of questions in the present study concerned other areas of the disease, still, the level of knowledge was low. The highest score was achieved by patients in Canada, amounting to 13, and the lowest one was obtained in Iran, with the mean of 4 [15, 16].

Large differences between Western European countries and developing countries (Iran) can be attributed to the quality of health care, limited access to websites, and a small number of publications. Nevertheless, debates and discussions on the usefulness of the CCKNOW questionnaire are on-going. Patients from hospital in Tehran (100 persons) had the lowest level of knowledge about the complications of bowel diseases. The present study participants also had difficulties in defining possible complications. Another similarity between the two studies concerns the willingness to improve knowledge of available treatment options. However, none of the aforementioned questionnaires (Knowledge Questionnaire and CCKNOW) could have been used to assess knowledge of children and adolescents. It was possible only thanks to a study by D. Haaland, A.S. Day and A. Otley that demonstrated a IBD-KID device (Knowledge Inventory Device), a questionnaire assessing the knowledge of children aged between 10 and 17 [17]. It is filled in by both parents and children. The assessment of and studies on the questionnaire showed that it was an important and efficient measurement tool. It was tested for validity among 99 parent-child pairs. Similarly to the present findings, the first results showed that more than half of the parents and less than half of the patients had not noticed complications of the disease in a part of the body other than the intestines. As with the present study, less than half of the respondents did not indicate osteoporosis and eye diseases as complications of the disease. Less than half of the parents and more than half of the patients had knowledge about the adequate

diet and above all its relation to health of a child. This corresponds with the present study results that showed that the parents of children with IBD did not have a high level of knowledge on nutrition and dietetics.

The IBD-KID questionnaire was also useful and valid in an Australian study whose results demonstrated poor knowledge of a wide variety of treatment aspects of IBD as well as its complications, which was, again, in line with the present outcomes [18]. Major medical organisations in the UK developed common guidelines and standards providing IBD patients with the highest quality care and emphasising the importance of the level of knowledge of patients for the course of the disease [19]. Another interesting analysis was carried out among gastroenterologists who were asked to assess the knowledge of adolescents reaching adulthood. It showed poor knowledge of young adults: more than 50% of the study participants had deficits in the knowledge of their case history and drug-intake schedule [20].

There are just a few Polish publications on inflammatory bowel disease devoted to the knowledge of parents or children and adolescents with enteritis. A publication by M. Perek and G. Cepuch is one of them [7]. The study enrolled both young patients and their parents. According to the authors, the study participants had a satisfactory knowledge of inflammatory bowel disease. Only 9% of respondents indicated genetic factors as the cause of the disease, whereas the genetic load was indicated by as many as 52% of the present study participants. The question about symptoms in the study by M. Perek and G. Cepuch as well as in the present study showed a high level of knowledge: in both studies the respondents listed abdominal pain, diarrhoea, weight loss, nausea and vomiting. In both studies, medical personnel (31% in a study by M. Perek and as many as 7% in the present study) and the Internet (45% and 75%, respectively) constituted the main sources of knowledge of patients and their parents about the disease.

The present study, similarly to the others mentioned above, demonstrated poor knowledge of inflammatory bowel disease. The results obtained by M. Perek, who assessed the knowledge as satisfactory, may be referred to the present outcomes only in a few aspects. It can be assumed that the knowledge of parents in the present study about the symptoms of the disease resulted from their own experience since the percentage of correct answers to the questions about dietary recommendations was insufficient (poor knowledge with respect to consumption of raw food products, milk, Coca-Cola, as well as elimination diets and diarrhoea caused by certain deficiencies). The knowledge of safety and vaccination was also unsatisfactory. Over two-thirds of the respondents were unable to indicate

whether they could get vaccinated with particular vaccines available on the market.

The general level of knowledge of parents and children receiving biological therapy about the infusion route and what to do if a dose is missed was sufficient, however the lack of knowledge of post-infusion adverse effects and when they can occur raises concerns. No similar publications or studies were found in the Polish and world literature. The percentage of correct answers regarding possible complications was between 4 and 29%. Not a single study participant indicated the correct period when complications were most likely to occur (up to two weeks post infusion). In spite of that, as many as 74% of the respondents correctly indicated the procedure to follow if a dose of a biological medicine was missed and as many as 100% of the study participants showed up for a scheduled consultation with a gastroenterologist.

## Conclusions

1. General knowledge of the disease among respondents was insufficient. It would be advisable to develop an educational campaign, introduce a larger number of consultations with dieticians and improve methods of communication.
2. The parents of children receiving biological therapy had better knowledge of symptoms, complications, and dietary recommendations, however, these were not significant differences. They need to be provided with a better access to information on biological therapy.
3. The comparison of the present results and the available Polish and world studies showed similar outcomes: the knowledge of the disease and its complications was insufficient.
4. The analysis of the available literature demonstrated that more research tools are needed and there is a need for more analyses of knowledge of adolescents and parents of children suffering from inflammatory bowel disease.
5. Doctor-patient communication and nurse-patient communication should be improved to decrease the role of the Internet in gaining information.

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# ■ AN ALGORITHM FOR NURSING CARE OF A PATIENT PRIOR AND POST RHINOPLASTY

## ALGORYTM OPIEKI PIELĘGNIARSKIEJ NAD PACJENTEM PRZED I PO OPERACJI KOREKCYJNEJ NOSA

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### ABSTRACT

**Aim.** The aim of this paper was to obtain and analyze clinical nursing practices in dealing with patients operated for posttraumatic nose deformity.

**Material and Methods.** The survey was carried out among nurses from university hospitals who work with patients undergoing posttraumatic rhinoplasty. The examined nurses (n=66) were recruited from: Plastic, Reconstructive and Aesthetic Surgery Clinic (15 nurses from one hospital), Otolaryngology Department (26 nurses from three hospitals) and Cranio-Maxillofacial Surgery Clinic (25 nurses from two hospitals).

**Results.** The obtained data were critically assessed by plastic surgery specialists and an algorithm of nursing care for these patients was created. It was developed by analyzing knowledge and practices of the experienced nurses and recommendations of plastic surgeons.

**Conclusion.** We presented a simple algorithm for nursing care in patients undergoing posttraumatic rhinoplasty, which can be helpful in clinical practice and can be used for education purposes.

KEYWORDS: post-operative care, rhinoplasty, algorithm.

### STRESZCZENIE

**Cel.** Celem pracy była analiza klinicznych praktyk pielęgniarskich stosowanych u pacjentów leczonych operacyjnie z powodu po-urazowego zniekształcenia nosa.

**Materiał i metody.** Badanie zostało przeprowadzone wśród pielęgniarek z uniwersyteckich szpitali, uczestniczących w opiece nad pacjentami, u których wykonywana jest rinoplastyka. Badane pielęgniarki (n = 66) były rekrutowane z: Kliniki Chirurgii Plastycznej, Rekonstrukcyjnej i Estetycznej (15 pielęgniarek z jednego szpitala), Oddziału Otolaryngologii (26 pielęgniarek z trzech szpitali) oraz Kliniki Chirurgii Szczękowo-Twarzowej (25 pielęgniarek z dwóch szpitali).

**Wyniki.** Uzyskane dane zostały poddane ocenie przez specjalistów z dziedziny chirurgii plastycznej, co pozwoliło opracować algorytm opieki nad pacjentami po operacji nosa. Opierał się on na analizie wiedzy i praktyki klinicznej doświadczonych pielęgniarek oraz zaleceń lekarskich.

**Wnioski.** W pracy zaprezentowano algorytm opieki pielęgniarskiej nad pacjentem poddawany zabiegowi rinoplastyki, który może być pomocny w praktyce klinicznej i wykorzystany do celów edukacyjnych.

SŁOWA KLUCZOWE: opieka pooperacyjna, rinoplastyka, algorytm.

### Introduction

The nose, being the most prominent and central structure of the face, influences its appearance [1, 2]. As the nose attracts an observer's attention any deformities can be easily noticed and are often commented on [3]. In some people, especially in those with severe deformity, emotional distress may occur. Moreover, apart from an aesthetic aspect, nose deformity can cause breathing disturbances with all possible consequences such as frequent infections of the upper respiratory tract, sinusitis and headaches [4, 5].

An aesthetic and functional aspect of nasal deformity makes rhinoplasty one of the most commonly performed procedures in plastic surgery clinics. The aim of these operations is to correct or, in posttraumatic deformities, restore the nose's function and correct its appearance by improving its shape and symmetry. It is a challenge, even for an experienced surgeon, to obtain a satisfactory rhinoplasty result and such operations require appropriate pre – operative planning and postoperative care. Nursing care plays a very important role in successful treatment of pa-

tients with nose deformity. In the light of contemporary nursing practices and existing trends a great importance is ascribed to the optimization of the care quality. Nurses provide care according to the procedures developed on the basis of their experience in dealing with patients.

According to a systematic review concerning the effect of nursing practice guidelines, the use of such procedures was found to be effective in improving the accuracy of nursing records and the outcome of nursing activities such as a decrease in the incidence of complications [6]. Moreover, clinical practice guidelines reduce inappropriate variations in practice, promote the quality of care and enable healthcare professionals to explain the rationale underlying their interventions [7, 8]. Based on the literature review, Park and Park developed nursing practice guidelines to address the pre – and postoperative care of gastric cancer patients in a rapid and systematic way. They highlighted the fact that the presented guidelines may improve the quality of nursing care and may also be used for education purposes for both the students of nursing and novice nurses in the pre – and postoperative nursing care of gastric cancer patients [9]. Algorithms seem to be the best form of clinical guidelines as they can be used easily by novices as well as experts and they show simple diagrams for the decision making process [10]. Nursing algorithms make it possible to plan and implement the optimal patient care and may ensure that it is provided in a correct, logical order. As a result, a nurse is able to control her work on each stage and, if necessary, make an appropriate correction.

The aim of this paper was to obtain and analyze clinical nursing practices in dealing with patients operated for posttraumatic nose deformity. The obtained data were critically assessed by plastic surgery specialists and an algorithm of nursing care for these patients was created.

Methods

The survey was carried out among nurses from university hospitals who worked with patients undergoing posttraumatic rhinoplasty. The examined nurses (n=66) were recruited from: the Plastic, Reconstructive and Aesthetic Surgery Clinic (15 nurses from one hospital), the Otolaryngology Department (26 nurses from three hospitals) and the Cranio-Maxillofacial Surgery Clinic (25 nurses from two hospitals). Posttraumatic rhinoplasty is a common procedure in these hospitals, however, different techniques may be used in particular departments, e.g. osteotomies are more often performed

in the Plastic Surgery Clinic while septoplasty without osteotomy – in Otolaryngology Clinics. The study group consisted mostly of women (n = 65) and one men. The mean age of the participants was 44 ± 4 years and the mean value of their clinical nursing experience was 24 ± 4 years. Demographic data of the nurses from the chosen Clinics are presented in **Table 1**. The questionnaire was prepared by the authors and contained questions related to the participants' demographic data, clinical experience and practice in dealing with patients prior to and post rhinoplasty. The data were analyzed in order to detect any changes in the nursing process among different clinics. Finally, the results were analyzed and discussed by the group of specialists (the nurses and surgeons), the collaborative consensus and an algorithm was presented.

Statistical analysis

The statistical comparison between the respondents' answers was made using the chi-square test, while the age and length of clinical experience were compared with ANOVA variation analysis. The data on the frequency of monitoring in post-op period were analyzed with the Kruskal-Wallis test due to the disturbances in the normal distribution. The normality of the distribution was checked with the Kolomogorov-Smirnov test. The level of significance  $p < 0.05$  was accepted.

Results

The nurses from analyzed Departments differed significantly in many respects: age, clinical experience and education, however, the mean length of their clinical practice was more than 20 years ( $p < 0.05$ , **Table 1**).

**Table 1.** The studied group characteristics and statistical comparison between the departments

	Otolaryn- gology n=26	Cranio-Maxillo- facial Surgery n=25	Plastic Surgery n=15	p
Sex				
Female	100%	96%	100%	
Male	0%	4%	0%	
Age	46 ± 6	41 ± 9	44 ± 4	0.0430
Length of clinical experience	25 ± 6	20 ± 10	23 ± 4	0.0478
Education				0.0197
Secondary	80.8%	36%	46.7%	
Incomplete higher	3.8%	28%	20%	
Higher	15.4%	36%	33.3%	

Source: author's own research

Pre-operative nursing care practices were similar among the examined nurses in the following aspects: measuring basic life parameters, taking nursing history, informing the patient about the ward's topography, informing about fasting on operation day and about postoperative discomfort connected with the presence of the gauze packing in the nose. The differences were related to the type of nursing documentation and asking a patient about his/her anxiety connected with the procedure (**Table 2**).

**Table 2.** Pre-operation nursing care practices and statistical comparison between the departments

	Otolaryngology n=26	Cranio-Maxillofacial Surgery n=25	Plastic Surgery n=15	p
Nursing documentation include:				
Nursing individual history	100%	100%	100%	-
Body temperature charts	100%	100%	100%	-
Pain assessment and treatment card	42.3%	12%	100%	0.000
Intravenous catheters observation card	100%	60%	100%	0.000
On admission to the ward patient's blood pressure, heart rate and body temperature are measured by the nurse:				
No	7.7%	0%	0%	0.203
Rather yes	11.5%	4%	0%	
Definitely yes	80.8%	96%	100%	
On admission to the ward the nurse takes history about patient's diseases, medications and allergies:				
No	0%	0%	0%	0.205
Rather yes	7.7%	0%	0%	
Definitely yes	92.3%	100%	100%	
On admission to the ward the nurse acknowledges a patient with the ward's topography:				
No	0%	0%	0%	0.293
Rather yes	15.4%	12%	0%	
Definitely yes	84.6%	88%	100%	
On admission to the ward the nurse informs a patient that during the day, when operation is planned; he cannot eat and drink without MD's permission:				
No	3.8%	0%	0%	0.603
Rather yes	7.7%	4%	13.3%	
Definitely yes	88.5%	96%	86.7%	
Before operation the nurse informs a patient about postoperative discomfort connected with the presence of the gauze packing in the nose:				
No	3.8%	3%	13.3%	0.184
Rather yes	30.8%	3%	13.3%	
Definitely yes	65.4%	84%	73.3%	

Before operation the nurse asks a patient about his anxiety connected with the procedure:

No	7.7%	8%	0%	0.032
Rather yes	80.8%	52%	86.7%	
Definitely yes	11.5%	40%	13.3%	

Source: author's own research

Postoperative nursing care practices differed among the nurses from examined departments in many ways. The nurses practicing in the Plastic Surgery Clinic more frequently obtained information from MDs about the patient's general health condition after operation and filled in the observation chart. Additionally, more often than the nurses from Otolaryngology and the Cranio-Maxillofacial Surgery Clinic, they evaluated and reported patient's pain. The mean time intervals between patient's basic life parameters monitoring by a nurse in the postoperative period varied between the Wards ( $p = 0.0007$ ). The frequency of monitoring was the lowest in the Otolaryngology Clinic ( $45 \pm 34$  min), but the highest in the Plastic Surgery Clinic ( $16 \pm 4$  min). Moreover, nurses in the Plastic Surgery Clinic observed the patients' eyelids for possible oedema and hematoma and put cold dressings on the patients' eyelids to prevent or reduce these symptoms (**Table 3**).

**Table 3.** Postoperative nursing care practices and statistical comparison between the departments

	Otolaryngology n=26	Cranio-Maxillofacial Surgery n=25	Plastic Surgery n=15	p
Before transferring a patient from the operating theatre the nurse gains information from MDs about his/her general health condition:				
No	7.7%	0%	0%	0.000
Rather yes	61.5%	8%	0%	
Definitely yes	30.8%	92%	100%	
Just after transferring a patient to the ward, the nurse fills in the observation card:				
No	0%	12%	0%	0.005
Rather yes	34.6%	8%	0%	
Definitely yes	65.4%	80%	100%	
In the postoperative period patients' basic life parameters are monitored with the frequency [min. mean $\pm$ SD]				
	45 $\pm$ 34	27 $\pm$ 19	16 $\pm$ 4	0.001
In the postoperative period the nurse assesses and reports patient's pain:				
No	30.7%	44%	0%	0.035
Rather yes	26.9%	16%	6.7%	
Definitely yes	42.3%	40%	93.3%	

The external dressing placed under the nose is changed by the nurse with the frequency:

<20 min	3.8%	0%	6.7%	0.067
20-40 min	7.7%	12%	0%	
40-60 min	11.5%	0%	6.7%	
60-90 min	23.1%	4%	0%	
>90 min	53.8%	84%	86.7%	

In the postoperative period, the nurse observes patients' eyelids for edema and hematoma:

No	57.7%	16%	0%	0.000
I do not know	7.7%	4%	0%	
Rather yes	30.8%	40%	80%	
Definitely yes	3.8%	40%	20%	

In the postoperative period the nurse puts cold dressings on patients eyelids to prevent/reduce edema:

No	76.9%	60%	6.7%	0.000
I do not know	15.4%	4%	0%	
Rather yes	7.7%	8%	86.7%	
Definitely yes	0%	28%	6.7%	

Source: author's own research

The examined nurses were also asked about the most common complaints reported by the patients in the postoperative period. Regardless of the Ward, the first most common were breathing disturbances connected with the gauze packing in the nose. The second complaint was different in each Ward, namely oedema in oral mucosa was observed on the Plastic Surgery and Otolaryngology Ward and pain in the Cranio-Maxillofacial Surgery Clinic ( $p = 0.033$ ). As the third cause of postoperative discomfort the following symptoms were reported: pain (Otolaryngology), oedema in oral mucosa (Cranio-Maxillofacial Surgery) and sore throat (Plastic Surgery) ( $p = 0.011$ ).

Nursing care practices before the patients' discharge from hospital were similar on all Wards to the extent of informing patients on the necessity of self-care and educating them about self-care and the forms and materials used to provide it. It was also found that all nurses informed a patient about possible dangers and methods of protection of the operated area (**Table 4**).

**Table 4.** Nursing care practices before patients' discharge from the hospital and statistical comparison between the departments

	Otolaryngology n=26	Cranio-Maxillofacial Surgery n=25	Plastic Surgery n=15	p n=66
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In the nurses' opinion obtaining a satisfactory effect of rhinoplasty determines patients' psychological comfort and motivation to follow doctor's instructions:

No	11.5%	0%	0%	0.002
I do not know	7.7%	0%	0%	
Rather yes	50%	24%	6.7%	
Definitely yes	30.8%	76%	93.3%	

The nurse informs a patient that after discharge he/she will have to start self-care and educates him/her about it:

No	7.7%	8%	0%	0.125
I do not know	11.5%	0%	0%	
Rather yes	50%	40%	73.3%	
Definitely yes	30.8%	52%	26.7%	

The nurse uses the following forms/materials to educate a patient about the self-care after discharge:

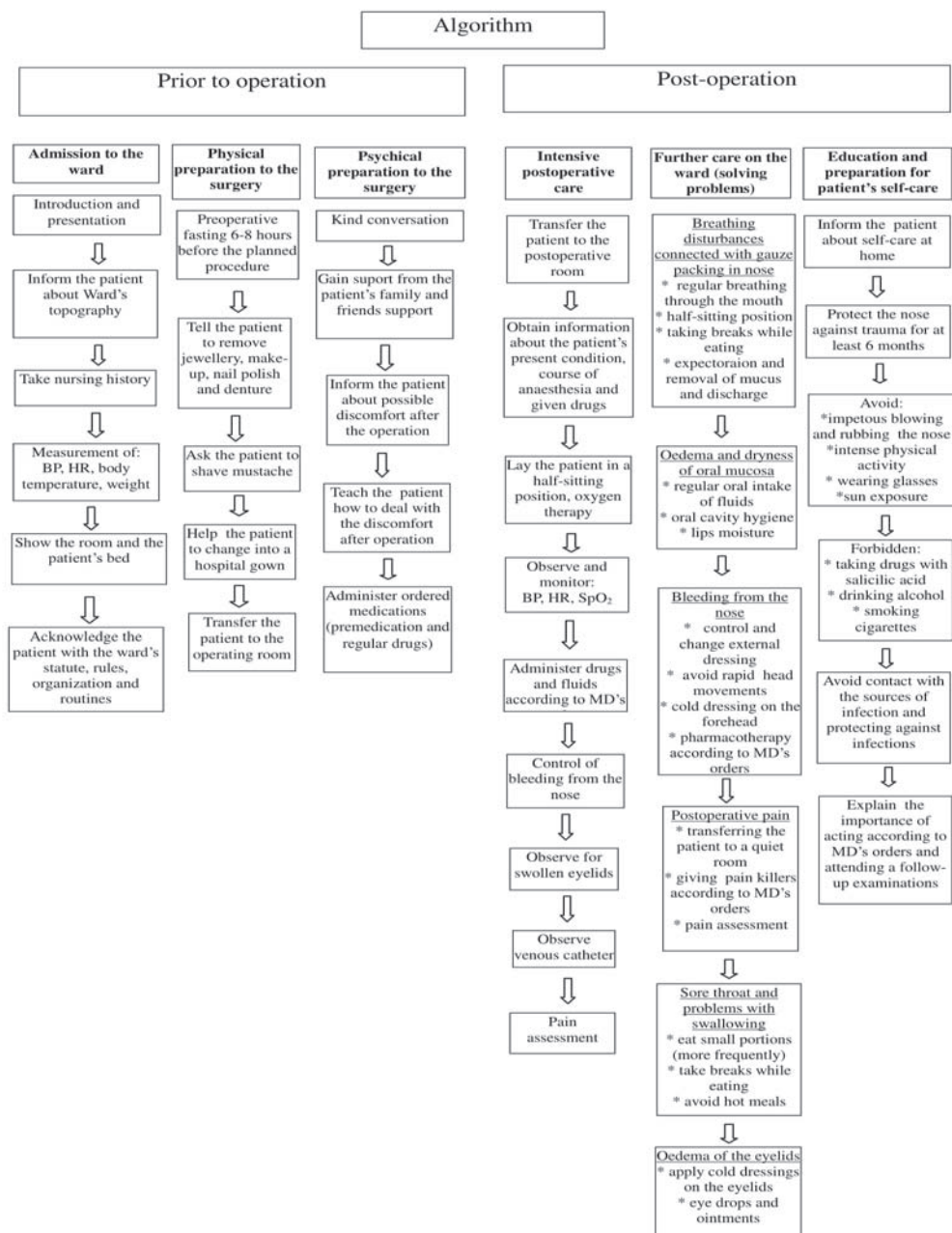
Individual conversation	69.2%	60%	66.7%	0.326
Specialist literature (articles, books)	0%	0%	6.7%	
Brochures, booklets	0%	8%	0%	
All mentioned above	30.8%	32%	26.7%	

Before discharge the nurse informs a patient about dangers and methods of protection of the operated area:

No	0%	0%	0%	0.025
Rather yes	61.5%	36%	20%	
Definitely yes	38.5%	64%	80%	

Source: author's own research

On the basis of the obtained data on the most common fields of nursing care practices in patients undergoing rhinoplasty and after discussing the issue with plastic surgery specialists, an algorithm of such care was created and presented (**Figure 1**).



