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

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

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ABSTRACT

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

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

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

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

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

STRESZCZENIE

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

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

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

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

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

Introduction

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

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

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

necessary in assessing the long-term results of increasing the number of students who begin their studies at the Midwifery department. Moreover, identification of factors that influence the progress and educational achievements as well as shaping the professional skills that eventually lead to a positive completion of studies are an important tool in rational planning and developing curricula [8].

Aim

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

Material and methods

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

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

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

Source: author's own analysis

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

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

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

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

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

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

In the model of multiple regression, the same set of socio-demographic predictors was applied and the

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

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

Results

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

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

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

* binary variable (dichotomous variable)

OR – odds ratio; 95% CI – confidence interval

Source: author's own analysis

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

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

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

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

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

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

* binary variable (dichotomous variable)

b – regression coefficient; β –standardized regression coefficient; t – value of statistics; 95% CI – 95% confidence interval

Source: author's own analysis

Discussion

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

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

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

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

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

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

the academic year of 2010/11 accumulated to as much as 34.9% [1]. That is why, achieving high precision in assessing candidates for whom the score is around the cut-off point is such an important element of the admission process, because this group of candidates bears the highest risk of attrition during studies [17].

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

Conclusions

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

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

References

1. Departament Pielęgniarek i Położnych przy Ministerstwie Zdrowia. Zabezpieczenie społeczeństwa w świadczenia

pielęgniarskie i położnicze – rekomendacje i ich realizacja. Warszawa; 2015.

2. Liczba pielęgniarek na 1000 mieszkańców: jesteśmy w ogonie Europy. Rynek Zdrowia; 2015. http://www.rynekzdrowia.pl/Polityka-zdrowotna/Liczba-pielegniarek-na-1000-mieszkancow-jestesmy-w-ogonie-Europy,154956,14.html. (Access 28.09.2015).

3. American Association of Colleges of Nursing. Nursing Shortage. Washington; 2009. http://www.aacn.nche.edu/media-relations/FacultyShortageFS.pdf. (Access 28.09.2015).

4. National Health Workforce Taskforce, 2009. Health workforce in Australia and factors for current shortages, 2009. www.nhwt.gov.au/documents/NHWT/The%20health%20workforce%20in%20Australia%20and%20factors%20influencing%20current%20shortages.pdf. (Access 28.09.2015).

5. Royal College of Nursing United Kingdom. Past trends, future imperfect? A review of the UK nursing labour market 2004 to 2005. www.rcn.org.uk/__data/assets/pdf_file/0008/78659/002760.pdf. (Access 28.09.2015).

6. Zinkowska D, Cholewka B, Wrońska I. Pielęgniarstwo jako kierunek zamawiany – działania podejmowane w perspektywie finansowej 2007–2013. Piel XXI w. 2013; 1: 9–14.

7. McMillan J. Longitudinal survey of Australian youth: Course change and attrition from higher education. http://www.lsay.edu.au/publications/1849.html. (Access 28.09.2015).

8. Pitt V, Powis D, Levett-Jones T, Hunter S. Factors influencing nursing students' academic and clinical performance and attrition: an integrative literature review. Nurse Educ Today. 2012; 32: 903–13.

9. Madigan V. Predicting prehospital care students' first-year academic performance. Prehosp Emerg Care. 2006; 10: 81–8.

10. McCarey M, Barr T, Rattray J. Predictors of academic performance in a cohort of pre-registration nursing students. Nurse Educ Today. 2007; 27: 357–64.

11. Ofori R. Age and 'type' of domain specific entry qualifications as predictors of student nurses' performance in biological, social and behavioural sciences in nursing assessments. Nurse Educ Today. 2000; 20: 298–310.

12. Pryjmachuk S, Easton K, Littlewood A. Nurse education: factors associated with attrition. J Adv Nurs. 2009; 65: 149–60.

13. van Rooyen P, Dixon A, Dixon G, Wells C. Entry criteria as predictor of performance in an undergraduate nursing degree programme. Nurse Educ Today. 2006; 26: 593–600.

14. Houltram B. Entry age, entry mode and academic performance on a Project 2000 common foundation programme. J Adv Nurs. 1996; 23: 1089–97.

15. Kevern J, Ricketts C, Webb C. Pre-registration diploma students: a quantitative study of entry characteristics and course outcomes. J Adv Nurs. 1999; 30: 785–95.

16. Panczyk M, Belowska J, Zarzeka A, Gotlib J. Assessment of readiness of candidates to undertake studies of the 1st degree at the Nursing department. Prob Piel. 2015; 23: 208–13.

17. Panczyk M, Zarzeka A, Belowska J, Gotlib J. Risk of attrition from Bachelor's degree of Nursing programme – predictive evaluation. Piel XXI w. 2015; 51: 66–72.

18. Andrew S, Salamonson Y, Weaver R, Smith A, O'Reilly R, Taylor C. Hate the course or hate to go: semester differences in first year nursing attrition. Nurse Educ Today. 2008; 28: 865–72.

19. Wilson R, Eva K, Lobb DK. Student attrition in the Ontario midwifery education programme. Midwifery. 2013; 29: 579–84.

20. Waters A. What a waste: Nursing Standard's investigation into attrition rates from pre-registration courses produced some startling findings. Nurs Stand. 2006; 20: 14–7.

21. Banks P, Kane H, Rae C, Atkinson J. Support for nursing and midwifery students: a special case? Nurse Educ Today. 2012; 32: 309–14.

22. Seago JA, Spetz J. Admission Policies and Attrition Rates in California Community College Nursing Programs. University of California at Berkeley: California Policy Research Center; 2003.

23. Waters A. The question for universities: how can they win the war on attrition? Nurs Stand. 2010; 24: 12–5.

24. Sabin M, Group SRRD. Student attrition and retention: untangling the Gordian knot. Nurse Educ Today. 2012; 32: 337–8.

25. Waters A. Nursing student attrition is costing taxpayers£ 99 million a year: In an exclusive Nursing Standard report, Adele Waters reveals the true extent of the profession's escalating university drop-out rates. Nurs Stand. 2008; 22: 12.

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