**Figure 1.** The algorithm of nursing care for patients undergoing rhinoplasty

Source: author's own research

## Discussion

In this study, we examined nursing practices and the knowledge about nursing care in patients with post-traumatic nose deformity. On the basis of the collected data and the collaborative consensus, the algorithm for nursing care for such patients was developed. It included recommendations concerning: the preoperative care – admission and preparation prior to the surgery and the postoperative care, including intensive postoperative care, further postoperative care and discharge care categories. As Park and Park emphasized, each recommendation, concerning not only the treatment

but also nursing care, should be made on the basis of the evidence from randomly controlled experimental research or systematic clinical trials. However, the authors observed the lack of the research evidence concerning the pre- and postoperative nursing care in case of gastric cancer patients. They made their recommendations on the basis of the literature review and concluded that more clinical research was required before making further attempts to develop evidence-based nursing practice guidelines [9]. The same methodological problem was encountered in our research that aimed at preparing an algorithm for nursing care for a patient



prior to and post rhinoplasty. We have not found any recommendations for nursing care of such patients in literature. Nurses responsible for the care process from the patient's admission and preparation to the surgery, to discharge of a well-educated patient from the ward, face many problems and difficulties. One of them is the lack of guidelines or algorithms concerning care. This could help to maintain a basic standard of nursing care and may ensure that patients are given optimal and professional care. Moreover, Park and Park found in their study that pain management was recognized by the nurses as rather ineffective and inapplicable [9]. This could result from the fact that clinical nurses lacked the knowledge of pain assessment and possible interventions, do not recognize the importance of pain management, and/or do not have the skill of pain management [11, 12, 13]. The authors found that it was necessary to introduce strategies to improve knowledge about pain assessment and interventions before introducing their guidelines in clinical practice. Pain assessment and management is also an important part of our postoperative care algorithm.

The algorithm developed in the present study covers the most common aspects of nursing care in patients undergoing rhinoplasty prior to and after surgery. It may be useful and helpful to group the nursing practices systematically according to guidelines. As it was observed by some authors, such algorithms provide important information and can be used as teaching and training materials in nursing practice [9]. Currently, most of the diagnostic and treatment processes are based on specific guidelines and algorithms. However, extensive clinical practice guidelines for various nursing problems should be developed in the near future.

## Limitations

It is worth stressing that our algorithm has some limitations although it is based on nursing practices of the experienced nurses from three different wards in hospitals caring for the patients suffering from the same condition (posttraumatic nose deformity). The examined nurses represented only one Polish city, so the applicability of this algorithm may be limited, as in other centers different practices may be applied. It would be valuable if other hospitals presented their nursing practices for pre- and postoperative care for patients undergoing rhinoplasty. It would enable to share knowledge and experience, and create a universal algorithm for nursing care.

## Conclusion

In conclusion, in this study we presented a simple algorithm for nursing care in patients undergoing post-traumatic rhinoplasty, which can be helpful in clinical practice and can be used for education purposes. It

was developed by analyzing knowledge and practices of experienced nurses and recommendations of plastic surgeons. Sharing experience among nurses from different clinical settings may enable to develop universal guidelines for patients undergoing different surgical procedures in the future. Such guidelines should include surgeons' recommendations and result from cooperation between the nurses and the surgeons.

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# KNOWLEDGE REGARDING INFLUENZA AMONG NURSING STUDENTS

## WIEDZA STUDENTÓW PIELĘGNIARSTWA NA TEMAT GRYPY

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### ABSTRACT

**Introduction.** Influenza is one of the most common infectious diseases and, due to its high prevalence, it constitutes a real and present threat to human life and health globally.

**Aim.** Assessment of knowledge of influenza among the first- and second-year students of Nursing at the Faculty of Health Sciences, Warsaw Medical University.

**Material and Methods.** A total of 120 nursing students (115 female, 5 male) were enrolled in the study. The study group comprised 57 first-year and 63 second-year students. Mean age of the study group amounted to 25.72 years, and the most frequently reported job tenure was below one year.

**Results.** The largest number of respondents assessed their knowledge of influenza as good (4) or quite good (3.5). The mean score of self-assessment of knowledge about influenza was approximately 3.68. A prevailing number of the study participants had not been vaccinated against influenza in the epidemic season of 2015/2016. More than three-fourths of the study group had not been vaccinated against influenza over the last five years.

**Conclusions.** 1) The level of knowledge of influenza among the study group of nursing students is insufficient. 2) A vast majority of respondents are not vaccinated against influenza. 3) There is a need to dedicate more time to the issue of influenza in training of nursing students and promote vaccination against influenza.

**KEYWORDS:** Prevention of influenza, knowledge, students.

### STRESZCZENIE

**Wstęp.** Grypa jest jedną z najczęściej występujących chorób zakaźnych, a ze względu na jej powszechne występowanie stanowi aktualne i realne zagrożenie zdrowia i życia ludzi na całym świecie.

**Cel.** Ocena wiedzy studentów I i II roku studiów kierunku pielęgniarstwo Wydziału Nauki o Zdrowiu Warszawskiego Uniwersytetu Medycznego na temat grypy.

**Materiał i metody.** Badaniem objęto 120 studentów pielęgniarstwa (115 kobiet, 5 mężczyzn). Wśród badanej grupy znalazło się 57 studentów I roku studiów oraz 63 studentów II roku. Średnia wieku badanej grupy wyniosła 25,72 lat, a najczęściej deklarowany czas pracy zawodowej wynosił poniżej roku.

**Wyniki.** Najwięcej respondentów oceniło własną wiedzę na temat grypy jako dobrą (4) lub dość dobrą (3,5). Średnia samooceny wiedzy na temat grypy w badanej grupie wyniosła ok. 3,68. Przeważająca liczba ankietowanych nie zaszczepiła się przeciw grypie w ówczesnym sezonie epidemicznym 2015/2016. Ponad trzy czwarte badanej grupy nie szczepiło się wcale w ciągu ostatnich 5 lat.

**Wnioski.** 1) W badanej grupie wiedza studentów pielęgniarstwa na temat grypy jest niewystarczająca. 2) Przeważająca większość badanych studentów nie szczepi się przeciw grypie. 3) Występuje konieczność poszerzenia tematyki dotyczącej grypy w kształceniu studentów pielęgniarstwa oraz promowania szczepień przeciw grypie.

**SŁOWA KLUCZOWE:** profilaktyka grypy, wiedza, studenci.

### Introduction

Influenza is one of the most common infectious diseases and due to its high prevalence, it constitutes a real and presents threat to human life and health globally [1–4]. Influenza occurs with different intensity in two forms. Seasonal influenza occurs regularly as an epidemic, usually caused by typical influenza viruses affecting humans, whereas pandemic influenza spreads worldwide

in an unpredictable manner, once every several years or decades, caused by new and yet unknown subtypes or variants of influenza viruses [1–4].

With the current state of medical knowledge, it is impossible to successfully eradicate the disease due to the huge genetic variability of the influenza virus. However, there is a variety of therapeutic and preventive agents. Preventive vaccination is highly effective

tive against influenza and its complications, however, it is not commonly used. This is reflected by a very low influenza vaccination coverage rate in Poland, amounting to just a few percent (3.7%) [1]. Although influenza can cause serious complications and even lead to death, it is often underestimated and undiagnosed [1–4].

The practice of nursing helps develop health seeking behaviour in patients, provide them with necessary knowledge and enhance responsibility and awareness of their health and disease. This allows for implementing the prevention of influenza and reducing the risk of its complications.

Aim

The study aimed to assess the knowledge of influenza among first- and second-year students of Nursing at the Faculty of Health Sciences, Warsaw Medical University.

Material

The study enrolled a total of 120 nursing students (115 female, 5 male). The study group comprised 57 first-year and 63 second-year students. Mean age of the study group was 25.72 years (minimum age: 22 years, maximum age: 53 years). Persons aged 22–25 years were the most numerous among the respondents (79.2%). Most study participants were working and had one job. Over half of the respondents were employed in a hospital. An outpatient clinic was the second most frequent place of employment in the study group.

The most common job tenure among the respondents was below one year, followed by no work experience at all.

Methods

The study was performed between December 2015 and March 2016. A diagnostic survey was applied as a method of data collection, supported by an anonymous questionnaire. The questionnaire comprised 35 closed-ended single-choice questions. Participation in the study was voluntary.

The data were entered into a Microsoft Excel sheet and the statistical analysis was conducted using the STATISTICA 10.0 software (licensed to Warsaw Medical University).

Results

The largest number of respondents assessed their knowledge of influenza as good (4) or quite good (3.5). The mean score of self-assessment of knowledge was approximately 3.68. A prevailing number of the participants were not vaccinated against influenza in the epi-

demio season of 2015/2016. More than three-fourths of the study group have not been vaccinated at all over the last five years.

Most students did not know the correct answer to the question about the proportion of the global population that becomes infected with influenza viruses and influenza-like infections every year, according to the World Health Organisation (WHO). Most study participants provided a wrong answer to the question about the number of influenza cases in Poland in 2014. Most respondents did not know the correct answer to the question about the types of influenza viruses that are the most virulent human pathogens. One-in-five study participants knew the correct answer to the question about the type of influenza virus undergoing antigenic shift. Over half of the students did not know the modes of transmission of influenza. A majority of respondents did not know the correct answer to the question about effective drugs for influenza viruses A and B. A vast majority of study participants did not know the correct answer to the question about influenza virus strains that require mandatory hospitalisation even if only suspected. Slightly over half of the students participating in the study knew the most effective method for preventing influenza. Slightly more than one-third of the total had knowledge about the influenza vaccination coverage rate in Poland. See **Table 1** for detailed data.

Table 1. Selected questions concerning knowledge about influenza

Question	Answer choice	% of answers
Knowledge of the study group about the percentage of the global population suffering every year from influenza and flu-like infections according to the World Health Organization (WHO)	0.5/–1.5%	0%
	1.6/–5%	17.5%
	6/–25%	41.67%
	26/–40%	23.33%
	I don't know	17.5%
Knowledge of the study group about the number of deaths due to influenza, according to the World Health Organization (WHO)	200,000	30.83%
	300,000–500,000	37.5%
	500,000–1,000,000	12.5%
	1,000,000–2,000,000	3.33%
	I don't know	15.83%
Knowledge of the study group about the number of influenza cases diagnosed in Poland in 2014	+ / – 50,000	20.83
	+ / – 400,000	35%
	+ / – 1,500,000	18.33%
	+ / – 3,700,000	2.5%
	I don't know	23.33%
Knowledge of the study group about the types of influenza viruses that are the most virulent human pathogens	Influenza viruses A and B	36.67%
	Only Influenza virus A	8.33%
	Influenza virus A and influenza virus C	16.67%
	Influenza virus B and influenza virus C	5.83%
	I don't know	32.5%

Knowledge of the study group about animal species which are reservoirs for influenza virus A in nature	Only wild birds and pigs	22.5%
	Domestic poultry, pigs, horses, cows	16.67%
	Wild birds, domestic poultry, pigs, horses	35%
	I don't know	25.83%
Knowledge of the study group about the type of virus causing the influenza pandemics and annual epidemics of seasonal influenza	A	47.5%
	B	15.83%
	C	10.83%
	I don't know	25.83%
Knowledge of the study group about the type of influenza virus undergoing antigenic shift	A	20.83%
	B	20%
	C	8.33%
	I don't know	50.83%
Knowledge of the study group about the modes of transmission of influenza	Only airborne spread	33.33%
	Spread by blood and direct physical contact	2.5%
	Food-borne spread and airborne spread	15%
	Direct physical contact and airborne spread	45.83%
	I don't know	3.33%
Knowledge of the study group about the time of excretion of the influenza virus by the infected person	/Between several days before the onset of symptoms and three days after their resolution	25%
	Between several days before the onset of symptoms and approximately seven days after their resolution	34.17%
	Between the onset of symptoms and 14 days after their resolution	14.17%
	Only during the presence of symptoms	8.33%
	I don't know	18.33%
Knowledge of the study group about the symptom not present in typical clinical picture of influenza	Fever >38°C	24.17%
	Rhinitis	40.83%
	Headache	15.83%
	Muscle pain	12.5%
	I don't know	6.67%
Knowledge of the study group about the most accurate method used in the diagnosis of influenza infections	Immunofluorescence assay	18.33%
	RT-PCR assay	10%
	Culture	8.33%
	Rapid antigen test	31.67%
	I don't know	31.67%
Knowledge of the study group about the effective drugs for influenza viruses A and B.	Amantadine and zanamivir	17.5%
	Zanamivir and oseltamivir	23.33%
	Rimantadine and oseltamivir	15.83%
	I don't know	43.33%
Knowledge of the study group about influenza virus strains that require mandatory hospitalisation, even if only suspected	influenza viruses H2 and H1	25%
	influenza viruses H1 and H3	22.5%
	influenza viruses H5 and H7	9.17%
	Hospitalisation is not mandatory for any strain of influenza virus	10%
	I don't know	33.33%

Knowledge of the study group about the most effective method for preventing influenza	Patient isolation	21.67%
	Preventive vaccination against influenza	52.5%
	Frequent hand washing	14.17%
	Use of protective mask and disposable gloves	7.5%
Knowledge of the study group about the influenza vaccination coverage rate in Poland	I don't know	4.17%
	0.8%	17.5%
	3.7%	35.83%
	6.5%	13.33%
Wiedza badanej grupy na temat, czy szczepienie przeciw grypie może wywołać grypę u zaszczepionej osoby/Knowledge of the study group about whether influenza vaccine can cause influenza in vaccinated individuals	9.2%	5%
	I don't know	28.33%
	Yes	60.83%
	No	25%
Wiedza badanej grupy na temat szczepionek przeciw grypie dostępnych w Polsce w sezonie 2015/2016 / Knowledge of the study group about influenza vaccines available in Poland in the season 2015/2016	I don't know	14.17%
	Fluarix, Influvac	10%
	Vaxigrip, Influvax	46.67%
	Influvax, Agrippal, Inflflexal V	6.67%
Knowledge of the study group about the most common adverse events following immunization against influenza	Begrivac, Agrippal, Optaflu	0%
	I don't know	36.67%
	1–2 days of elevated body temperature, muscle pain, abdominal pain, rhinitis	16.67%
	Up to two days of localised redness, tenderness and swelling at the site of vaccination, elevated body temperature	41.67%
Knowledge of the study group about a medical condition not being a severe post-vaccination reaction associated with hypersensitivity to egg protein in the vaccine	Up to five days of localised redness, muscle and joint pain, itching, high fever	23.33%
	I don't know	18.33%
	Quincke's oedema	16.67%
	Allergic asthma flare-up	4.17%
Knowledge of the study group about the effective drugs for influenza viruses A and B.	Anaphylactic shock	24.17%
	Lymphadenitis	21.67%
	I don't know	33.33%

Source: author's own research

## Discussion

Influenza is an infectious and common disease that continues to be a matter of concern and a threat to human health and life. Students of nursing, both working and not working in their profession, are at risk of influenza. During classes they might come into contact with, among others, other students, healthcare professionals, and patients infected with influenza. In addition, not only are nursing students at risk of influenza, but they also may become a source of infection and thus



contribute to the spread of influenza epidemics. Therefore, students' knowledge of influenza may contribute to their own safety as well as to the safety of persons in their care, all persons in their environment, and, consequently, the entire community. This requires students of nursing in particular to have and promote the necessary knowledge about this serious disease as well as to take a responsible attitude towards human health and life through undertaking and promoting preventive actions.

Preventive vaccination is the most effective method of preventing influenza. However, the present results demonstrated that a prevailing number of nursing students were not vaccinated against influenza in the epidemic season of 2015/2016 when the present study was performed. In addition, more than three-fourths of the study group have not been vaccinated against influenza over the last five years. The estimated percentage of individuals vaccinated among medical staff in Poland is low, comparably to the one obtained in the present study, and amounts to 5–6%. It is slightly higher than the vaccination rate of the general population (3.7%) [2].

According to the data found in literature, it is possible to increase the vaccination coverage rate. For instance, the influenza vaccination rate among healthcare workers in the US varies between 20% and 80% [3].

The present results are similar to the findings obtained in 2009 which showed that among a group of 524 people only one-in-ten nurses and students of medicine and one-in-five doctors declared being regularly vaccinated against influenza. Based on the above data it may be concluded that a small percentage of medical personnel and students of medicine are regularly vaccinated against influenza [4].

Different results were obtained in a study of 2013. Over half of the study group comprising 888 healthcare workers said that they had been vaccinated against influenza in the epidemic season in question and over one-third reported being vaccinated against influenza on a regular basis over the last five years [5].

The present study group comprising 120 students of nursing was asked to evaluate their knowledge of influenza. It was found that the largest proportion of students assessed their knowledge as good (4) or quite good (3.5). However, the present results demonstrated that the level of knowledge of the second-year students of nursing about influenza was low. Nearly three-quarters of the questions about influenza were difficult for the students who failed to provide the correct answer.

Similar results were obtained in a study of 2014 conducted within the National Test of Knowledge about Influenza [6]. A total of 495 respondents from Poland participated in the part intended for doctors and healthcare workers, with doctors comprising 83% of all par-

ticipants and nurses, students of medicine and other medical professionals comprising the remaining 17% of participants. The results demonstrated that correct answers represented approximately 25% of all answers provided to each question [6].

It was found that the students participating in the present study did not have sufficient knowledge of the epidemiology of influenza. Most respondents did not know the proportion of the global population that becomes infected with influenza viruses and suffer from influenza-like infections every year according to the World Health Organisation, the annual number of deaths attributable to influenza according to the World Health Organisation, and the number of cases of influenza diagnosed in Poland in 2014. A vast majority of the study participants provided answers considerably underestimating the real incidence which may be indicative of the lack of interest in the scale of influenza infections and underestimation of the importance of influenza in Poland and globally.

The study showed that most students were disturbingly unfamiliar with the types of influenza viruses that are the most virulent human pathogens, animal species which are reservoirs for A virus influenza in nature, and the type of virus causing the influenza pandemics and annual epidemics of seasonal influenza [8].

Furthermore, a vast majority of the study group did not know the type of influenza virus undergoing antigenic shift. It was a vital question since the process of antigenic shift occurs only in influenza A viruses and may lead to an outbreak of dangerous epidemics or pandemics of influenza. In addition, type A influenza is most virulent and causes the most severe epidemics covering the largest areas [7, 8].

The study also demonstrated that most participants provided incorrect answers to the questions concerning modes of transmission of influenza viruses, the time of excretion of the influenza virus by the infected person, and symptoms of influenza. Without the proper knowledge in this regard, effective diagnosis of infection, isolation of patients, and prevention of further spread of infection will be impossible. Only 8.9% of the respondents taking part in the National Test of Knowledge about Influenza responded correctly to the question about the modes of transmission of influenza. It was also found that specialist knowledge about the types of influenza viruses was not common among the study population [6].

Although influenza may cause serious life- and health-threatening complications, the present study showed that nursing students did not have sufficient knowledge in that regard. Students responded correctly only to half of the questions. This may pose a threat to



the safety of patients infected with influenza and may also result in increased mortality due to influenza. The results of the National Test of Knowledge about Influenza also showed that only one-in-ten respondents gave the correct answer to the question about complications of influenza [6].

The present study revealed that the students did not have sufficient knowledge of diagnostics and treatment of influenza, which may, consequently, affect the diagnosis and course of treatment. A study carried out on the basis of the National Test of Knowledge about Influenza demonstrated that most respondents were familiar with antiviral drugs in treatment of influenza. However, only one in ten persons answered correctly to the question about the diagnostic work-up of influenza [6].

Although the vaccination coverage rate declared by the present study participants was low, both in the epidemic season in question and over the last five years, more than half of the students indicated influenza vaccination as the most efficient prophylaxis. The students did not know, however, the exact influenza vaccination coverage rate in Poland.

The respondents provided incorrect answers to more than half of the questions concerning influenza vaccination. Lack of knowledge and low awareness of the students in this regard might represent one of the reasons for low vaccination rate among the study sample population. Most participants responded positively to the question whether an influenza vaccine may cause influenza in a vaccinated person. This may testify to the concerns of students associated with possible complications of vaccination and lack of awareness of students about the safety of influenza vaccines available in Poland. Unfamiliarity with the indications for influenza vaccination makes it impossible for students to effectively promote prevention of influenza and prevent the spread of the disease. It should be noted that the students participating in the study were more familiar with the contraindications for vaccination, since most of them responded correctly to both questions concerning this issue. This indicates that there was a gap between the knowledge of indications and the one concerning contraindications.

In the National Test of Knowledge about Influenza it was also noticed that respondents' knowledge about contraindications for vaccination was significantly better (correct answers constituted 85.5%) than that of other aspects relating to the problem of influenza. Less than half of the study participants had knowledge concerning the indications for influenza vaccination listed in the Preventive Vaccination Plan for 2014. It was observed that asymmetry of knowledge of the respondents may be indicative of poor knowledge of the

risk associated with the disease and excessive concern about vaccination [6].

Although most students participating in the present study knew the possible routes of administration of the vaccine, most of them did not know the vaccines available in Poland in the epidemic season of 2015/2016. A majority of the participants did not have knowledge concerning the most common adverse reactions and serious complications following influenza vaccination.

Due to the insufficient level of knowledge of the study participants, students may be incapable of providing efficient education concerning the disease, health and life safety of patients, co-workers and other persons in their environment.

In summary, there is a need to expand the issue of influenza in the education of nursing students. It is of vital importance to promote vaccination against influenza among this group as the most effective method for the prevention of influenza. The need to educate healthcare workers with respect to influenza and its prevention has also been noticed in numerous studies performed by other Polish researchers [4, 5, 6].

## Conclusions

1. The level of knowledge of influenza among the study group of nursing students was insufficient.
2. A vast majority of respondents have not been vaccinated against influenza.
3. There is a need to dedicate more time to the issue of influenza in training of nursing students and promote vaccination against influenza.

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# SELF-ESTEEM IN STUDENTS' EVERYDAY LIFE, DEPENDING ON THE NUTRITIONAL STATUS AND MOTIVES FOR PHYSICAL ACTIVITY

## SAMOOCENA STUDENTÓW DOTYCZĄCA FUNKCJONOWANIA W ŻYCIU CODZIENNYM W ZALEŻNOŚCI OD STANU ODŻYWIENIA I MOTYWACJI DO PODEJMOWANIA AKTYWNOŚCI FIZYCZNEJ

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### ABSTRACT

**Introduction.** Balanced nutrition and physical activity are key determinants of human health at any age.

**Aim.** The aim of the study was to analyse the relationship between self-esteem in everyday life, nutritional status and motives for physical activity among students of fields related and unrelated to health care.

**Material and Methods.** The study was conducted among 400 students of the State Higher Vocational School in Tarnow (200 students of fields related to health care and 200 students of other fields). The Motives for Physical Activity Measure – Revised (MPAM-R) and the Rosenberg Self-Esteem Scale (SES) were applied. Measurements of body weight and height were carried out to calculate the Body Mass Index (BMI). Basic descriptive statistics, Mann-Whitney U test, Kruskal-Wallis test, chi-squared test and Spearman's correlation index were used to describe the results. Differences were considered significant when  $p < 0.05$ .

**Results.** 67 students (16.75%) were overweight, 19 (4.75%) were underweight and 8 (2.00%) were obese. There were no statistically significant differences between the field of study and the nutritional status of students ( $p > 0.05$ ). Students of health care-related fields gave higher ratings for their physical fitness ( $p < 0.05$ ). The average rate of motivation for engaging in physical activity among the studied group was 144.6 ( $\pm 37.0$  points). Students gave the highest ratings for the domain of "fitness", followed by "appearance", "enjoyment", "competence", and the lowest ratings for "social factors". Higher scores in terms of MPAM-R were obtained by students of health care-related fields ( $p < 0.001$ ). Students of fields related and unrelated to health care did not differ in the level of self-esteem ( $p > 0.05$ ). The BMI did not significantly affect the motivation of students for engaging in physical activity or the level of their self-esteem ( $p > 0.05$ ). The study showed a significant positive correlation between the MPAM-R and SES scores ( $p < 0.05$ ).

**Conclusion.** Factors such as the nutritional status and the field of study do not affect the level of student's self-esteem. Higher levels of self-esteem were associated with greater motivation for engaging in physical activity. Greater motivation for engaging in physical activity was demonstrated by the students of health care-related fields.

**KEYWORDS:** students, nutritional status, physical activity, MPAM-R.

### STRESZCZENIE

**Wstęp.** Racjonalne odżywianie się oraz aktywność fizyczna są podstawowymi czynnikami warunkującymi zdrowie człowieka w każdym wieku.

**Cel.** Celem pracy była analiza zależności pomiędzy samooceną funkcjonowania w życiu codziennym a stanem odżywienia i motywacją do podejmowania aktywności fizycznej wśród studentów kierunków związanych i niezwiązanych z ochroną zdrowia.

**Materiał i metody.** Badania przeprowadzono wśród 400 studentów PWSZ w Tarnowie (200 studentów kierunków związanych z ochroną zdrowia i 200 osób z pozostałych kierunków). Posłużono się skalą oceny motywacji do aktywności ruchowej (ang. The Motives for Physical Activity Measure – Revised, MPAM-R) oraz skalą samooceny Rosenberga (ang. Rosenberg Self-Esteem Scale, SES). Przeprowadzono pomiary masy i wysokości ciała, na podstawie których obliczono wskaźnik BMI (ang. Body Mass Index, BMI). Do opisu wyników wykorzystano podstawowe statystyki opisowe, test U Manna-Whitneya, Kruskala Wallisa,  $\chi^2$ , oraz współczynnik korelacji rang Spearmana. Różnice uznawano za istotne, gdy  $p < 0,05$ .

**Wyniki.** U 67 studentów (16,75%) stwierdzono nadwagę, u 19 (4,75%) niedowagę, a u 8 (2,00%) otyłość. Nie zaobserwowano istotnych statystycznie różnic pomiędzy stanem odżywienia a kierunkiem studiów badanych ( $p > 0,05$ ). Studenci kierunków związanych z ochroną zdrowia istotnie lepiej oceniali własną sprawność fizyczną ( $p < 0,05$ ). Średni wskaźnik motywacji do aktywności fizycznej w badanej grupie wyniósł 144,6 ( $\pm 37,0$  pkt.). Najwyżej studenci ocenili domenę „zdrowie”, w dalszej kolejności „wygląd”, „zabawę”, „wyzwanie”, najslabiej – „interakcje z ludźmi”. Wyższe wyniki w skali MPAM-R uzyskali studenci kierunków związanych z ochroną zdrowia ( $p < 0,001$ ). Studenci obu typów kierunków nie różnili się poziomem samooceny ( $p > 0,05$ ). BMI nie wpływało istotnie na motywację studentów do podejmowania aktywności ruchowej ani na poziom samooceny badanych ( $p > 0,05$ ). Wykazano istotną dodatnią korelację pomiędzy punktacją skali MPAM-R a wynikiem skali SES ( $p < 0,05$ ).

**Wnioski.** Stan odżywienia i kierunek studiów nie wpływał na poziom samooceny studentów. Wyższy poziom samooceny wiązał się z większą motywacją do podejmowania aktywności ruchowej. Większą motywację do aktywności ruchowej prezentowali studenci kierunków związanych z ochroną zdrowia.

**SŁOWA KLUCZOWE:** studenci, stan odżywienia, aktywność ruchowa, MPAM-R.

## Introduction

Lifestyle is believed to be the foundation of life, as it contains all the positive components affecting our health behaviours. These include, among others, balanced nutrition, physical activity, strengthening the organism, taking care of body clearance and maintaining adequate sleep [1, 2]. Determinants of health, as well as genetic factors may directly or indirectly cause illness, injury or death. Indirect determinants that affect the state of human health include social, environmental and economic conditions, while direct determinants include diet, the quality of consumed food and water, smoking and drinking alcohol [3].

Balanced nutrition is in line with the recommendations of food science as well as genetic, social and cultural predispositions. In other words, balanced nutrition satisfies all the needs of humans, which include biological, psychological and physical needs that enable proper mental and physical development, and also protect the body from illnesses [4].

It is a widely held view that the concept of healthy lifestyle cannot be separated from balanced nutrition and physical activity, as they go hand-in-hand in one direction – guaranteeing good health. Furthermore, in 2016 physical activity were added by the Food and Nutrition Institute to the Food Guide Pyramid, which from that time has been called the New Food Guide and Physical Activity Pyramid [4, 5].

Physical activity is any action related to physical effort and movement (the work of muscles), during which the heart rate and breath accelerate and a feeling of warmth (and often sweating) appears [4]. Even moderate physical exercise has a positive impact on human health, and it is not likely to cause injury and exhaustion, as opposed to the high-intensity physical exercise. According to the European Society of Cardiology, the best solution is physical exercise of moderate intensity and endurance exercise undertaken for 30–45 minutes 4–5 times a week [6].

*According to the literature on the subject, there are two approaches to the relationship between self-esteem and pro-health behaviours: motivation and behaviours related to “personal development”. The first approach describes a person with high self-esteem who undertakes health behaviours, which in turn increase the person’s own value. The second approach describes a positive impact associated with successes and improvement of skills, which build up self-esteem [7]. A sense of health occurs when one can observe synchronization between physical and mental spheres as well as the surrounding environment. The subjective dimension of health is represented by all active and conscious activities undertaken by a person to achieve health [8, 9].*

The aim of the study was to evaluate the relationship between self-esteem in everyday life, the nutritional status and levels of physical activity in students of fields related and unrelated to health care of the State Higher Vocational School in Tarnow.

## Material and Methods

The study was conducted among 400 students of the State Higher Vocational School in Tarnow (200 students of fields related to health care and 200 students of other fields). The Motives for Physical Activity Measure – Revised (MPAM-R) and the Rosenberg Self-Esteem Scale (SES) were applied.

Anthropometric measurements were used in order to determine the nutritional status of students. Body height was measured from the ground surface (basis) to the highest point of the skull (vertex) using a graduated anthropometer with an accuracy of 0.01 m. During the measurement, the subjects stood upright with their feet together and eyes facing forward. Body weight was measured on the Tanita scale with an accuracy of 0.1 kg.

The obtained results were used to calculate the Body Mass Index (BMI). The measurements were taken in a well-lit, warm room. The sequence of measurements was fixed. The same equipment, operated by the same person, was used to take all measurements. Students were wearing only underwear, without shoes. The interpretation of the nutritional status based on BMI was made in accordance with recommendations of the World Health Organization (WHO) [10].

The MPAM-R scale consists of respondent’s particulars, self-assessment of physical fitness and 30 questions defining motives for physical activity, sorted into five major domains: fitness, enjoyment, appearance, competence and social factors. The respondents assess the extent to which they agree with the stated motives for physical activity based on the seven-point Likert scale (entirely disagree, mostly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, mostly agree, entirely agree). The more points scored, the greater the motivation for engaging in physical activity is. The study used the Polish version of the scale, the authors of which are: Jana Vašíčková, Hana Hřebíčková (Czech Republic) and Dorota Groffik (Poland) [11].

The self-esteem scale contains 10 diagnostic statements which relate to personal beliefs of the respondents. The respondent, based on the four-point Likert scale (entirely disagree, mostly disagree, mostly agree, entirely agree), points to one answer, which gives a detailed view on the extent to which the respondent agrees with the statement. The scale presents two types of sentences that depict the body in a positive or negative way. The overall rate of self-esteem is calculated by adding up points (from 1 to 4 points for one question),

which are subject to interpretation (32–40 points – high self-esteem, 28–31 points – average self-esteem; 10–27 points – low self-esteem) [12].

Basic descriptive statistics, the Mann-Whitney U test, the Kruskal-Wallis test, the chi-squared test and the Spearman's correlation index were used to describe the results. Differences were considered significant when  $p < 0.05$ . The study was conducted in accordance with the ethical principles and good research practice resulting from the Helsinki Declaration.

## Results

### Characteristics of participants

The study included 67 representatives (16.75%) of fields such as: physiotherapy, physical education, economics and Polish philology. In addition, 66 students (16.50%) of nursing and computer science were examined. The vast majority, i.e. 260 respondents (65.00%) were female.

### Nutritional status and field of study

The average weight of students was 66.12 kg (SD = 12.68) and ranged from 40 to 115 kg. Students of fields related and unrelated to health care differed in body weight: students of fields unrelated to health care weighed more. The average height was 1.71 m (SD = 0.08). It was demonstrated that students of fields unrelated to health care were characterized by higher height. 67 students (16.75%) were overweight, 19 (4.75%) were underweight and 8 (2.00%) were obese. There were no statistically significant differences between the field of study and the nutritional status of students ( $p > 0.05$ ) (Table 1).

**Table 1.** Nutritional status of students of fields related and unrelated to health care

Field	Body weight [kg]								p *
	n	X	SD	Me.	Min.	Max.	Q1	Q3	
Related to health care	200	64,33	12,98	60	40	115	55	70	p=0,001
Unrelated to health care	200	67,92	12,15	66	48	102	59	75,25	
In total	400	66,12	12,68	63	40	115	56	73,25	
Body height [m]									p *
Related to health care	200	1,7	0,09	1,68	1,5	1,94	1,65	1,74	p=0,013
Unrelated to health care	200	1,72	0,07	1,7	1,54	1,98	1,66	1,78	
In total	400	1,71	0,08	1,69	1,5	1,98	1,65	1,75	
BMI	Fields related to health care			Fields unrelated to health care			In total		p **
	n	%		n	%		n	%	

Underweight (BMI < 18,5)	13	6,50%	6	3,00%	19	4,75%
Normal range (BMI 18,5-24,99)	156	78,00%	150	75,00%	306	76,50%
Overweight (BMI 25-29,99)	26	13,00%	41	20,50%	67	16,75%
Obese (BMI > 30)	5	2,50%	3	1,50%	8	2,00%

p=0,088

n – sample size; X – arithmetic average; SD – standard deviation; Me. – median; Min. – minimum; Max. – maksimum; Q1 – the first quartile; Q3 – the third quartile; p – significance level; \* Mann-Whitney U test; \*\* Chi-squared test

Source: author's own analysis

### Level of self-esteem and field of study

The average score on the Rosenberg scale was 29.58 points (SD = 4.8) and ranged from 10 to 40 points. Students of fields related and unrelated to health care did not differ in the level of self-esteem ( $p > 0.05$ ). In total, 242 students (60.50%) had average self-esteem, 147 (36.75%) had high self-esteem, and 11 respondents (2.75%) – low self-esteem.

### Self-assessment of physical activity and field of study

The vast majority of students of both types of fields identified their physical fitness as above average. Students of health care-related fields gave higher ratings for their physical fitness ( $p < 0.05$ ) (Table 2).

**Table 2.** Self-assessment of the physical fitness level among students of fields related and unrelated to health care

Determine your level of physical fitness in comparison with other students	Fields related to health care		Fields unrelated to health care		In total		Chi-squared test
	n	%	n	%	n	%	
Above average	134	67,00%	109	54,50%	243	60,75%	p=0,014
Below average	66	33,00%	91	45,50%	157	39,25%	

n – sample size

Source: author's own analysis

### Motivation for engaging in physical activity and field of study

The average rate of motivation for engaging in physical activity among the studied group was 144.6 ( $\pm 37.0$  points). Students gave the highest ratings for the domain of “fitness”, followed by “appearance”, “enjoyment”, “competence”, and the lowest ratings for “social factors”. Higher scores in terms of MPAM-R were obtained by students of health care-related fields ( $p < 0.001$ ) (Table 3).



**Table 3.** Descriptive statistics of the results of the MPAM-R questionnaire among students of fields related and unrelated to health care

MPAM-R	X	Result	SD	Me.	Min.	Max.	Q1	Q3	p*
Total result (number of items: 30)									
In total	144,59	4,82	37,03	146	30	210	119	176	
Fields related to health care	158,97	5,30	31,22	163,5	77	210	136,5	182,25	p<0,001
Fields unrelated to health care	130,21	4,34	36,87	131	30	207	108,5	155,25	
Fitness (number of items: 5)									
In total	25,55	5,11	6,83	26,5	5	35	21	31	
Fields related to health care	27,84	5,57	5,85	29	12	35	24	32	p<0,001
Fields unrelated to health care	23,26	4,65	6,99	23	5	35	19	29	
Enjoyment (number of items: 7)									
In total	33,67	4,81	9,43	34	7	49	27	42	
Fields related to health care	37,23	5,32	8,37	39	7	49	31	44	p<0,001
Fields unrelated to health care	30,12	4,30	9,09	30	7	49	24	36	
Appearance (number of items: 6)									
In total	30,39	5,07	8,06	31	6	42	25	37,25	
Fields related to health care	33,49	5,58	6,67	35	14	42	29	39	p<0,001
Fields unrelated to health care	27,3	4,55	8,16	28	6	42	22,75	33	
Competence (number of items: 7)									
In total	33,34	4,76	9,66	33	7	49	27	41	
Fields related to health care	36,76	5,25	8,68	38	13	49	30	44	p<0,001
Fields unrelated to health care	29,93	4,28	9,4	30	7	49	23,75	36	
Social factors (number of items: 6)									
In total	21,63	3,61	7,47	22	5	35	17	27	
Fields related to health care	23,65	3,94	6,9	23	5	35	19	29	p<0,001
Fields unrelated to health care	19,61	3,27	7,48	20	5	35	15	25	

n – sample size; X – arithmetic average; SD – standard deviation; Me. – median; Min. – minimum; Max. – maksimum; Q1 – the first quartile; Q3 – the third quartile; p – significance level; \* Mann-Whitney U test

Source: author's own analysis

### Nutritional status, self-esteem and motivation for engaging in physical activity

The BMI did not significantly affect the motivation of students for engaging in physical activity ( $p > 0.05$ ) or the level of their self-esteem ( $p > 0.05$ ).

### Motivation for engaging in physical activity and self-esteem

The study showed a significant correlation between motivation for engaging in physical activity (at each subscale of the MPAM-R) and self-esteem of the respondents ( $p < 0.05$ ). These relationships are positive, i.e. the higher the score on the MPAM-R scale, the more points obtained in the SES questionnaire (Table 4).

**Table 4.** Motivation for engaging in physical activity and self-esteem among students of fields related and unrelated to health care

MPAM-R	Correlation coefficient	Correlation with SES		
		p	Direction of the relationship	Strength of the relationship
Total result	0,314	<0,001	positive	average
Fitness	0,299	<0,001	positive	weak
Enjoyment	0,307	<0,001	positive	average
Appearance	0,211	<0,001	positive	weak
Competence	0,294	<0,001	positive	weak
Social Factors	0,288	<0,001	positive	weak

p – significance level

Source: author's own analysis

### Discussion

Physical activity has been the subject of many studies. Epidemiological studies clearly demonstrate that the absence or low levels of physical activity increase the risk of coronary heart disease and cancer, and above all, obesity and the metabolic syndrome. Conversely, regular and moderate physical activity has many health benefits; it has a positive effect on the respiratory and circulatory systems, it also significantly reduces the number of diseases associated with the lack of physical activity. Changes in the approach to physical activity are evident, particularly in young people. More and more people from the media or culture promote physical activity. In the era of consumer electronics and the Internet, an increasing number of free applications, which measure physical activity during the day, can be observed [4, 5, 13].

Despite the emerging positive trends, the surveys of the Central Statistical Office show that the majority of adult Poles do not get enough exercise on a daily basis [14]. It is worth paying attention to a certain relationship – physical activity in children and adolescents is inversely proportional to their age. The recommended level of physical activity (at least an hour a day for 5–7 days a week) is achieved by 45% of boys at the age of 11 and 17% of boys at the age of 18. This relationship is similar in the case of girls – the percentage of active girls at the age of 11 is 39%, and 11% at the age of 18 [4]. Planned and targeted participation in physical education classes amounts to only 70% of all school children.

More than 80% of children have no positive patterns of physical activity in their families and use unjustified exemptions from physical education classes [15].

From the literature it is known that only 29.40% of girls and 41.20% of boys aged 11–15 in Poland maintain the recommended level of physical activity [16]. The case among adults is as follows: up to 57% of students from six universities in Poland claim to not engage in regular physical activity, 25% of respondents exercise twice a week, and only 12.40% of respondents exercise every day [17]. Another study, which used a shortened, Polish version of the International Physical Activity Questionnaire (IPAQ), shows that up to 58% of high school students assess their physical fitness as high, 23% as sufficient, and 19% as insufficient [18]. Yet another study considered the Moderate to Vigorous Physical Activity (MVPA), which represents the number of days a week in which we undertake a 60-minute form of physical activity. Based on these studies, it was found that 18.30% of respondents met the MVPA = 7 days. Low physical fitness was presented by 59.40% of the examined school children, and average physical activity (MVPA = 5–6 days) by 22.30% [19].

The results of this study indicate that a total of 60.75% of students claim that their physical fitness is above average and 39.25% of respondents believe that it is below the average. A slightly better fitness level was obtained by students of fields related to health care (67% rated their fitness as above average). The results of this study also suggest that much higher motivation for engaging in physical activity is presented by students of fields related to health care. The studies of Sochocka and Wojtyłko show that the field of study determines the regularity of physical activity. Students of physiotherapy, political science and computer science performed better than students of journalism, obstetrics and social communication, who were characterized by the lack of engaging in physical activity [17].

When analysing the results of this study it can be concluded that the respondents (of both types of fields) associated the highest motivation for engaging in physical activity with health, followed by appearance, enjoyment, competence and social factors. The studies of Vašíčková, Hřebíčková and Groffik show that, regardless of gender, health was the main motive for physical activity among young people, and the second motive was enjoyment. The subsequent motives include: appearance, competence and social factors [11]. For comparison, the study conducted among school children showed that the highest motive for engaging in physical activity among respondents aged 7–12 was enjoyment. As many as 82% of school children gave the highest ratings for statements such as: “Because it’s fun” and

“Because I like to do this activity”. The motive “appearance” came in last. Differences in responses between adults and children may be due to the age difference [19]. According to the researchers from Opole, more than half (51.10%) of the Polish students claim that taking care of mental and physical well-being is a priority when engaging in physical activity, and slightly more than 40% of the respondents take care of health and fitness through participation in sports. Appearance was the least important factor (loss of excess weight – 28.2%, maintaining a constant body weight – 18.1%, improving body shape – 15.1%) [17].

Starting a new job or studies (and often both activities at the same time) is often associated with less time for a healthy lifestyle – quickly and irregularly eaten meals, often more caloric and the lack of time for physical activity. This manifests itself in the nutritional status. Maniecka-Bryła and Bryła examined selected elements of health among students of the Medical University of Lodz. After calculating the BMI, it was found that as many as 30.2% of respondents were underweight, 56.1% were of normal weight, 10.2% were overweight and 1.1% – obese [20]. However, in this study the nutritional status of students of fields related to health care was as follows: 6.50% of respondents were underweight, 78% were of normal weight, 13% were overweight and 2.50% – obese. One can clearly see a high percentage difference in the case of underweight respondents. The results of studies conducted among high school students are similar to those obtained in this study – 5% of high school students were underweight, 84% were of normal weight, and 10% were overweight or obese [18].

The following study confirmed that the higher the students’ self-esteem is, the more eager they are to engage in physical activity. Sankowski emphasizes that people who are active in sports have higher self-esteem compared to people who do not undertake any form of physical activity. Conversely, low self-esteem causes a lower level of expectations regarding the outcome of further activities. This involves a considerably higher focus on failures rather than successes. A person anticipates bad performance and the fear of failure causes even lower self-esteem. Physical activity has an indirect effect on the general self-esteem, and direct, thus more significant, on its components, such as “attractiveness”, “physical strength” and so on [21].

## Conclusion

1. Nutritional status and the field of study do not affect the level of self-esteem.
2. Greater motivation for engaging in physical activity was presented by students of fields related to health care.

3. Higher level of self-esteem was associated with greater motivation for engaging in physical activity.
4. Well-being, which is the result of engaging in physical activity, may be an important strategy in health promotion programs, which pursue the goal of raising the overall mental and physical well-being of the society.

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# MODERN KNOWLEDGE ABOUT INFLUENZA – A REVIEW OF NATIONAL AND WORLD LITERATURE

## WSPÓŁCZESNA WIEDZA NA TEMAT GRYPY – PRZEGLĄD KRAJOWEGO I ŚWIATOWEGO PIŚMIENICTWA

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### ABSTRACT

Influenza, as a contagious and common disease, is a continuing current problem and a threat to human health and life. According to the WHO, up to 1.5 billion people suffer from flu and even 1 million people die of influenza each year.

Preventive vaccination is the most effective method for the prevention of influenza. According to the WHO recommendations, the largest possible proportion of the global population should be covered by the vaccination programme. In particular, people from high-risk groups and young children should receive vaccination. New vaccines against influenza appear at the turn of September and October, and it is the best time to get vaccinated. In Poland, however, the peak incidence of influenza falls between January and March, and therefore it is possible to be vaccinated at a later date. In the past two years, the incidence of flu in Poland nearly doubled, and the number of hospitalizations increased by almost half. The number of vaccinations in Poland has decreased almost three times over the last ten years. Timely data indicate that only 5% of the population get vaccinated against influenza. It should also be emphasized that in Poland the influenza-related costs, that is an underestimated problem, range between 40 and 700 million zloty per year.

**KEYWORDS:** influenza, the influenza epidemiology, complications of influenza, vaccination.

### STRESZCZENIE

Grypa jako choroba zakaźna występująca powszechnie stanowi niezmienne aktualny problem i zagrożenie dla zdrowia i życia. Zgodnie z danymi WHO każdego roku na grypę choruje do 1,5 miliarda osób, a w wyniku tej choroby umiera nawet 1 milion populacji.

Najskuteczniejszą metodę zapobiegania grypie stanowią szczepienia ochronne. Według zaleceń WHO szczepieniem powinien być objęty jak największy odsetek światowej populacji. Szczepieniom powinny poddać się przede wszystkim osoby z grup wysokiego ryzyka oraz małe dzieci. Nowe szczepionki przeciwko grypie pojawiają się na przełomie września i października, i to w tym okresie powinno się zaszczepić. W Polsce jednak szczyt zachorowań na grypę przypada między styczniem a marcem, w związku z czym można dokonać szczepienia w późniejszym terminie. W ciągu ostatnich dwóch lat zapadalność na grypę w Polsce wzrosła prawie dwukrotnie, a liczba hospitalizacji wzrosła prawie o połowę. Liczba szczepień w Polsce na przestrzeni ostatnich dziesięciu lat spadła prawie trzykrotnie. Aktualne dane podają, że jedynie 5% społeczeństwa szczepi się przeciwko grypie. Warto też podkreślić, że koszty spowodowane przez niedocenianą grypę w Polsce sięgają od 40 do ponad 700 milionów złotych rocznie.

**SŁOWA KLUCZOWE:** grypa, epidemiologia, powikłania, szczepienia ochronne.

### Introduction

Influenza is an infectious, acute respiratory disease. It constitutes a group of clinical symptoms associated with the acute respiratory infection caused by an influenza virus. Influenza is caused by influenza A and B viruses that comprise one genus, and type C virus that is substantially different from A and B viruses. They all belong to the family Orthomyxoviridae [1, 2, 3].

The disease process may involve the upper and lower respiratory tract. The course of influenza is associated with the occurrence of general symptoms, such as fever, muscle pain, headache, and general weakness. Influenza epidemics covering various areas and having different severity are observed almost every winter. An epidemic results in an increasing mortality rate among high-risk patients [1, 2, 3].



## Influenza Epidemiology

An infected person, regardless of age, constitutes the most common source of infection. A local outbreak occurs usually every one to three years and global epidemics and pandemics occur every ten to fifteen years [1]. Zoonoses are also possible. They are caused by animal viruses. Influenza is spread through the air or by a direct contact with objects that are contaminated with respiratory secretions from an infected person [2, 3].

There are seasonal influenza and pandemic influenza. Seasonal influenza occurs on a yearly basis in the epidemic season. It is caused by common human influenza viruses. Pandemic influenza occurs every several years or decades and is caused by yet unknown subtypes or variants of influenza viruses. During a pandemic, new infections spread very fast, since a majority of the human population has not developed immunity against new types of viruses. Therefore, the number of new cases during a pandemic exceeds several times the number of new cases during common annual epidemics. Declaration of a pandemic depends on the decision by the WHO. It is geographical coverage that matters here, not the severity of incidence [1, 2, 3].

Epidemics of influenza occur every year but their severity and coverage differ. Global pandemics are observed significantly less often than local epidemics. The most severe epidemics covering the largest areas are caused by influenza A virus, the most active one [1, 2, 3].

Influenza B virus usually causes less severe epidemics covering smaller areas compared to influenza A virus. They usually occur in military camps and schools as well as in elderly care homes. In comparison with influenza A and B viruses, influenza C virus less commonly cause disease in humans. Influenza C virus is commonly associated with asymptomatic infections and occasional, mild diseases and does not cause epidemics [1, 2, 3].

Increased incidence and mortality constitute a serious problem resulting from flu epidemics. Most influenza-related deaths are associated with the presence of other previous illnesses that increases the risk of complications. Factors increasing the risk of death mainly include old age and chronic respiratory and heart diseases. A slightly lower mortality rate than in the above cases is observed in patients with chronic renal diseases, metabolic diseases and certain diseases that affect the immune system [1, 2, 3].

At present, factors responsible for the outbreak and the ending of an epidemic are not fully known. The immunity level of persons who are in danger of being infected constitutes the main criterion that decides about

the severity and geographic spread of an epidemic. An outbreak may be caused by an antigenically new virus among a given population. Antibody response to such a virus is low or absent. If the absence of the corresponding antibodies occurs all around the world, a pandemic is likely to develop. A pandemic wave may last for several years until high population immunity is developed [1, 2, 3].

The most lethal outbreak in history was the 1918-1919 flu pandemic in Europe. Approximately 50 million people died of the Spanish flu pandemic, i.e. about five times more than during the entire World War I [4].

## Global epidemiological and virological situation of influenza

Influenza occurs worldwide. In the temperate climate zone, an increase in the number of flu cases is observed commonly in the autumn/winter season [2]. The flu season in the Northern Hemisphere occurs between autumn and early spring, whereas in the Southern Hemisphere it falls between spring and late summer [1, 2, 3]. According to the WHO, between 330 million and 1,575 million people become infected and as many as 0,5–1 million people die every year due to influenza and influenza-like infections [3].

Seasonal influenza is most commonly caused by type A Influenza, subtypes H1N1 and H3N2, and also by H1N2 in some seasons, but rarely by type B Influenza. Over the past years, there were reported several cases of influenza in humans caused by avian influenza virus that may possibly cause a pandemic and carry a high risk of complications and high mortality rate. They were mostly observed in Asia and Egypt (H5N1) and China (H7N9). However, human-to-human spread of avian influenza is limited [1, 2, 3].

In March 2009 a number of flu cases caused by a new type of influenza A/ H1N1 virus was observed in Mexico. Another foci of influenza were found worldwide, which made the World Health Organisation declare a pandemic in June 2009 [5]. The new type of influenza A/H1N1 prevailed in 2009/2010 season. It was also present during consecutive seasons, but was less common [1, 2, 3]. The 2009 H1N1 influenza virus emerged as a result of reassortment between Eurasian and North American pig flu viruses. Severe infections were observed mostly in young children and pregnant women, persons with other diseases, and young adults [5]. Information on pandemic flu is collected and updated by Centers for Disease Control and Prevention (CDC) and World Health Organisation (WHO) [6].



## Epidemiological and virological situation of influenza in Poland

In Poland, because of the temperate climate, influenza occurs seasonally during the autumn/winter period every year [7]. The number of flu cases and hospital admissions for influenza are reported in Poland to the Local Sanitary and Epidemiological Stations. Then data in the form of reports are sent every week or two weeks by the Voivodship Sanitary and Epidemiological Stations to the National Institute of Hygiene. Data about influenza-related deaths are annually processed by the Central Statistical Office [8]. During the 2014/2015 influenza season, over 3.7 million cases of influenza and suspected influenza were reported in Poland. There were also as many as 12,200 hospital admissions and 11 deaths caused by the infection. This constituted a 37% increase in infections and nearly 50% increase in hospital admissions compared to the 2013/2014 season. The influenza vaccination coverage rate in Poland for the last three years has remained low, amounting to approximately 3.7% of the population [1, 2, 3]. See **Table 1** for cases of influenza and suspected influenza as well as related hospitalisations and deaths in Poland.

**Table 1.** Data on cases and suspected cases of influenza and related numbers of hospitalizations and deaths in the seasons 2006/2007–2014/2015

Season	Morbidity	Hospitalization	Deaths
2006/2007	355 326	730	0
2007/2008	243 591	142	0
2008/2009	562 443	2 200	0
2009/2010	855 127	7 949	177
2010/2011	1 061 391	5 470	187
2011/2012	1 066 238	3 289	1
2012/2013	2 989 041	13 837	119
2013/2014	2 761 522	9 374	15
2014/2015	3 774 795	12 227	11

Source: Recommendations of Polish experts on prevention of influenza during influenza season 2015/2016 Open Letter to experts. Practical Medicine, Krakow 2015

A comparison of the number of flue cases registered before the 2009 influenza pandemic and during the post-pandemic period demonstrated an increase in the incidence of influenza and influenza-like diseases. The recent increase in the number of influenza cases reported is a result of the improvement of the quality of the surveillance system introduced during the 2009 flu pandemic. The case definition expanding the scope of registration and the increase in frequency of reports about new cases were introduced. They helped to increase the system sensitivity, and thus the number of cases registered [9].

The number of vaccinations reported to the National Institute of Public Health – the National Institute of Hygiene (NIZP-PZH) shows a downward trend. The vaccination rate in Poland is too low to significantly slow down the virus circulation among the population. See **Table 2** for the number of influenza vaccinations registered in Poland.

**Table 2.** The number of influenza vaccinations reported to the NIPH-PZH

Year	Immunization
2006	1 371 605
2007	1 212 651
2008	1 158 878
2009	1 577 332
2010	1 168 432
2011	1 061 111
2012	903 308
2013	928 706
2014	855 085

Source: Recommendations of Polish experts on prevention of influenza during the influenza season 2015/2016 Open Letter to experts. Practical Medicine, Krakow 2015

A comparison between the number of registered influenza vaccinations and the number of influenza vaccines sold on the market demonstrated that approximately 40–45% of vaccines administered most probably in private doctor's offices and medical centres are not reported to the NIZP-PZH [9]. See **Table 3** for the number of administered influenza vaccinations.

**Table 3.** Estimation of the number of vaccinations carried out based on the number of units sold on the Polish market of influenza vaccines, and the number of administered vaccinations reported to the NIPH-PZH in different age groups

Year	Immunization
2006	2 930 656
2007	2 339 300
2008	2 164 783
2009	2 593 707
2010	1 990 507
2011	1 728 000
2012	1 411 000
2013	1 422 000
2014	1 424 000

Source: Recommendations of Polish experts on prevention of influenza during the influenza season 2015/2016 Open Letter to experts. Practical Medicine, Krakow 2015

## Pathogenesis of influenza virus infections

The initial stage of the disease begins when the respiratory epithelium becomes infected with the influenza virus. Aerosols from sneezing and coughing play a dominant role in transmission of the disease [4].

Influenza virus replicates in epithelial cells of the upper and lower respiratory tract. The extrapulmonary

replication of the avian influenza H5N1 virus constitutes the only known exception. Influenza virus does not cause viremia. General symptoms of the infection are caused by cytokines released during an inflammatory reaction. It was found that the 2009 H1N1 influenza virus had a higher affinity for the epithelial cells of the lower respiratory tract compared to other seasonal flu viruses [1, 2, 3].

The replication cycle of influenza virus in infected cells lasts between four and six hours. Then infectious viral particles are released to involve nearby cells. The severity of the disease is associated with the amount of the virus excreted from the respiratory tract [4]. The influenza incubation period amounts to about 1–7 days, 2 days on average. An infected person excretes virus from 1–6 days before the onset of symptoms up to a week after symptoms have subsided [1, 2, 3].

Humans as well as a number of animals constitutes the reservoir of influenza viruses. The disease is spread mainly through the air but it is also possible to transmit the infection by a direct contact with contaminated objects or hands [1, 2, 3].

Risk factors include a direct contact with an infected or ill person as well as contaminated objects, face-to-face contact, longer stay near a person with influenza without any protection (e.g. a protective mask), being in huge crowds during flu seasons, insufficient hand hygiene, as well as touching eyes, nose and mouth with contaminated hands [1, 2, 3].

### **Clinical picture of influenza**

A sudden outbreak of general symptoms, such as a headache, muscle pain, fever, chills, general weakness, as well as accompanying respiratory-related symptoms, such as cough and sore throat commonly occur in the course of influenza. Fever ranges between 38 and 41°C in most cases [4].

A sudden temperature rise occurs during the first 24 hours and then it drops gradually for the following 2–3 days but fever may persist up to a week. Patients usually give a history of a feeling of cold and fever. A headache in the frontal region or generalized headache may be particularly inconvenient. Muscle pain may affect any part of the body. They mostly occur in the lumbosacral region and in the lower extremities. Joint pain may also appear. With the resolutions of general symptoms, respiratory-related complaints start to prevail. A number of patients develops persistent cough and sore throat [4].

The range of the clinical course of the disease may be very wide. In some cases there is a mild respiratory disease without fever and respiratory-related symptoms may be slight [4].

In children, the aforementioned symptoms may be accompanied by nausea, vomiting, and diarrhoea [1, 2, 3]. In the elderly, influenza may be accompanied by confusion, loss of appetite, fatigue, and lack of fever [7].

### **Uncomplicated influenza**

In uncomplicated influenza acute symptoms usually resolve within 2–5 days. Patients fully recover within a week [4]. Cough is a symptom that lasts the longest, even up to two weeks. In not numerous patients, particularly in elderly persons and in persons with chronic diseases, general weakness and fatigue may last up to several weeks [6].

### **Complications of influenza**

Complications of influenza occur mainly in persons aged over 64 as well as in patients with chronic diseases, such as diabetes mellitus, heart diseases, pulmonary diseases, renal impairment, haemoglobinopathy, conditions of immunosuppression. Children under 2 and pregnant women during the second and third trimesters are also particularly susceptible to complications [4].

Pneumonia is the most serious and most common complication of influenza. Primary influenza viral pneumonia, secondary bacterial pneumonia, or mixed viral and bacterial pneumonia may develop as a result of infection with influenza [4]. Primary pneumonia is one of the least common but also most serious flu complications. Its clinical symptoms include: exacerbation and no resolution of acute flu symptoms, accompanied by persistent dyspnoea, fever, and possible cyanosis. Persons with heart diseases and pregnant women are predisposed to develop primary pneumonia [4]. Secondary bacterial pneumonia is a consequence of the acute stage of influenza. It occurs after 2–3 days following the improvement of the patient's general condition. Fever and clinical symptoms of bacterial pneumonia such as cough and purulent secretion as well as pulmonary densities are developed. Secondary pneumonia is most often caused by the following pathogens: *Staphylococcus aureus*, *Streptococcus pneumoniae*, and *Haemophilus influenzae*. This complication most often occurs in older persons and patients with chronic cardiovascular and respiratory diseases [4].

The most common pulmonary complications during flu epidemics probably have characteristics of both primary and secondary pneumonia. This is pneumonia of mixed aetiology, in which symptoms of the acute primary disease gradually worsen or clinical symptoms exacerbate and symptoms typical of bacterial pneumonia develop. This complication occurs mainly in persons with chronic cardiovascular and respiratory diseases [4]. Other pulmonary complications include: exacerba-

tion of chronic respiratory diseases such as chronic obstructive pulmonary disease (COPD), chronic bronchitis, and asthma [4].

The remaining post-influenza complications with an extrapulmonary site of infection are rare. Reye syndrome is developed very rarely, usually in children, constituting a serious complication of influenza A or B, or infection with varicella-zoster virus. Reye syndrome is usually associated with the use of acetylsalicylic acid [1, 2, 3]. The following complications are observed particularly in children: gastrointestinal conditions, abdominal pain, nausea, vomiting, and diarrhoea. An increased number of cases of myositis and otitis media is also observed in children [10].

Except for complications related to particular systems and organs, in at-risk groups and elderly persons influenza may lead to a gradual exacerbation of coexisting chronic diseases. In some cases changes may be irreversible and lead to death. This contributes to the increased mortality during influenza epidemic [1, 2, 3].

## Diagnosis of influenza

During an epidemic season when the activity of influenza viruses in a particular area is confirmed, the diagnosis is usually clinical. Studies conducted among adults in good general health demonstrated that a clinical diagnosis is correct in 80–90% of patients. However, clinical diagnosis rates are much lower among the elderly and paediatric patients [10].

The following data can make a clinical diagnosis easier: medical history indicating a contact with a person infected with influenza, epidemiological information about an increased incidence of influenza, and results of epidemiological follow-ups indicating an increase in the number of patients presenting with particular symptoms [6].

Communicable diseases with similar signs and symptoms need to be considered in differential diagnosis of influenza. They include diseases caused by adenoviruses, RSV, rhinoviruses, *Legionella* sp., and *Mycoplasma pneumoniae* [10].

A positive virological test confirms diagnosis of influenza. Virological examinations include, among others, direct (DFA) or indirect (IFA) immunofluorescence, detection of the virus genetic material using the RT-PCR, virus isolation in cell culture, as well as the rapid antigen test of samples taken from the nose and throat (washings, aspirate, and swab). The time to obtain results depends on the method used for examination. The waiting time in the case of immunofluorescence is about 1–4 hours, in the case of RT-PCR it is 1–6 hours, in the case of cell culture it is between 3 and 10 days, and in the

case of the rapid antigen test it is up to 30 minutes [1, 2, 3].

RT-PCR constitutes the most precise technique used in the diagnosis of influenza. Specimens need to be taken with the use of a swab entirely made of plastic. A number of factors influences test results: sample collecting method and type of sample collected, time of sample collection since the onset of the disease, transport and storage conditions. Any problems may produce false-negative results. Aspirates from the trachea and bronchi need to be tested in the case of the involvement of the lower respiratory tract. In Poland, RT-PCR is performed in laboratories of selected voivodship sanitary and epidemiological stations and in the National Institute of Hygiene [1, 2, 3].

Rapid tests for detection of the influenza virus antigen constitute another technique for diagnosing influenza. Rapid antigen tests have high specificity (80–100%) but moderate sensitivity (10–80%). Therefore, with a negative result, infection cannot be ruled out when the clinical presentation and epidemiological data are suggestive of influenza [1, 2, 3]. An advantage of rapid antigen tests is that the results are obtained within 30 minutes. In Poland, the usefulness of rapid tests is limited due to their high costs and moderate risk (up to 30%) of false-positive or false-negative results [6].

Although virological examinations are not necessary in most cases, they need to be considered in high risk groups and in persons with severe or progressive influenza-like infections and other indications for hospitalisation [1, 2, 3].

A severe case of influenza or its complications, being an indication for hospitalisation, is diagnosed if, except for the initial typical symptoms, at least one of the following occurs:

- central nervous system related symptoms (convulsions, encephalopathy, encephalitis), severe dehydration, clinical (hypoxia, tachypnoea and other dyspnoea symptoms) and/or radiological (signs of pneumonia) symptoms of the lower respiratory tract infections,
- secondary complications such as sepsis, septic shock, renal failure, multiple organ insufficiency, skeletal muscle disintegration, myocarditis,
- exacerbation of chronic primary disease, e.g. COPD, asthma, chronic failure of the liver, heart and kidneys, coronary heart disease, and diabetes mellitus,
- other indications for hospitalisation,
- any sign of progression of the disease [1, 2, 3].

Development of alarming symptoms in patients reporting to a doctor due to uncomplicated influenza

indicates a progression (exacerbation) of the disease. The patient's condition may deteriorate very fast and the presence of alarming symptoms is an indication for quick verifications of treatment methods and hospitalisation in most cases. The alarming symptoms include:

- signs and symptoms of the involvement of the lower respiratory tract or heart insufficiency (chest pain, haemoptysis, low blood pressure, decreased oxygen-haemoglobin saturation by pulse oximetry, dyspnoea, and cyanosis),
- symptoms indicating complications related to the central nervous system (disturbance of consciousness, pathological somnolence, loss of consciousness, seizures, paralysis, paresis, and deterioration of muscle functions),
- symptoms indicating severe dehydration (decreased diuresis, dizziness, pathological somnolence, syncope upon standing up, other consciousness disorders),
- clinical or laboratory symptoms of the present viral infection or invasive secondary bacterial infection (e.g. high fever persisting longer than 3 days) [1, 2, 3].

### Treatment of influenza

Uncomplicated influenza generally resolves spontaneously. It usually requires symptomatic treatment and a relatively long convalescence. Symptomatic treatment includes correction of water and electrolyte imbalance, bed rest, antipyretics, antitussives, and light diet. The use of acetylsalicylic acid is contraindicated in children due to the risk of Reye syndrome [10]. Commonly used medicines such as rutoside and vitamin C are not effective in the treatment of influenza and beneficial effects of homoeopathic drugs are not confirmed.

Treatment of complicated influenza depends on the complication itself. A complete anti-shock treatment is recommended in patients with shock. Patients with cardiovascular and neurological complications need a targeted therapy, e.g. cardiovascular, dehydrating, and antioedematous drugs. Antibiotics are used for bacterial pneumonia. However, influenza uncomplicated by bacterial infection does not require antibiotic therapy or antibiotic cover [1, 2, 3].

Specific treatment for influenza consists in administering chemotherapeutic agents to inhibit the replication of the influenza virus. This therapy is recommended for high risk patients. The following agents are used:

- amantadine and rimantadine effective against the influenza A virus,
- zanamivir and oseltamivir effective against influenza A and B viruses

- ribavirin (in vitro active, clinically ineffective) [1, 2, 3].

Since the rate of resistance of the influenza A/H3N2 virus isolate to amantadine was more than 90% over the period 2005-2006, at present it is not recommended to use amantadine and rimantadine on a large scale. However, the use of these drugs might be considered after first determining the sensitivity of a particular influenza viral strain [4].

### Legal aspects of treatment and prevention of influenza

The Act of December 5, 2008 on preventing and combating infections and infectious diseases among people is the fundamental Polish act referring to communicable diseases. The Act was published in the Journal of Laws on December 30, 2008 and took effect from January 1, 2009. All people staying in the territory of the Republic of Poland are subject to this law [1, 2, 3].

Legal provisions on preventing and combating infections and infectious diseases among people include, among others, influenza and avian influenza in humans [11]. The Act refers to the rules governing the organisation and control of infections and infectious diseases, organisation of preventive vaccination, procedure for suspected and confirmed cases of infection, contagious disease or death due to communicable disease, monitoring of the epidemiological situation, the procedure in the event of an epidemic or threat of an epidemic, and others [1, 2, 3].

On the basis of Article 34 (1) (2) of the Act on preventing and combating infections and infectious diseases (Journal of Laws, Dz. U. 2008, No. 234, Item 1570), patients with confirmed or suspected H5 or H7 avian influenza have to be hospitalised [11].

### Prevention of influenza

Prevention of influenza includes specific methods such as protective vaccination and chemoprevention as well as non-specific methods. Since vaccination against influenza does not provide total protection from being affected, it is advisable to combine different methods [1, 2, 3].

Non-specific methods for preventing influenza include, among others, the use of protective gloves, glasses, apron, and face mask, strict hand hygiene, avoiding mass gatherings and crowds in the epidemic season. Patients need to be isolated for a week since the onset of symptoms and when the symptoms persist for more than 24 hours after acute respiratory symptoms and fever have disappeared. Longer isolation is needed in the case of a patient with immunodeficiency [1, 2, 3].



Systematic prophylaxis, including flu vaccines in particular, helps to reduce the incidence of influenza, mortality due to complications of influenza, potential social and economic impact of the disease as well as ensuring a better functioning of the healthcare system during an epidemic [6].

### Preventive vaccination

Preventive vaccination is the most effective method for the prevention of influenza. As the influenza virus exhibits a high mutation rate, the vaccine composition must be updated and vaccines need to be repeated annually [6].

Flu vaccines available worldwide and recommended by the Advisory Committee on Immunization Practices (ACIP) are live or inactivated. The most common inactivated vaccines include split and subunit vaccines. Split vaccines contain a split virion and subunit vaccines contain peripheral membrane proteins. These types of vaccines cannot cause influenza and are recommended for persons of any age over six months of age. The vaccine composition may vary depending on the geographical region [3].

Both split and subunit influenza vaccines are used in Poland. They must be certified by the Polish Ministry of Health [6].

Preventive vaccination should be provided particularly to high risk groups. According to the Center for Disease Control and Prevention (CDC) in Atlanta, such patients constitute approximately 30% of each population. Inactivated vaccines against influenza reduce morbidity and mortality rates among high risk groups by 50–70%. According to the WHO recommendations, the largest possible proportion of the global population should be covered by the vaccination programme. Significant benefits in the efficiency and effectiveness of inactivated vaccines were found in all age groups. Community immunity can be gained with the immunization coverage of about 70–80% of the population [3].

Influenza vaccination is particularly recommended for the elderly. The risk of influenza in persons over 65 years of age increases tenfold. Most influenza-related complications and deaths concern older people [3].

Flu vaccines among patients with diabetes mellitus reduce the mortality rates by 56% and the number of hospital admissions by 70%. Diagnosis of diabetes mellitus is an indication and not a contraindication to immunisation. Compared to non-diabetics, the risk of hospitalisation of a diabetic is six times higher and mortality rate is two-three times higher. During an epidemic the risk of death increases by 5–15% among patients with diabetes mellitus. The WHO, the American Diabetes Association, and the Polish Diabetes Association recommend annual vaccination as safe and effective [7].

Vaccination against influenza is also important for persons with heart diseases as it has been observed that the number of myocardial infarctions and cardiovascular-related deaths increases during influenza epidemics. It was found that 25% of myocardial infarctions is preceded by an acute respiratory infection. Influenza vaccination in patients with coronary heart disease reduces the risk of serious cardiovascular events by approximately 30% as well as the risk of hospitalisation and death. Immunisation is recommended to patients with chronic heart insufficiency since it decreases the risk of viral myocarditis and pericarditis. Numerous societies of cardiology recommend flu vaccination in all persons with heart and circulatory diseases [12].

Owing to the fact that the risk of hospitalisation due to complications of influenza in pregnant women is sevenfold higher than in general population, protective vaccination is particularly recommended for this group. Over half of flu complications occur in pregnant women during the second and third trimesters. In vaccinated pregnant women, the number of febrile infections in mothers was reduced by 36% and the number of laboratory confirmed influenza in children decreased by 63%. 92% efficacy of vaccination against influenza in pregnant women was observed in prevention of hospitalisation for influenza in newborns and infants below 12 months of age. Immunisation of women during pregnancy and the puerperium period helps to protect babies who cannot be vaccinated due to medical contraindications or their young age. It was not found that influenza vaccination increases the risk of C-section, premature birth, miscarriage, or has a harmful effect on foetal development and the incidence of psychomotor difficulties and malformation in children at later stages of life [7].

Vaccinations are recommended for children from the age of 6 months. According to the WHO, children between 6 months and 2 years of age should be vaccinated in the first place since the youngest children are at high risk for complications of influenza. In Poland, children aged between 2–5 years receive the seasonal influenza vaccine most often whereas infants receive it least often. A well-matched vaccine gives 50–80% vaccination efficacy in children. Vaccinations against influenza in children are safe and post vaccination reactions are usually local. General adverse events occur in children who receive their flu vaccine for the first time. Immunisation of children helps to reduce the spread of flu to other age groups as well [13]. It was observed that vaccination of schoolchildren reduces the incidence of influenza among all age groups [3].



## Chemoprevention of influenza

Chemoprevention of influenza consists of using antiviral drugs effective against influenza viruses. Efficacy of up to 84–89% was observed in the prevention of influenza A and B viruses following the use of inhaled zanamivir with a dose of 10 mg per day or orally administered oseltamivir with a dose of 75 mg per day. The prophylactic use of amantadine and rimantadine is not recommended since the growing resistance of influenza viruses to these therapies has been reported [4]. Chemoprevention should be initiated up to two days since the onset of symptoms and continued for at least five days. It is estimated that the efficacy of chemoprevention reaches 50% in reduction of the risk of pneumonia [1, 2, 3].

Chemoprevention should be applied to high risk patients who have not received a flu vaccine as well as when a vaccine provided might be ineffective due to an antigenic change of the virus. During an influenza epidemic, chemoprevention may be used together with an inactivated vaccine, which does not interfere with the immune response to vaccination. It was demonstrated that the use of a live-attenuated vaccine in combination with chemoprevention may interfere with the immune response to vaccination. Chemoprevention should not be introduced for at least two weeks after live-attenuated vaccine. This kind of prophylaxis may be used to control intrahospital influenza epidemics [4].

## Surveillance of influenza

In Poland, cases of influenza and influenza-like diseases must be reported to the State Sanitary Inspection. Data from the Voivodship Sanitary and Epidemiological Stations are the basis for reports by the Epidemiology Institute of the National Institute of Hygiene about the current epidemiological situation. At the national level, surveillance of influenza is coordinated by the National Influenza Centre cooperating with the regional and global WHO reference centres [10].

The Department of Influenza Research plays the role of the National Influenza Centre in Poland. Since it is the only institution of that kind in Poland, it is a reference centre for influenza at the national level. The National Influenza Centre cooperates both with the WHO and the European Centre for Disease Prevention and Control (ECDC). It is also a member of international scientific networks, including the European Influenza Surveillance Network (EISN) and the Global Influenza Surveillance and Response System (GISRS). The tasks of the National Influenza Centre include: to perform virological surveillance of influenza, to perform antigenic analysis of the influenza strains, to coordinate, at the national level, the influenza SENTINEL surveillance sys-

tem, where the participants are Voivodship Sanitary-Epidemiological Stations and a representative number of family physicians, to perform diagnostics of influenza and influenza-like infections, as well as working in the area of the national preparedness for the influenza pandemic [13].

A well-functioning network for surveillance of influenza makes it possible to monitor the worldwide epidemiological situation and track the antigenic change among flu strains. This provides the basis for developing and updating the composition of influenza vaccine for each epidemic season [10].

## Socio-economic effects of influenza

Except for serious health implications, influenza infections may also have social and economic effects. Social consequences involve imposing a burden on the health-care system as well as impeding the occupational and social functioning of patients and their family members taking care of the patient. Economic costs include, among others, occupational absence of patients and their relatives involved in care, costs of medications, as well as inpatient and outpatient costs [6].

According to international data, costs of medical treatment for influenza and sickness absence due to influenza amount to billions of dollars, depending on the epidemic season and country's population. The cost of influenza epidemic in the USA amounts to 71–167 billion dollars depending on an epidemic season. According to a German study of 1996, it costs 632 euros on average to treat a patient with influenza. According to the National Interview Survey, in 1995 influenza infections among working adults in the USA were responsible for over 200 million days of limited activity at work and 75 million days of absence from work [10].

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# PREVENTION OF INFECTION, EFFECTIVE CONTROL AND TREATMENT OF INFECTED BURN WOUNDS – THE ROLE OF A NURSE IN AN INTERDISCIPLINARY TEAM

## *ZAPOBIEGANIE ZAKAŻENIOM, SKUTECZNA KONTROLA I LECZENIE ZAKAŻONYCH RAN OPARZENIOWYCH – ROLA PIEŁĘGNIARKI W ZESPOLE INTERDYSCYPLINARNYM*

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### ABSTRACT

Wound infection is one of many, but at the same time the most serious complication in the treatment of burns. The development of infection particularly concerns patients with deep burns of intermediate and full thickness of skin. In severe thermal, chemical or electrical burns the skin immune system (SIS) in the burn wound is damaged or destroyed. The SIS phenomenon is one of the causes of post-traumatic immunosuppression in the burn wound and systemic anti-infectious response.

The risk of burn wound infection and systemic infection is correlated with the burn area.

The aim of the study is to discuss the currently used methods of prevention, effective control and treatment of an infected burn wound. It discusses criteria for infection recognition, immunosuppressive limiting methods, standards and newly introduced methods of removing dead tissues, antimicrobial agents and methods to reduce the risk of bacterial transfer between patients.

Prevention, control and treatment of an infected burn wound requires a multidisciplinary approach, including close cooperation between a nurse and a physician. The patient's deep and extensive burn care process is designed to reduce the risk of developing burns and prevent critical infection that not only prolongs the healing process but also can lead to generalized infection. The patient care plan should be based on up-to-date medical knowledge and updated regularly.

**KEYWORDS:** burn, burn wound, immunosuppression, infection, prevention, infection control, antiseptics, dressings.

### STRESZCZENIE

Zakażenie rany oparzeniowej jest jednym z wielu, ale równocześnie najgroźniejszym powikłaniem w leczeniu oparzeń. Na rozwój zakażenia w sposób szczególny narażeni są pacjenci z głębokim oparzeniem pośredniej i pełnej grubości skóry. W głębokim oparzeniu termicznym, chemicznym lub elektrycznym w ranie oparzeniowej zostaje uszkodzony lub zniszczony układ odpornościowy skóry (ang. skin immune system – SIS). Zjawisko SIS stanowi jedną z przyczyn pourazowej immunosupresji w ranie oparzeniowej oraz systemowej odpowiedzi przeciwzakaźnej.

Ryzyko zakażenia rany oparzeniowej oraz infekcji ogólnoustrojowej jest skorelowane z powierzchnią oparzenia. Celem pracy jest omówienie aktualnie stosowanych metod zapobiegania, skutecznej kontroli i leczenia zakażonej rany oparzeniowej. Omówiono w niej kryteria rozpoznawania zakażenia, metody ograniczające immunosupresję, standardowe i nowo wprowadzone metody usuwania tkanek martwych, środki przeciwdrobnoustrojowe oraz metody ograniczające ryzyko transferu bakterii między pacjentami.

Zapobieganie, kontrola i leczenie zakażonej rany oparzeniowej wymaga podejścia wielodyscyplinarnego, w tym ścisłej współpracy pielęgniarki z lekarzem. Proces pielęgnowania realizowany na rzecz pacjenta z głębokim i rozległym oparzeniem ma na celu ograniczenie ryzyka rozwoju infekcji w ranie oparzeniowej oraz zapobieganie krytycznemu zakażeniu, które nie tylko wydłuża proces gojenia się rany oparzeniowej, ale także może doprowadzić do uogólnionego zakażenia. Plan opieki nad pacjentem powinien być oparty na aktualnej wiedzy medycznej i bieżąco aktualizowany.

**SŁOWA KLUCZOWE:** oparzenie, rana oparzeniowa, immunosupresja, zakażenie, zapobieganie, kontrola infekcji, antyseptyki, opatrunki.

### Introduction

One of the most important and still current problems in the treatment of deep burns are infection, which significantly impedes wound healing, can cause bacteremia and sepsis, which is always a serious threat to life

[1]. Patients with deep to severe burns and full thickness of the skin are particularly at risk for infection. In deep burns of intermediate skin thickness, superficial dermis is destroyed, burns are characterized by superficial necrosis, when the destruction crosses the der-

mis, deep necrosis is present in the clinical picture [2]. In severe thermal, chemical or electrical burns the skin immuno-system (SIS) in the burn wound is damaged or destroyed. Consequently, the active protective barrier of the skin is destroyed. It results in the damage to or destruction of the guard function of the skin. The skin loses its ability to react to foreign antigens, especially of bacterial origin. The SIS phenomenon is one of the causes of post-traumatic local immunosuppression in the burn wound and systemic anti-infectious resistance. The gates of contamination, colonization and infection are open [3]. The results of multicentre studies in different countries have demonstrated the microbiological dynamics of burn wound. During the first three days after burns the wound is settled by coagulase-negative staphylococci, mainly *Staphylococcus epidermidis* as well as *Staphylococcus aureus*, including methicillin-resistant *Staphylococcus aureus*. At 3–4 day the dominant etiological factor of septic complications in patients with burn wounds are *Pseudomonas aeruginosa* and *Acinetobacter baumannii* [4].

The mechanism of burn wound infection can be divided into three stages: colonization, invasion and generalized infection. The stage of colonization is divided into critical colonization and the formation of the biofilm structure. The condition for the biofilm formation is the adhesion of bacterial cells to the burned surface. In the next stage of the biofilm formation, the multiplication and accumulation of cells in the form of multiple layers is followed by the formation of a cluster immersed in the polymer matrix. Bacteria in the biofilm community adapt their metabolic processes according to the availability of nutrients and provide themselves protection from harmful conditions [4]. In the guidelines of the Polish Society for Wound Management (Polskie Towarzystwo Leczenia Ran) from 2012 on local and general management of wound infections, it was emphasized that microorganisms in the biofilm exhibit exceptional (resistance) tolerance to topical antibiotics. Therefore, there is an urgent need for therapeutic agents that allow eradication of microorganisms before they form the biofilm [5].

The risk of burn wound infection and systemic infection is correlated with the extent of burn wound assessed as a percentage of the total body surface area (TBSA). It is believed that the immune system is destroyed by burns over 30% of TBSA [5], but sepsis can develop in deep thermal burns covering less than 30% of TBSA, especially in the presence of additional factors increasing the risk of infection development [1]. The risk of wound infection associated with the need for topical antibiotic treatment may be assessed on the basis of the wound-at-risk scale, created by the team of clinicians from Germany, Italy, and Austria, and present-

ed in the Polish scientific literature. Indication for topical treatment is given after calculation of the parametric value of individual risk factors to which 1, 2 or 3 points are attributed. The initiation of antimicrobial treatment is justified when the combined value of individual risk factors is equal to or greater than 3. However, it should be noted that regardless of the number of points awarded, topical treatment should be undertaken in the presence of multiresistant microbes even if the risk score is less than 3 [5, 7]. Particular risks of infection in the burn according to the WAR scale (Wound at risk scale) are: local and general immune suppression, surface of the burn wound greater than 15% of TBSA, burn location, very young or old age of the patient, comorbidities, e.g. diabetes [2]. Prevention, effective control and treatment of the infected burn wound requires a multidisciplinary approach, including close cooperation between a nurse and a physician.

### The aim of the thesis

The purpose of this paper is to discuss the currently used methods of prevention, effective control and treatment of an infected burn wound. It discusses criteria for infection recognition, methods of immunosuppressive reduction, standards and newly introduced methods of removing dead tissues, antimicrobial agents, and methods to reduce the risk of bacterial transfer between patients.

### Methods of infection recognition

Accurate, clinical assessment of the condition of the wound during each dressing change allows to early identify the deterioration of the local condition. Deep infection is shown by the change of the macroscopic appearance of the wound. The most common symptom of profound infection is a change in the depth of burns from incomplete skin thickness to full thickness burns (burn conversion) or an unexpected change in coloration of necrosis, which from pale or whitish turns dark brown, black or violet. Rapid separation of the burn eschar in the first week after burn is the most common and easily noticeable symptom suggesting a deep infection. General symptoms that may be associated with infection are fever, hypothermia, hypotension, oliguria, hyperglycemia, mental disorders [8, 9]. The presence of these symptoms may signal the infection, but confirmation of this condition requires a microbiological examination. It is believed that methods of recognition and following registration of infections should be based on standardized criteria and clear programs.

Around the world, infection control programs are being developed and implemented for years, taking into account the specificity of burn injuries. According to the definition

of Centers for Disease Control and Prevention (CDC), for skin and soft tissue infections, one of the following criteria must be met to identify a burn wound infection:

1. Change of a burn wound appearance or character, such as: rapid eschar separation or dark brown, black or violaceous discoloration of the eschar or edema at the wound margin and invasion of the organisms into the adjacent viable tissue shown in the histologic examination of burn biopsy.
2. Change of a burn wound appearance or character, such as: rapid eschar separation or dark brown, black or violaceous discoloration of the eschar or edema at wound margin and both of following:
  - a) organisms cultured from blood in the absence of other identifiable infections,
  - b) isolation of HSV (Herpes simplex virus), histologic identification of inclusions by light microscopy or visualization of viral particles in electron microscopy in biopsies or lesions scrapings.
3. Patient with a burn has at least two of the following signs or symptoms with no other recognized cause: fever, hypothermia, hypotension, oliguria, hyperglycemia, mental confusion and at least one of the following conditions:
  - a) histopathologic examination of burn biopsy shows invasion of organisms into the adjacent viable tissue
  - b) organisms cultured from blood,
  - c) isolation of HSV, histologic identification of inclusions by light microscopy or visualization of viral particles in electron microscopy in biopsies or lesions scrapings [9].

It is believed that cultures from the swabs surface have limited usefulness in the diagnosis of infection, but can be used to monitor trends in the epidemiological center or burn treatment departments [8].

### **Reduction of immunosuppression**

The period between the burn and clinical signs of infection with *Pseudomonas aeruginosa* can be used for active immunization. Prophylactic use of *Pseudomonas* in patients with extensive and severe burns offers the ability to acquire active immunity against infections caused by cyanobacterium and significantly reduces the risk of infection spreading in all tissues and organs of the body. The treatment regimen consists in increasing doses of the preparation. The preparation is administered by intramuscular injection [10].

### **Modification of the immune response under the influence of nutrients**

Nutrients may modify and positively influence physiological processes. The use of preparations which, apart

from their basic purposes (satisfying the caloric needs, the supply of building substances) may to a greater extent than previously affect the immune system is referred to as immunomodulating nutrition [11]. Early and continuous nutritional interventions using high protein, high carbohydrate and low fat nutritional supplements, and adequate vitamin and trace elements supplementation [12] may reduce the effects of hypermetabolism in burns and support wounds healing. However, with the recognition of the intestines as immune-regulatory organs several key substances have been identified to modify physiological functions, alleviate oxidative stress and act as signaling molecules when administered enterally. Examples of such substances are amino acids: glutamine, arginine, cysteine, taurine, omega-3 unsaturated fatty acids, nucleotides, vitamins C and E, micronutrients such as zinc and selenium [11]. Glutamine is the major source of energy for macrophages, fibroblasts, lymphocytes and enterocytes, which prevents spreading of the bacteria from the digestive system into the body [12]. The clinical benefits of supplementation of glutamine in patients with burns include a reduced infection rate, reduced hospital stay, and lower mortality. It is believed that glutamine supplementation is relatively safe, which makes it worth considering as an element of prophylaxis of infections in severely burned patients. The role of arginine supplementation in burn patients is still under investigation [13]. Arginine accelerates healing of wounds, but it contributes to an increase of urea production and a massive loss of nitrogen from the organism, which often excludes it from clinical practice [12, 13]. The potential benefits of arginine in terms of wound healing can be seen particularly in malnourished patients, which also indicates its importance in the nutritional therapy of burn patients [13]. Among micronutrients, a significant role in the immune response modulation and burn wound healing has been demonstrated with respect to copper, selenium and zinc. A large escape of these trace elements with wounds exudate continue until their definitive closure. The time of supplementation depends on the surface of the open burn injuries [12].

After identifying the demand for individual nutrients and determining the composition of the diet the way to deliver nutrients which meet patient's metabolic and clinical needs best should be defined. Given the importance of maintaining intestinal mucous membrane integrity and benefits of enteral nutrition, especially in reduction of increased catabolism effects, most clinicians opt for enteral nutrition as the preferred form of therapy. [13]. It is recommended that enteral nutrition is introduced as soon as possible using a naso-gastric tube or a naso-intestinal tube [12, 13]. Parenteral nutrition is



treated as a supplement to enteral nutrition, and often at the initial stage of treatment it is carried out simultaneously with enteral nutrition [12, 13]. In the course of intensive nutritional therapy, one of the main problems of care is the infection associated with both enteral and parenteral nutritional interventions. Industrial enteral diets are manufactured in a standardized and sterile manner. The diet may be contaminated during the collection, filling, administration, and such contamination can cause local and general infection. Proper storage and administration of the diet guarantees microbiological safety [9]. Central vascular lines used in parenteral nutrition are often colonized by microorganisms, becoming the starting point for catheter-related infections. The problem of catheter-associated infections in patients with severe burns is particularly important for two reasons. Firstly, burn-induced immunosuppression limits the defenses of the patient's organism, and secondly, the location of the central vascular line, often near the wound, increases the risk of colonization by microorganisms. As far as possible, a central puncture should be performed through not burnt skin, preferably in an appropriate distance from the wound to prevent infection at the catheter site. Because it is not always possible in case of extensive burns, it may be necessary to frequently change the central access site. Handling a central puncture area near or through a burn wound is a challenge because occlusive dressing cannot be used. In such cases non-occlusive anti-microbial dressings changed every 2–4 hours are recommended [6]. An important part of prophylaxis is aseptic treatment during the use of the central vascular line.

### **Surgical and enzymatic methods of dead tissue removal**

The standard procedure in the case of deep burns is early surgical excision of necrosis [14]. Excision of dead tissue and the replacement of the burn wound to a pure surgical wound closed with autologous transplants of intermediate thickness skin or its substitutions closes the gates of infection and reduces the risk of systemic infection [15].

What is important is the time of application. The treatment should be performed quickly, before the burn wound infection and multi-organ failure development. Although early cut and closure of wounds are considered to be the main factors reducing the incidence of burn wound infections, questions have been raised in the literature on the effectiveness and safety of treatments performed during the first 24 hours of burn treatment. The quantitative study evaluating the effect of time on the degree of bacterial colonization of burn injuries showed that the incidence of wound infection was

lower in patients treated within the first 24 hours of injury compared to surgical patients treated in a deferred mode – 6 days after injury [16].

However, in the case of extensive wounds, surgical treatment may be distributed in time and the patient may require several treatments. Until all dead tissues have been removed, an important part of the nursing process is to protect the wound from burn conversion and infection. Antimicrobial agents are used for this purpose. The characteristics of antimicrobial agents used in the prevention and treatment of burn infections are presented in the following section.

Recently, for the treatment of the burn wound, hydrocephalic treatment has been introduced. Hydro-surgical procedures allow for a safe transfer during the procedure of cleaning a dead wound tissue. The method involves the use of a Versajet apparatus delivering physiological saline to the surgical tip, at supersonic speed, at about one atmosphere pressure. The fluid jet cuts off the dead tissues that are immediately aspirated together with a bacterial aerosol, the biofilm from the wound surface is also removed. The operator can control the depth and strength of the tissue aspirations. Hydro-surgical treatment guarantees a precise cleaning of the wound, especially in inaccessible areas to the expected depth and its decontamination and preparation of the wound to the free graft of the intermediate skin thickness - the next stage of surgical burn treatment. The authors emphasize the high safety of such a method for both the patient and the staff [1, 17].

An alternative method for surgical procedures is the enzymatic purification of burn wounds with NexoBrid [18]. NexoBrid is the first of a new generation of non-surgical treatment agents for burn wounds. NexoBrid is used in adults with deep thermal burns of intermediate and full-thickness of the skin. The formulation contains a mixture of enzymes called "bromelain-enriched proteolytic enzyme concentrate," which comes from the stalk of the pineapple plant. NexoBrid removes a dead tissue without damaging the living tissue, in most cases after one 4-hour local application. Efficacy in removing dead tissues is obtained without additional damage to surrounding living tissues, mainly dermis. NexoBrid dramatically reduces the time of effective removal of the burn wound, allowing for faster treatment and the possibility to move to the next step of wound closure by autogenic skin graft [19, 20, 21].

### **Time control of the wound after surgical or enzymatic debridement with skin transplantation**

Free skin grafts of intermediate thickness are the basic way to close wounds after the removal of dead tissues, in the treatment of burns of full thickness of the skin.

Free skin grafts of intermediate thickness excision sites heal spontaneously within seven to fourteen days. Dressings play a protective role both in the free skin grafts of intermediate thickness donor sites and in skin transplants, allowing or even facilitating and accelerating the healing of the wound. Wet treatment is most commonly used in these locations so that it does not interfere with the natural healing process, as the growth factors, proteins and other active substances in the wound healing are retained in the exudate fluid.

Unfortunately, the warm environment of wounds and water, electrolytes and proteins is not only a condition for reproducing the epidermis in the donor field of free skin grafts of intermediate thickness and for grafting, but also for the development of bacteria [22]. Therefore, transplanted areas and transplant sites require the observation and evaluation of both transplant conditions and wound healing after transplantation. Clinical manifestations of infection include present or increasing pain, a change in appearance and increased or changed exudate [23]. Antiseptics and modern silver-containing dressings are recommended for treatment of dermatitis [22, 23]. In the case of changes of care and wounds treatment, it is important to regularly update the patient care plan.

### **Use of antiseptics with a broad spectrum of antimicrobial activity**

The aim of care assuming maximization of preventive measures is important when choosing the optimal antimicrobial agent. The choice of the local antimicrobial agent should be based on its ability to inhibit the development of microorganisms, in controlled microbiological tests and the monitoring of infections within a burn treatment site [24].

When selecting an antimicrobial agent, we also need to be sure of its local and systemic safety. At present antiseptic, which remains a safe therapeutic option in the prevention and treatment of septic complications of burns, is octenidine. For over 30 years of octenidine use, the resistance mechanism has not been developed by microorganisms. Octenidine is characterized by high antimicrobial activity, the activity spectrum includes Gram-negative and Gram-positive bacteria, fungi and protozoa. Octenidine dihydrochloride also has a high activity against microorganisms in the biofilm form. In addition, octenidine dihydrochloride has not been shown to be absorbed, whereas phenoxyethanol, which is an excipient in octenidine-containing formulations, is safely excreted from the body in the form of phenoxyacetic acid. Up to now, no case of allergy to octenidine has been reported in the scientific literature [4]. The choice of recommended antiseptic depends also on its individual form, e.g. liquid, gel or cream [24].

Liquid antiseptics have a short duration of antimicrobial activity limited to a few hours. In studies on the effectiveness of various antiseptics, it has been shown that the octenidine gel has a longer and more effective bactericidal effect compared to liquid antiseptics [25].

Another compound used in burn antiseptics is povidone iodine (PVP-1). The mechanism of action of this antiseptics is to penetrate the free iodine particles through the cell wall of the microorganisms and to irreversibly combine them with the proteins, lipids and nucleic acids. PVP-1 has a strong and wide range of both antimicrobial and antifungal properties. However, its use on the wound causes pain, and the brown color can mask the wound infection in the wound. For this reason, PVP-1 was included in the 2012 group of antiseptics that should not be used in the treatment of chronic wounds. What is more, in case of extensive burns iodine can affect the thyroid. Iodine compounds are absorbed by the wound and penetrate into the serum. Accumulation of elemental iodine in the thyroid can lead to thyroid dysfunction. The antiseptics still used to combat septic complications in burns include chlorhexidine and polyhexadine. However, according to microbiologists, their use may not lead to satisfactory therapeutic effects due to the high resistance of microorganisms [4]. However, it needs to be emphasized that antimicrobial therapy alone in case of deep and extensive burns using antimicrobial agents (antiseptics and silver-containing dressings) cannot protect the patient from invasive burn wound infections. The purpose of antimicrobial preparations is to support surgical or enzymatic treatment.

### **Dressings containing silver**

Silver has a broad spectrum of antimicrobial, antiviral and antifungal effects. It is currently widely used in wound dressings, and its use has increased in recent years, probably due to the resistance of bacteria to traditional antibiotics. The use of silver can provide effective antimicrobial effects in critically colonized wounds or infected wounds [26]. Hydrofiber dressings with silver ions and foam dressings with ionic silver are recommended for the use in infected wounds. Hydrocarbon dressings with silver ions have a mechanism for absorbing exudates and closing bacteria in the structure of the dressing fibers. They easily adapt to the wound, forming a gel under the influence of absorbed exudate. They are antibacterial. Foam dressings with silver ions have strong absorption properties and ensure optimal moist environment in the wound. They are antimicrobial and prevent penetration of microorganisms from the outside [27]. The well controlled and long silver release process to the wound allows less frequent dressing changes, reducing the risk of the tissue damage, infection and patient's discomfort [24]. If the dressing is dry,

it should be changed after time recommended by the manufacturer, if it leaks with exudate from the wound, it should be removed earlier, then re-evaluation of the depth of the wound and the local condition should occur [27]. Although extensive clinical experience proves the safety and therapeutic efficacy of silver-containing dressings, however, this has not been proven in randomized prospective clinical trials. Most of the publication applies only to the clinical case reports or case series [28, 29]. In a recent study, the advantages and disadvantages of various dressings used for the temporary dressing of the burn wound, including nanocrystalline silver dressings, were analyzed [30]. It showed a high clinical efficacy of all tested dressings. However, it should be remembered that nanocrystalline silver is toxic to human cells [28]. According to the guidelines of the Polish Society for Wound Management on local and general treatment of infected wounds, it is important to use medicinal products that should be pharmaceutically compatible. Iodine based antiseptics cannot be used with silver-containing dressings. One should not combine antiseptics, containing octenidine and iodine since a chemical reaction of pure iodine release can be observed. We can use octenidine-based antiseptics and silver-based dressings to treat wounds at risk of infection and infected ones [5]. The recommendations of the Group of Experts representing the Polish Society for Wound Management allow to focus diagnostic and therapeutic procedures in a particular clinical situation and are important not only in the selection of the appropriate antimicrobial agent, but also throughout the decision-making process in the diagnosis and treatment of wound infections. The recommendations focus on the diagnosis of the microbiological condition of the wound, the route of entry of microorganisms into the wound, the clinical stages of wound infection development, the principles of local treatment of infected wounds and the risk of infection [5].

### **Antibiotic prophylaxis and antibiotic therapy**

According to experts dealing with the treatment of burns place of antibiotics is not recommended because it promotes resistance of strains [14], whereas systemic antibiotic prophylaxis is debatable. It is believed that the routine prophylactic use of antibiotics before the results of the bacteriological test is not justified [31]. Some authors recommend perioperative prophylaxis. It is suggested that antibiotics can be administered immediately prior to the procedure of the dead tissue removal, during and one or two doses following the procedure, especially in patients with extensive burns [24]. Targeted antibiotic therapy is carried out with the bacteriological findings [14].

### **Practices of controlling infection**

Nursing care is an important part of environmental control in burn treatment. Nurses and other medical staff should be assigned to the care of a particular patient or a group of patients as a team, and contacts with other patients should be limited to a minimum and strictly controlled.

Cross-contamination is additionally minimized within hospitals by treating patients in single rooms. Modern burn treatment centers provide the ability to perform all intensive care and treatment procedures, including patient operations and all aspects of care within the ward in which the patient is treated. Infection control programs developed in burn treatment departments require strict compliance with strict rules, including strict adherence to hand washing procedures and the use of personal protective equipment such as overalls, gloves and masks. Staff are required to wear disposable overalls and gloves during each visit to an isolated room where the patient is present [24, 32]. Particularly strict rules apply during a dressing change procedure. A strict aseptic technique should be used when handling open wounds and dressings. What is more, the frequency of dressing change should be adjusted to the clinical condition of the wound. It is essential to use sterile gloves and masks during the dressing procedure, and it is also advisable to minimize open wound exposure time [6].

When applying gel or cream preparations, it should be first applied on dressings prior to the application to the wound, in order to eliminate the possibility of contamination with the flora of the burn wound [24]. Studies assessing the impact of prophylaxis on nosocomial infections and treatment costs indicated that multidirectional prophylaxis against nosocomial infections provide beneficial results in terms of reduction of time and cost of treatment [32].

### **Recapitulation**

The purpose of this study was to present the latest knowledge on the prevention, effective control and treatment of an infected burn wound essential for optimal nursing care. Providing a wide range of burn prevention prophylaxis methods requires a multidisciplinary approach, including close cooperation between the nurse and the doctor. The use of antimicrobial agents significantly reduces the microbial load on the wound and reduces the risk of infection, but it is used adjunctively with the early removal of dead tissues by surgical, mechanical or enzymatic methods. The use of procedures to reduce the risk of bacterial transfer between patients ensures patient safety and is important in reducing the risk of hospital infections. The patient care plan should be based on up-to-date medical knowledge and should be regularly updated.

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# PHYSICAL ACTIVITY DURING PREGNANCY

## AKTYWNOŚĆ FIZYCZNA PODCZAS CIĄŻY

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### ABSTRACT

Physical activity should be a permanent part of everyone's daily routine. Pregnancy seems to be an ideal time to reflect on one's lifestyle and a great opportunity to start working out. Regular exercising while being pregnant not only prepares a woman for labour, but also increases the functional efficiency of her body, improves general physical fitness and positively affects her well-being.

Physical activity during pregnancy is still an open topic, which divides professionals from various countries. The American College of Obstetricians and Gynecologists (ACOG) and the Center for Disease Control and Prevention (CDC) promote physical exercise during pregnancy, while the Polish Gynecological Society (PTG) does not recommend it.

Doubts on this subject could be dispelled by the position of the World Health Organization (WHO), but so far WHO has not made a clear stance on undertaking physical activity by pregnant women. This article presents both the advantages of undertaking physical activity during pregnancy and contraindications to doing so. It presents recommendations regarding undertaking physical activity in successive trimesters and information on abdominal muscle training during pregnancy.

The aim of the study is to increase the awareness of women to the topic on physical activity during pregnancy, as well as informing them of the rules of its taking and continuing.

**KEYWORDS:** physical activity, pregnancy, exercise, healthy lifestyle.

### STRESZCZENIE

Aktywność fizyczna powinna stanowić stałą część dnia każdego człowieka. Ciąża wydaje się być idealnym momentem skłaniającym do refleksji oraz być doskonałą okazją, aby rozpocząć ćwiczenia. Regularne ćwiczenia w czasie ciąży nie tylko stanowią przygotowanie do porodu, ale także zwiększają wydolność czynnościową organizmu ciężarnej, poprawiają sprawność ogólną oraz prowadzą do poprawy samopoczucia.

Aktywność fizyczna w czasie ciąży wciąż pozostaje tematem otwartym, dzielącym specjalistów z różnych krajów. Amerykańskie Towarzystwo Położników i Ginekologów (ACOG) oraz Centrum Prewencji i Kontroli Chorób (CDC) promują aktywność fizyczną w czasie ciąży, podczas gdy Polskie Towarzystwo Ginekologiczne (PTG) w swych zaleceniach podkreśla, iż aktywność fizyczna jest niewskazana.

Wątpliwości w tym temacie rozwiątałyby stanowisko Światowej Organizacji Zdrowia (WHO), jednak jak na razie Organizacja ta nie zajęła jednoznacznego stanowiska w sprawie podejmowania aktywności fizycznej przez kobiety w ciąży.

Artykuł przedstawia zalety podejmowania aktywności fizycznej podczas ciąży, jak również przeciwwskazania do jej podejmowania. W artykule przedstawiono zalecenia dotyczące podejmowania aktywności fizycznej w czasie ciąży z podziałem na kolejne trymestry jej trwania oraz informacje na temat treningu mięśni brzucha podczas ciąży.

Celem pracy jest zwiększenie wiedzy kobiet na temat aktywności fizycznej w czasie ciąży, a także poinformowanie o zasadach jej podejmowania i kontynuowania.

**SŁOWA KLUCZOWE:** aktywność fizyczna, ciąża, ćwiczenia, zdrowy tryb życia.

### Introduction

Physical activity is one of the basic elements of a healthy lifestyle and should be a constant part of every person's daily routine. It is very important to make sure that the time spent on physical exercise does not involve taking care of personal or business matters, but is devoted solely to resting and relaxation.

Physical activity is defined as any bodily movement performed by skeletal muscles that results in increased energy expenditure. It should be understood not only as

a particular sport discipline, such as yoga, football or swimming. Physical activity includes primarily the activities performed on a daily basis, i.e. walking, cleaning, cooking, dishwashing and working.

Pregnancy may seem like the perfect time to sit or lie down and relax. The feeling of fatigue and additional pregnancy-related complaints tend to be seen as a medical condition or a pathology. Some people perceive a pregnant woman as not fully functional or even limited in a way. What is worse, at some point even



women themselves start believing in this as they listen to family and friends' opinions or read posts on online forums. Nothing could be further from the truth. Pregnancy does not have to stop women from being active. Actually, it can be a good time to reflect and a great opportunity to start exercising and change bad lifestyle habits. As a result, the feeling of fatigue and discomfort may disappear or the symptoms may become less intense and less frequent.

### **Positions of various global organizations regarding physical activity during pregnancy**

The American College of Obstetricians and Gynecologists (ACOG) published recommendations on physical activity during pregnancy already in 2002. Although these recommendations are still being updated and have been confirmed by the Center for Disease Prevention and Control (CDC), they differ, for instance, from recommendations of the Polish Gynecological Society (PTG) on antenatal care in normal pregnancy published in 2005. Many organizations around the world, such as Sports Medicine Australia (SMA), Physical Activity Australia (PAA) or the Blueearth Foundation, hold similar views on physical activity during pregnancy to those of the American College of Obstetricians and Gynecologists and the Center for Disease Control and Prevention [1, 2].

The recommendations of the Polish Gynecological Society clearly state that the level of physical activity should be decreased during pregnancy and that undertaking or increasing physical activity at that time is contraindicated [2]. However, the American College of Obstetricians and Gynecologists advises that pregnant women should slowly and gradually start engaging in physical activity, and those who were very active prior to pregnancy should continue exercising after consultation with a specialist and on condition that their weight control is maintained [3].

Although to date the World Health Organization (WHO) has not issued recommendations on physical activity during pregnancy or on discrepancies in the recommendations published by various organizations, such as ACOG or PTG, more and more specialists address this subject and conduct research, suggesting that pregnant women not only can but should exercise regularly. While physical activity is recommended to women by an increasing number of physicians, specifying the types of exercise that are safe and allowed during pregnancy remains problematic.

As recommended by the American College of Obstetricians and Gynecologists, women with uncomplicated pregnancies may take up or continue doing most

types of exercise. This does not increase the risk of miscarriage, low birth weight or premature delivery. However, the exercise regimen should be discussed with a physician or another healthcare provider, i.e. a midwife or a physiotherapist [3]. On the other hand, recommendations by the Polish Gynecological Society emphasize that physical activity during pregnancy increases the risk of premature delivery and complications, such as dehydration, abnormal uterine and placental blood flow, fetal growth disorders, excessive fatigue, fainting, and others [2].

The latest studies suggest that pregnant women should be physically active. According to recommendations by the Physical Activity Resource Center (PARC), pregnant women should not give up on exercising. It is stressed that if prior to pregnancy a woman was physically active at least three times a week for 30 minutes, and her pregnancy is uncomplicated, she may remain physically active also when pregnant. For women who were not physically active prior to pregnancy, the best time to start exercising is the beginning of the second trimester. This period is characterized by reduced risk of pregnancy problems [4].

### **Changes occurring in the body during pregnancy**

The body of a pregnant woman undergoes changes (anatomical and functional). They mainly occur in the cardiovascular, respiratory, musculoskeletal, reproductive, urinary, digestive, nervous, endocrine and immune systems. Pregnancy causes changes in energy requirements, metabolism and calorie storage capacity [5]. Common pregnancy-related complaints include: back pain, fatigue, insomnia, nausea, vomiting, heartburn, edema, varicose veins and frequent urination [6].

### **Advantages of undertaking physical activity during pregnancy**

Regular exercising prepares the body of a pregnant woman for labour, increases her functional capacity, improves her overall fitness, enhances well-being and boosts self-esteem. In addition, physical activity during pregnancy alleviates pregnancy-related symptoms, reduces low back pain, increases joint mobility, improves circulatory function (strengthening the heart and blood vessels), and reduces the risk of gestational diabetes, hypertension and preeclampsia. Regular physical exercises promote healthy weight gain during pregnancy, help to lose weight after childbirth, and lead to a rapid return to a state of general fitness in the postpartum period [3, 5, 7, 8].

## Recommendations on undertaking physical activity during pregnancy

The recommendations by the American College of Obstetricians and Gynecologists define precautions that pregnant women should follow when exercising. According to the guidelines, plenty of water should be drunk during and after exercising in order to prevent dehydration. Workout clothing should be comfortable and airy, and the sports bra should be well-fitted so as to protect the breasts [9]. Both the American College of Obstetricians and Gynecologists and the Physical Activity Resource Center stress that physical activity is contraindicated during fever, in overheated rooms and on hot days. Too high body temperature, especially above 38°C in the first trimester of pregnancy, may lead to miscarriage by inducing contractions of the uterus. According to the American College of Obstetricians and Gynecologists, animal studies have shown that a 1.5°C rise in the temperature of the mother's body causes severe birth defects in fetuses. Human studies have shown that hyperthermia above 39°C in the first two months of pregnancy may have a teratogenic effect [9, 10].

In the second and third trimesters of pregnancy, a woman should reduce the amount of exercise done in the standing or the supine position. Exercise performed in these positions may cause the aortocaval compression syndrome, also known as the inferior vena cava syndrome. The inferior vena cava is formed by-joining common iliac veins and runs on the right side of the body. During pregnancy the uterus also becomes physiologically slightly shifted to the right and as it expands, it initially compresses large blood vessels, half-way through the pregnancy the aorta and later the inferior vena cava [11]. The compression of this vessel may lead to shock symptoms (pallor, dyspnoea, dizziness, sweating), reduction of venous blood flow to the heart, reduction of cardiac output and intrauterine hypoxia [10]. The best positions for exercising during pregnancy are four point kneeling, the left lateral position and the seated position.

The Center for Disease Control and Prevention recommends that pregnant women should spend at least 150 minutes per week on moderate aerobic exercises so as to benefit from physical activity during pregnancy. Examples include fast marching, gardening, swimming and other exercises that involve large parts of the muscles and increase the heart rate. Women who were not physically active prior to pregnancy should slowly and gradually increase both the frequency and intensity of exercise. Women who engaged in physical activity prior to pregnancy for pleasure or professionally might continue the training after consultation with a specialist obstetrician [1].

In the first trimester, low intensity exercises are recommended. Women are advised to practice breathing, relaxation and do exercises to correct their body posture. High intensity and strength training should be avoided during the first trimester of pregnancy. Exercise positions are not relevant at this time. They can be done while standing, sitting or lying, on either side or on the back. In the second trimester, it is recommended to do exercises that improve flexibility and mobility of hip joints and strengthen pelvic floor muscles. Both weight and strength training, as well as high intensity exercises are allowed. One should avoid exercises done in the supine position, jumps and violent movements, as well as exercises which may result in intrauterine hypoxia or injury. The intensity, frequency and type of exercises performed in the third trimester of pregnancy should be adjusted to the woman's abilities. At this stage, it is important to do exercises in the most relaxing positions and to breathe properly throughout. A common complaint occurring in the third trimester of pregnancy is back pain. Proper exercises can reduce tension in the back and relieve back pain. It is equally important to maintain the right position – seated position on a ball or standing on all fours. Examples of such exercises include cat stretch, hip circles, tilting hips forward and back, and lifting one or two limbs in the four point kneeling position [12].

The American College of Obstetricians and Gynecologists stresses that pregnant women should avoid sports that increase the risk of falling, contact sports with a potential for abdominal injury and sports that require breath holding, e.g. diving. Exercises that pregnant women should avoid include climbing and sports practiced at altitudes exceeding 2,500 m above the sea level, which may result in altitude sickness [9].

## Training abdominal muscles during pregnancy

Much controversy is still associated with strength training and exercising abdominal muscles during pregnancy. Dr. Cooker Perkins and Hannah Dewalt believe that uncomplicated pregnancy is not a contraindication to CrossFit training, and both stress that the body adjusts to the stimuli it is exposed to. In their publication, they compared training plans of two women who volunteered to continue their workouts during pregnancy. One did CrossFit workouts while the other performed a standardized workout for pregnant women. The workouts differed in duration, intensity and type of exercise. The woman who continued CrossFit did 10-minute high intensity workouts during which she performed 255 repetitions for muscle strength, power and endurance. The other woman did 15-minute workout sessions of moder-

ate intensity during which she performed 80 repetitions for muscle strength. Both women gave birth in the 40th and 41st week of their pregnancies, respectively. Both babies had normal birth weight. Dr. Cooker Perkins and Hannah Dewalt recommend increasing awareness and the sense of body during pregnancy, and point out that although the results of their study are encouraging, they are insufficient to promote this type of training in all pregnant women [13].

Weight gain during pregnancy and weakening of muscles resulting from limited physical activity are a huge problem among pregnant women. That is why it is vital for them to start or continue physical exercise during pregnancy, especially strength training which reduces the complaints related to the musculoskeletal system and strengthens muscles. It is believed that strength training during pregnancy is safe for women who regularly did it prior to becoming pregnant. However, trying out new strength exercises which were not practiced prior to pregnancy, isometric exercises and resistance exercises performed in the supine position should be avoided. When increasing weights during workouts, a pregnant woman should observe her body's reactions. Towards the end of pregnancy, weights should be reduced so that the woman does not feel pain or fatigue. What is crucial for pregnant women, is maintaining the proper strength of the muscles of the limbs, the abdomen and the lower back. For instance, a woman should become strong enough to be able to raise her newborn baby after giving birth [13].

The effects of abdominal muscle training are still unknown. None of the organizations promoting physical activity during pregnancy have taken a stance on this issue. The proponents believe that these exercises prevent both the overstretching of abdominal wall muscles and diastasis recti. An additional argument for is the fact that after giving birth women get their pre-pregnancy bodies back much faster [13]. The opponents, on the other hand, believe that working out to strengthen straight abdominal muscles may cause premature uterine contractions by increasing the pressure in the abdominal cavity and by compressing the uterus. That is because the so called "crunches" lead to the occurrence of the Valsalva phenomenon. In addition, it is believed that strengthening of abdominal muscles during pregnancy does not prevent them from stretching, and may actually contribute to abdominal separation [14]. It is worth emphasizing that most exercises for abdominal muscles, i.e. "crunches", are performed in the supine position, which is not recommended during pregnancy.

## **Contraindications for physical activity during pregnancy**

The American College of Obstetricians and Gynecologists has issued contraindications for exercising during pregnancy. The absolute contraindications include severe heart disease, restrictive lung disease, pregnancy-induced hypertension, incompetent cervix or cerclage, placenta previa after 26 weeks of gestation, persistent second- or third- trimester bleeding, the ruptured amniotic sac and the risk of premature birth. Relative contraindications include severe anemia, arrhythmia, obesity, underweight, multiple pregnancy, chronic bronchitis, intrauterine growth restriction, poorly controlled hypertension, preeclampsia, severe gestosis, orthopedic limitations and poorly controlled thyroid disease, poorly controlled type I diabetes and seizure disorder. Relative contraindications also included nicotine addiction and sedentary lifestyle [9].

## **Summary**

When engaging in physical activity during pregnancy, women should keep in mind that in the event of disturbing symptoms, exercise should be stopped and an appointment with a gynecologist should be made. Unusual symptoms that may occur during exercise include malaise, fatigue, abdominal pain, headache and dizziness, fainting, chest pain and shortness of breath, vaginal bleeding, calf pain and swelling, muscle aches, weaker fetal movements, uterine contractions and amniotic fluid leakage [9, 15].

Pregnant women seeking answers to questions regarding pregnancy, childbirth and the postpartum period, tend to look for information online. Research conducted in 2003 showed that 56% of women learn about pregnancy and health behaviors during pregnancy from the Internet. Studies conducted a decade later showed that as many as 71% of pregnant women got information about pregnancy from the Internet [16, 17]. In the 21<sup>st</sup> century, the Internet is not only a rich source of knowledge, but also a great threat. There are many websites devoted both to general and specialist gynecological and obstetric issues, which are authored by doctors, midwives, nurses, physiotherapists and other specialists. Unfortunately, alongside these sites, one can find many guides, advertisements, videos and numerous online forums where messages and comments are posted by people with insufficient medical knowledge.

Nowadays, more and more people take care of their appearance and aspire to achieve the perfect body through various diets and supplements, by practicing sports or undergoing cosmetic treatments or even surgery procedures. Pregnant women also want to look as

perfect as models from the covers of mother magazines prior to and after childbirth. In order to reach their goal, women risk their own and their baby's health by restricting their diets and by doing grueling workouts found on Internet websites. Some women use the help of professionals, but, according to research, the majority of pregnant women use free and easy-to-access sources, such as the Internet.

A significant shortcoming of the Internet is the lack of control over what is published and by whom. Hence the great challenge for professionals to try and help their patients and clients by providing them with information based on the conducted research and according to the current medical knowledge.

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# ■ THE REPORT FROM THE TENTH STUDENT SCIENTIFIC SYMPOSIUM: WROCLAW PUBLIC HEALTH DAYS

## *SPRAWOZDANIE Z X STUDENCKIEGO SYMPOZJUM NAUKOWEGO: WROCŁAWSKICH DNI ZDROWIA PUBLICZNEGO*

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On March 23, 2017 representatives of the Student Scientific Society “Manage Your Health” at the University of Medical Sciences in Poznań (Daria Nowadzka and Natalia Kurczak) participated in the 10<sup>th</sup> edition of the Student Scientific Symposium “Wroclaw Public Health Days” under the name “Quo Vadis Public Health?” This two – day meeting was organized by the Student Scientific Society of Young Managers at the Faculty of Health Sciences, Wroclaw Medical University and the Polish Society of Public Health.

During the first day, the following Sessions took place: Inaugural, Change Management, International session, and Communication and Education. Among several interesting lectures the most thought-provoking were: “Quo Vadis AI – time to change in the health care?” presented by Dawid Łyś and “Crisis of the medical staff as a challenge to the health system” given by Alicja Domagala. The first of the aforementioned speakers raised a question that could soon be addressed in many areas of health care, and discussed an alternative to the work of medical personnel, i.e. in the area of patient outcomes analysis. The second speaker talked about the crisis of medical staff. The figures presented clearly pointed to the dangerous shortage of medical professionals that needs urgent interventions.

One of the most inspiring and motivating lecture was presented by Katarzyna Kozłowska and Agata Biernat who brought closer the problem of communication in oncological prevention on the example of nationwide information and the education campaign, entitled “Rakkoobrona”. The speakers provided several examples of actions taken to identify factors that could significantly increase the risk of cancer of the cervix, malignant melanoma and lung cancer.

During the second day of the Symposium, unfortunately we could not personally attend, there were two sessions: E-Health and Varia. The winners of the Varia session were: Wojciech Szorski and Paulina Tokarzewska who presented the speech entitled “Topography of “black spots” in medical processes of operating theaters in Poland”.

An extremely interesting program, as well as a number of substantive presentations and inspirational debates, which were also attended by international guests for the first time, have long held the conference as a model of good practice and mobilization and a great commitment of the organizers.



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CZĘSTOCHOWA 2018

## KOMUNIKAT PRASOWY

**XXII Konferencja Naukowo-Szkoleniowa Opieki Paliatywnej i Zespołów Hospicyjnych  
w Częstochowie w dniach 18–20 stycznia 2018 r.**

**pt. „Miłuj bliźniego swego jak siebie samego”**

**połączona z obchodami 25-lecia Stowarzyszenia Opieki Hospicyjnej Ziemi Częstochowskiej**

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ma na celu promowanie idei hospicyjnej i opieki paliatywnej, prezentację osiągnięć naukowych, szerzenie wiedzy w zakresie leczenia i wsparcia chorych w schyłkowej fazie nieuleczalnej i niepoddającej się leczeniu choroby, a także tworzenie forum do dyskusji, wymiany doświadczeń i integracji środowiska. Do uczestnictwa w Konferencji zapraszamy naukowców, ekspertów, praktyków, pielęgniarki, lekarzy, psychologów, fizjoterapeutów, studentów, doktorantów, oraz wszystkie osoby zainteresowane zagadnieniami z zakresu opieki paliatywnej i hospicyjnej.

Organizator: Stowarzyszenie Opieki Hospicyjnej Ziemi Częstochowskiej.

Współorganizatorzy: Zakład Medycyny i Opieki Paliatywnej Katedry Pielęgniarstwa – Wydział Nauk o Zdrowiu ŚUM w Katowicach, Polskie Towarzystwo Pielęgniarstwa Opieki Paliatywnej, Koło Terenowe Polskiego Towarzystwa Pielęgniarstwa w Częstochowie.

Patroni medialni: TVP3 Katowice, Telewizja ORION, Telewizja NTL, Radio Jasna Góra, Radio Jura, Pielęgniarstwo Polskie, Tygodnik Katolicki Niedziela, Medycyna Praktyczna, Portale: baza konferencji, Konferencje Medyczne.

Szczegółowe informacje publikowane będą na stronie internetowej: [www.hospicjum-konferencja.pl](http://www.hospicjum-konferencja.pl)

## WSKAZÓWKI DLA AUTORÓW

### WSTĘP

#### Informacje dla autorów

„Pielęgniarstwo Polskie” jest kwartalnikiem. Zamieszcza recenzowane prace oryginalne, pogładowe i kazuistyczne oraz recenzje książek, sprawozdania ze zjazdów naukowych, notatki kronikarskie, wspomnienia pośmiertne itp. napisane w języku polskim oraz angielskim. Czasopismo ukazuje się w papierowej wersji pierwotnej oraz w wersji elektronicznej w systemie open-access na stronie internetowej <http://www.pielengniarstwo.ump.edu.pl/>. Siedziba redakcji czasopisma mieści się w Katedrze Pielęgniarstwa Uniwersytetu Medycznego im. Karola Marcinkowskiego, ul. Mariana Smoluchowskiego 11, 60-179 Poznań.

#### Zgłoszenia prac

Prace należy przysyłać drogą elektroniczną poprzez internetowy system redakcyjny przetwarzania prac „Open Journal Systems” (OJS), dostępny w zakładce „zgłaszanie manuskryptów on-line”. Pracę należy wprowadzić do systemu zgodnie z instrukcją, po uprzednim zalogowaniu się lub zarejestrowaniu – w przypadku braku swojego konta w systemie. W procesie zgłaszania pracy w systemie OJS należy pamiętać o wprowadzeniu danych:

- imię i nazwisko wszystkich autorów z afiliacją (skorzystać z opcji „dodać autora”),
- skan wypełnionego druku **Oświadczenia autorów** w pliku pomocniczym systemu edytorskiego. Wzór oświadczenia dostępny jest na: [oswiadczenie.doc](#),
- adres autora, do którego będzie kierowana korespondencja. Adres należy wpisać wyłącznie w biogramie pod afiliacją wybranego autora. Należy podać: imię i nazwisko, pełny adres (ulica, kod, miejscowość), numer telefonu (służbowy), e-mail, afiliację autora.

#### Przygotowanie manuskryptu

Tekst powinien być napisany 12-punktową czcionką Times New Roman, z odstępem między wierszami 1,5 (półtora odstępu), 2,5 cm marginesem z każdej strony, bez sformatowania, tj. bez twardych spacji, znaków końca linii, przy użyciu tzw. miękkich enterów. Powinien być wyrównany (wyrównany do lewego i prawego marginesu). Należy pisać zwykłą czcionką w kolorze jednolicie czarnym (dopuszcza się wytłuszczenie tytułów i podtytułów), bez wyróżnień dużymi literami, bez rozstrzelania, podkreśleń linią ciągłą itp. W liczbach miejsca dziesiętne należy oddzielać przecinkami (nie kropkami). Akapity należy rozpoczynać wcięciem przy użyciu odpowiedniego polecenia w edytorze tekstu (bez używania tzw. enterów). Przed zapisem z tekstu należy usunąć wszystkie zaznaczenia używane podczas redagowania tekstu w edytorze. Prace w języku angielskim powinny być napisane poprawną angielszczyzną. Plik należy zapisać w formacie: DOC lub DOCX. Kolejne strony należy ponumerować, zaczynając od strony tytułowej.

Praca powinna zawierać, w kolejności:

- stronę tytułową,
- streszczenie w języku polskim i angielskim,
- słowa kluczowe w języku polskim i angielskim,
- manuskrypt wraz z tabelami, rycinami, fotografiami,
- piśmiennictwo wg stylu Vancouver,
- informację o źródłach finansowania i konflikcie interesów.

#### Strona tytułowa

Zawiera tytuł pracy w języku polskim i angielskim. W tytule nie należy zamieszczać skrótów. Prosimy o niepodawanie danych dotyczących nazwisk autorów i ich afiliacji ze względu na anonimowość recenzji.

#### Strona druga

Zawiera streszczenie w języku polskim i angielskim. **Streszczenie** w pracach oryginalnych powinno mieć charakter struk-

## GUIDANCE FOR AUTHORS

### INTRODUCTION

#### Information for authors

‘Pielęgniarstwo Polskie’ (‘Polish Nursing’) is a quarterly. It prints reviewed original research, opinion articles and case studies, book reviews, conference reports, notes on events, obituaries, etc. in both Polish and English. “Pielęgniarstwo Polskie” (Polish Nursing) is published in the open-access on the following website: <http://www.pielengniarstwo.ump.edu.pl/>. The editorial office is located in the Chair of Nursing, Poznan University of Medical Sciences, Smoluchowskiego 11, 60-179 Poznan.

#### Paper submission

Papers should be submitted electronically via the editorial journal processing system ‘Open Journal Systems’ (OJS), available in ‘submission of manuscripts on-line’. The paper should be entered into the system in accordance with the instructions, after logging in or registering if you are new to the system. When submitting papers in the OJS be sure to enter the following data:

- all authors’ first names and surnames with affiliation (use the option ‘add the author’),
- the completed scanned form of **Authors’ declarations** in the auxiliary file of the editorial system. The model declaration is available on: [oswiadczenie.doc](#),
- the corresponding author’s address. The address should be entered only in the biographical note under the affiliation of the author in question. Please provide: name, full address (street, post code, town), office telephone number, e-mail address, author’s affiliation.

#### Manuscript preparation

The text should be written with 12 spot font Times New Roman, with the space between the lines 1.5 (one and a half space), 2.5 cm margin from every side, without editing, i.e. without hard spaces, end of the line signs (so-called soft enters). It should be justified (balanced to the left and right-hand margins). One should write with an ordinary font in black exclusively (greased titles and subtitles are possible), without upper case distinctions, spacing out or underlining with the solid line, etc. In numbers, decimals should be separated by commas (not dots). Paragraphs should begin indented using the appropriate commands in a text editor (without using the so-called breaks between). Before saving, one must remove all selections used when editing the text. Papers in English should be written in the correct English language. The file should be saved in the format: DOC or DOCX. Pages should be numbered, starting with the title page.

The paper should include, in order:

- title page,
- abstract in Polish and English,
- key words in Polish and English,
- manuscript with tables, figures and photographs,
- literature prepared in accordance with the Vancouver style,
- information on sources of funding and conflict of interest.

#### Title page

It includes the paper title in Polish and in English. The title should not contain abbreviations. Please, do not include authors’ names and affiliations due to review anonymity.

#### Second page:

It contains abstracts in Polish and in English. **The abstract** of original papers should be structural – it should contain: **Intro-**

turalny – zawierać: **Wstęp, Cel, Materiał i metody, Wyniki, Wnioski**; w przypadku prac kazuistycznych – **Wprowadzenie, Cel, Opis przypadku, Wnioski**; w przypadku prac poglądowych – **Wstęp, Podsumowanie kolejnych rozdziałów, Podsumowanie/Wnioski**. Streszczenie (w języku polskim oraz angielskim) powinno zawierać nie więcej niż 250 słów. Należy unikać skrótów, a w przypadku ich użycia podać wyjaśnienie przy pierwszym zastosowaniu. Pod streszczeniem należy umieścić słowa kluczowe – nie więcej niż pięć w języku polskim i angielskim, spośród wymienionych w Medical Subject Headings (MeSH).

### Strona trzecia i kolejne

Powinny zawierać zasadniczy tekst pracy.

### PRACA ORYGINALNA

Praca w tej kategorii przedstawia wyniki oryginalnych badań przeprowadzonych w dziedzinach zgodnych z obszarem zainteresowań czasopisma (zob. Wstęp). Konstrukcja tekstu powinna być następująca:

**Wprowadzenie** powinno zawierać syntetycznie ujętą podstawę teoretyczną i empiryczną badania wraz z jego uzasadnieniem, bez szczegółowego, obszernego przeglądu literatury i wcześniejszych badań.

**Cel pracy** powinien być jasno określony i nawiązywać do informacji podanych we **Wprowadzeniu**.

**Materiał** – opis powinien być na tyle szczegółowy, aby możliwa była replikacja badania.

**Metody** – opis powinien być na tyle szczegółowy, aby możliwa była replikacja badania. W przypadku stosowania wcześniej opublikowanych metod i narzędzi badawczych należy podać stosowne przypisy bibliograficzne.

**Wyniki** powinny być przedstawione w sposób jasny i zwięzły, bez szczegółowego powtarzania informacji zawartych w tabelach i rycinach.

**Dyskusja** powinna podkreślać znacznie wyników badań własnych w kontekście literatury przedmiotu. Nie powinna powtarzać wyników ani zastępować przeglądu piśmiennictwa.

**Wnioski** powinny mieć uzasadnienie w przeprowadzonym badaniu.

Tekst pracy nie powinien przekraczać 6 tys. słów, tj. ok. 12–15 stron (łącznie z tabelami, rycinami i **Piśmiennictwem**). **Piśmiennictwo** nie powinno przekraczać 25 pozycji. Należy podać informację o zgodzie właściwej komisji bioetycznej na przeprowadzenie badania (w części **Materiał** lub **Metody**).

### PRACA POGLĄDOWA

Prace w tej kategorii dotyczą przeglądu wiedzy na temat ważnych zagadnień, istotnych odkryć w zakresie pielęgniarstwa i dziedzinach pokrewnych. Układ publikacji poglądowej różni się od publikacji oryginalnej brakiem opisu przeprowadzonych badań, a zamiast dyskusji wyników zawiera kolejne rozdziały stanowiące główną część pracy (np. zestawione z sobą wnioski z innych publikacji). Zalecany jest podział tekstu na rozdziały opatrzone zwięzłymi tytułami i/lub śródtytułami. **Podsumowanie/Wnioski** zawierają własne przemyślenia wynikające z przeprowadzonego przeglądu piśmiennictwa opisanego w poszczególnych rozdziałach pracy. Objętość pracy nie może przekraczać 6 tys. słów, tj. ok. 12–15 stron (łącznie z **Piśmiennictwem**). **Piśmiennictwo** nie powinno przekraczać 40 pozycji.

### PRACA KAZUISTYCZNA

Praca kazuistyczna opisuje jeden lub więcej interesujących, rzadkich przypadków. Praca powinna mieć następujący układ: **Wprowadzenie, Opis przypadku, Dyskusja**. Objętość nie może przekraczać 2,5 tys. słów, tj. ok. 3–4 stron (łącznie z **Piśmiennictwem**).

**duction, Aim, Material and methods, Results and conclusions**; in case studies – **Introduction, Aim, Case, Conclusions**; in review papers – **Introduction, Summary of each chapter, Summary/Conclusions**. The abstract (in Polish and English) should contain no more than 250 words.

Abbreviations should be avoided, and when used, the explanation of the first application should be given.

Under the abstract key words should be included – not more than 5 in Polish and English, from among those listed in the Medical Subject Headings (MeSH).

### Third and next pages

They should contain the main text of the paper.

### ORIGINAL PAPER

The original paper presents results of original investigations conducted in the field of nursery and medicine in general (see Introduction). The paper should be divided into:

**Introduction** – it should contain a synthetically recognized theoretical and empirical framework of the research along with its justification, without a detailed, comprehensive literature review and previous studies.

**Aim** – it should be clearly defined and should refer to the information included in the Introduction

**Material** – the description should be sufficiently detailed to allow for the study replication

**Methods** – the description should be sufficiently detailed to allow for the study replication. When using previously published methods and research tools, provide the appropriate bibliographical references.

**Results** – they should be presented in a clear and concise way, without a detailed repetition of the information contained in tables and figures.

**Discussion** – it should emphasize the importance of one's own research results in the context of literature. It should not repeat results or replace the literature review.

**Conclusions** – they should be justified in the research carried out.

The text should not exceed 6000 words, i.e. about 12–15 pages (including tables, figures and **References**). **References** should not exceed 25 items. Please provide information on the approval of conducting the research by the relevant bioethics committee (in Material or Methods).

### OPINION ARTICLE

Opinion articles concern fundamental findings in the field of nursery and medicine in general. The opinion article structure is different from the original paper in the lack of the conducted study description and, instead of Discussion, it contains subsequent chapters constituting the main part of the paper (e.g. summarized conclusions from other publications). It is recommended to divide the text into chapters with concise titles and/or subtitles. **Summary/Conclusions** contain authors' own reflections resulting from the literature review, as described in separate chapters of the paper. The text should not exceed 6000 words, i.e. about 15–20 pages (including **References**).

### CASE STUDY

The case study presents one or more interesting rare cases or clinical conditions. The paper should be divided into: **Introduction, Case description** and **Discussion**. The text should not exceed 2500 words, i.e. about 3–4 pages (including **References**).

## PODSUMOWANIA ZJAZDÓW I INNE TEKSTY INFORMACYJNE (por. Wstęp)

Artykuły w tej kategorii nie powinny przekraczać 1–1,5 tys. słów (2 strony).

## PIŚMIENICTWO

Piśmiennictwo powinno być napisane na oddzielnej stronie, wg standardu Vancouver. Należy podawać tylko pozycje związane z tematem pracy i uwzględnione w tekście manuskryptu. Cytowania powinny być numerowane w kolejności ich występowania w tekście i powinny być oznaczane cyframi arabskimi w nawiasach kwadratowych. W spisie piśmiennictwa każda kolejna pozycja powinna być pisana od nowego wiersza i poprzedzona numerem. Należy przestrzegać jednolitej interpunkcji wg wzorów:

W przypadku źródeł z czasopisma należy podać: nazwiska autorów i pierwsze litery imion, następnie: tytuł artykułu, tytuł czasopisma z zastosowaniem obowiązujących skrótów wg bazy danych MedLine (zawsze zakończone kropką), rok publikacji, tom, numer strony pierwszej i ostatniej. Nie należy podawać źródeł: „w druku”, „w przygotowaniu”, „informacja ustna”.

Przykład:

1. Kowalski J, Nowak J. Nozologiczne aspekty bólów głowy. J Med. 2007; 1: 12–27.

W przypadku cytatu z książki należy podać: nazwiska autorów i pierwsze litery imion, następnie: tytuł książki, siedzibę i nazwę wydawnictwa, rok wydania, numer strony pierwszej i ostatniej.

Przykład:

2. Pawlak P. Życie i umieranie. Warszawa: PWN; 2007. 12–32.

W przypadku cytowania rozdziału pochodzącego z książki należy podać: nazwisko/nazwiska i pierwsze litery imion autora/autorów tegoż rozdziału, tytuł rozdziału cytowanej książki, nazwisko i imię autora (redaktora) książki, tytuł książki, siedzibę i nazwę wydawnictwa, rok wydania, numer pierwszej i ostatniej strony cytowanego rozdziału.

Przykład:

3. Pawlak P. Życie i umieranie. W: Malinowski A (red.). Gerontologia. Warszawa: PWN; 2007. 12–32.

W przypadku cytowania materiału elektronicznego (Internetu) należy podać: nazwiska autorów i pierwsze litery imion, następnie: tytuł artykułu, pełny adres strony internetowej oraz datę dostępu (datę wejścia).

## TABELE

Tabele należy wykonać w programie Word dla Windows. Powinny być w formie edytowalnej, z ograniczeniem linii wertykalnych. Tabele powinny być oznaczone numerami arabskimi, z użyciem pełnego wyrazu **Tabela**, a nie skrótu **tab.** (np. Tabela 5). Tytuły w języku polskim i angielskim powinny znajdować się nad tabelami. Tekst w tabeli powinien być napisany czcionką Arial Narrow CE wielkości 10 pkt. Szerokość tabeli nie powinna przekraczać 8 cm lub 16 cm. Wnętrze tabeli powinno zawierać również wersję angielską. Liczba tabel powinna być ograniczona do niezbędnego minimum.

## RYCINY

Wykresy należy wykonać w programie Word dla Windows lub Excel. Ilustracje należy zapisać w formacie TIF lub JPG. Ryciny należy podpisywać w języku polskim i angielskim z użyciem numeracji arabskiej, bez używania skrótu **ryc.** (czyli np. Rycina 5). Tytuły w języku polskim i angielskim powinny być napisane w programie Word, edytowalne i powinny znajdować się pod rycinami. Liczba rycin powinna być ograniczona do niezbędnego minimum.

## CONFERENCE REPORTS AND OTHER INFORMATION TEXTS (compare Introduction)

The text should not exceed 1000–1500 words (2 pages).

## REFERENCES

Literature should be presented on a separate sheet of paper using the Vancouver style. Only references related to the topic of the paper should be included in the text of the manuscript. Quotations should be numbered according to their appearance in the text and marked using Arabic numerals in square brackets. Each new item in the list of references should be written in a new line, preceded by a number. Homogeneous punctuation should be respected as follows:

The sequence for a journal article should be the following: authors' names and first names, paper title, journal title abbreviated as in the MedLine database (always ended up with a dot), year of publication, volume number, first and last page numbers. One should not include references: 'in print', 'to appear soon', 'oral information'.

Example:

1. Kowalski J, Nowak J. Nozologiczne aspekty bólów głowy. J Med. 2007; 1:12–27.

The sequence for the book should be as follows: authors' names and first letters of their first names, book title, place and edition of publication, year of publication, first and last page numbers.

Example:

2. Pawlak P. Życie i umieranie. Warszawa: PWN; 2007.12–32.

The sequence for the book chapters should be as follows: chapter authors' names and first letters of their first names, chapter title, book title, book authors, place and edition of publication, year of publication, chapter first and last page numbers.

Example:

3. Pawlak P. Życie i umieranie. W: Malinowski A (red.). Gerontologia. Warszawa: PWN; 2007.12–32.

The sequence for the Internet should be as follows: authors' names and first letters of their first names, paper title, full address of the website, access date.

## TABLES

Tables should be prepared in Word for Windows. They should be in the editable form, limiting vertical lines. All tables should be numbered using Arabic numerals and a full word 'TABLE', not an abbreviation 'tab.' (e.g. Table 5). The titles in both Polish and English should be placed above tables. The text in the table should be written in 10-point *Arial Narrow CE* font. The width of the table should not exceed 8 cm or 16 cm. The interior of the table should also include the English version. The number of tables should be limited to the necessary minimum.

## FIGURES

Charts should be prepared in Word for Windows or Excel. Illustrations must be saved in JPG or TIF format. Figures should be provided with Polish and English captions and numbered using Arabic numerals, with no abbreviation 'fig.' (e.g. Figure 5). Titles in Polish and English should be written in Word, they should be editable and should be placed under figures. The number of figures should be limited to the necessary minimum.



## OŚWIADCZENIE AUTORÓW

Do każdej pracy należy dołączyć oświadczenie autorów, że praca nie była drukowana wcześniej w innym czasopiśmie. Aby przeciwdziałać przypadkom *ghostwriting* oraz *ghost authorship*, redakcja prosi autorów nadsyłanych prac o podanie informacji, jaki jest ich wkład w przygotowanie pracy. Informacja powinna mieć charakter jakościowy, tzn. autorzy zobowiązani są podać, czy ich wkład w powstanie publikacji polegał na opracowaniu koncepcji, założeniach, metod, protokołu itp. Autorzy są także proszeni o podanie źródeł finansowania badań, których wyniki są prezentowane w nadsyłanej pracy. Załączone do pracy oświadczenie powinno być podpisane przez wszystkich autorów zgłaszanej pracy.

## SKRÓTY

Skróty należy objaśniać przy pierwszym wystąpieniu, umieszczając je w nawiasie po pełnym tekście. Należy sprawdzić poprawność użytych skrótów. W tytule i streszczeniu zaleca się unikania skrótów. W tabelach i rycinach użyte skróty powinny być wyjaśnione w podpisach znajdujących się poniżej.

## PROCEDURA RECENZOWANIA

Wszystkie artykuły podlegają wstępnej ocenie Redaktora Naczelnego lub jednego z członków Rady Naukowej, którzy mogą odrzucić pracę lub przesłać ją do recenzji zewnętrznej. Podwójnie anonimowy system recenzowania przez przynajmniej dwóch ekspertów w danej dziedzinie jest stosowany dla artykułów zaakceptowanych do dalszej oceny. Po otrzymaniu recenzji Redaktor Naczelny podejmuje decyzję o akceptacji artykułu do druku, akceptacji po drobnej poprawie, akceptacji po zasadniczej poprawie lub odrzuceniu. Autorzy otrzymują uwagi do manuskryptu niezależnie od decyzji. W przypadku akceptacji pracy wymagającej poprawy **autorzy zobowiązują się ustosunkować się do recenzji w ciągu 30 dni**. Redakcja zastrzega sobie prawo poprawiania usterek dotyczących stylistyki, mianownictwa i skrótów oraz poprawek wersji w języku angielskim – bez uzgodnienia z autorem.

## PRAWA AUTORSKIE

W przypadku akceptacji artykułów do druku wydawca nabywa do nich prawa autorskie, a wszelkie reprodukcje wersji elektronicznej lub papierowej nie mogą być dokonywane bez zgody wydawcy.

## AUTHORS' DECLARATIONS

Each manuscript should be accompanied by authors' declarations that the paper has never before been published in any other journal. To counteract the occurrence of 'ghostwriting' or 'ghost authorship' phenomena the Editorial Board asks all listed authors of submitted papers to provide information on their contribution to manuscript preparation. The information has to be qualitative in character, i.e. the authors should state whether their work included preparation of the conceptual framework, assumptions, methods, protocol, etc. Authors are also asked to state sources of funding for research, the results of which are presented in the submitted paper. The declaration, attached to the manuscript, should be signed by all authors of a submitted paper.

## ABBREVIATIONS

Abbreviations must be defined in full along with their first appearance in the text. They should be placed in brackets after a full text. Their correctness should be checked. Avoiding abbreviations in titles and abstracts is recommended. Abbreviations used in tables and figures should be defined in captions below.

## REVIEWING PROCEDURE

All submitted papers are initially evaluated by the Chief Editor or a member of the Academic Council. The manuscripts may be turned down or reviewed further by two reviewers who do not know authors' names or the name of authors' institutions. On receiving the reviews, the Chief Editor decides whether the manuscript should be published, published after slight corrections, published after essential corrections or rejected. Authors receive remarks on the paper regardless of the decision made. If the manuscript is to be published after corrections, **authors are required to express their opinion on reviews within 30 days**.

The Editor reserves the right to make any adjustments of style, terminology and abbreviations as well as corrections of the English version without asking for the author's consent.

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