

SENSE OF SELF-EFFICACY OF NURSING STAFF AND THEIR WILLINGNESS TO WRITE PRESCRIPTIONS AND PRESCRIBE MEDICINES

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ABSTRACT

Introduction: A sense of self-efficacy plays a significant role in the work of nurses. It influences the motivation of this professional group to take on new tasks and expand their competences. This translates into patient satisfaction and impacts the functioning of the entire healthcare system.

The aim of this study was to determine how the sense of self-efficacy of nursing staff affects their willingness to write prescriptions and prescribe medicines.

Material and methods: The study was carried out between May and September 2021 in 19 primary healthcare facilities located in Kielce. Two facilities from each of the 13 districts of Świętokrzyskie Province were also drawn to participate in the study. The study was conducted among 188 nurses. The directors of the drawn establishments gave their written consent for the survey to be carried out at the respective primary health care facility. The list of all facilities in the Świętokrzyskie region was compiled based on data from the National Health Fund on entities that provide primary health care services. The research tools were an original survey questionnaire and the Generalised Self-Efficacy Scale (GSES).

Results: Nurses with competences to issue prescriptions were characterised by higher scores of generalised self-efficacy. Based on the estimated logistic regression it can be concluded that the chance of willingness to prescribe medication is 10 times higher in nurses who are competent in relation to those who are not (OR = 9.934, 95% CI: 3.067-32.172, $p < 0.001$) and who have a higher sense of self-efficacy (OR = 3.559, 95% CI: 1.463-8.653, $p = 0.005$).

Conclusions: The inclusion of the new competencies in nurses' career paths can help improve their sense of self-efficacy and contribute to their motivation to use their new powers.

Key words: nurse, medicines, primary healthcare, prescription.

INTRODUCTION

Self-efficacy plays an important role in how nurses perceive the challenges and difficulties of their professional work. It also influences engagement in various additional activities and goal pursuit [1]. A study by Mróz [2] confirmed that self-efficacy plays an important role and is relevant to the behaviours and experiences of the nursing profession [3, 4].

The extension of nurses' competences to include the ability to prescribe medicines is consistent with the healthcare system's goal of providing comprehensive care. The introduction of the new powers and their use by medical staff allows the expected result to be achieved, i.e. high-quality health services. This is made possible thanks to patient-oriented care with appropri-

ately qualified staff who, striving to provide effective care, are continually developing their competences [5, 6]. It is important to note that the new regulations do not impose tasks such as writing prescriptions or referrals for diagnostic tests on these professional groups. It is up to them to take on the new challenges, which is why it is important for nurses to expand their competencies and improve their skills [7, 8].

The aim of this study was to determine how the sense of self-efficacy of nursing staff affects their willingness to write prescriptions and prescribe medicines.

MATERIAL AND METHODS

The study was carried out between May and September 2021 in 19 primary healthcare facilities (3 pub-

lic and 16 non-public) out of 23 facilities located in Kielce (4 facilities did not consent to participate). Two facilities (one public and one non-public) from each of the 13 districts of Świętokrzyskie Province were also drawn to participate in the study. One of them did not agree to participate in the study. The draw was made using R software (The R Project for Statistical Computing). In selecting the sample for the study, the sample size calculator was used from STATISTICA statistical software version for Windows 13.1 TIBCO Software Inc. – StatSoft. Participation in the study was offered to all nurses present at the clinics at the time of the survey. The study was approved by the Bioethics Committee of the Collegium Medicum of Jan Kochanowski University in Kielce (Bioethics Committee Resolution No. 45/2020).

The largest group of nurses (188; 100%) were in the age range of 40-49 years (60; 31.92%), living in cities (174; 92.55%), and with work experience of over 20 years (86; 45.74%).

Among the 188 nurses, 42 (22.34%) were competent to prescribe medication. In their work, the new competences were used by 23 nurses (12.23%), while 19 (10.11%) did not use the competences despite having them. Only 44 nurses (23.40%) of the 146 (77.66%) without the new competences planned to complete a specialist course in the future.

The nurses' sense of self-efficacy and their willingness to write prescriptions and prescribe medicines were assessed using the Generalised Self-Efficacy Scale (GSES). The reliability of the tool was checked using Cronbach's α , which was 0.93 for the whole tool (Table 1).

The Generalised Self-Efficacy Scale (GSES) consists of 10 statements that fall under one factor. For each statement, the respondent could receive between 1 and 4 points (indications: no – 1 point, somewhat no – 2 points, somewhat yes – 3 points and yes – 4 points), giving a total score of between 10 and 40 points.

To investigate the phenomenon in question, selected statements from an original questionnaire were used (in the creation of a logistic regression model), and the tool was subjected to a validation process (Table 2).

Statistical methods

For the raw data of the standardised tool of the GSES, the reliability was checked based on the Cronbach's α value (for which a cut-off value of 0.70 was used), and a factor analysis was performed. For the results obtained, according to tool normalisation, a measure of position – mean (M), a measure of variability – standard deviation (SD), and factor loadings were used. Non-parametric Mann-Whitney test for unrelated groups was used to investigate differences in wall results of the GSES standardized tool in the oc-

Table 1. Validation (Cronbach's α) for the Generalised Self-Efficacy Scale

Cronbach's α	Own results	Standardised results
For the whole tool	0.93	0.85

Table 2. Tool validation (Cronbach's α) for an original questionnaire dedicated to nurses

Cronbach's α	Pilot studies $n = 81$	Main study $n = 188$
For the whole tool	0.70	0.70

cupational group nurses with and without additional competences.

Seeking answers about the nurses' willingness to use the new competences, a logistic regression model was created to find out the predictors affecting the attitudes of the nurses surveyed. The additional competences of nurses (a dichotomous variable taking 2 variants: having or not having professional competences) were identified as the dependent variable in the logistic regression model. The construction of the model was preceded by an initial selection of predictors by assessing their quality using Crammer's V coefficient. At this stage, some of these were discarded and the remainder were included in the sequential construction of the logistic regression model. For this purpose, forward stepwise regression was used, and the significance of the difference between successive sequentially built models was assessed using the LR (likelihood ratio) test. In the final step, another group of variables was discarded and found to be insignificant. The statistical significance of the predictors was verified using the Wald test. In this paper, the chosen significance level of $\alpha = 0.05$ was adopted. Data were collected in an Excel spreadsheet from Microsoft MS Office suite. Statistical analysis was performed using STATISTICA for Windows 13.1 TIBCO Software Inc., StatSoft, Poland.

RESULTS

The average score for the professional group of nurses for the GSES tool was 33.55 points, which means that they are characterised by a high sense of self-efficacy at the level of 8 sten. The surveyed nurses were characterised by high self-efficacy. In accordance with data normalisation of the standardised GSES tool, mean and standard deviation values and factor loadings are given (Table 3).

The raw scores for each response were presented in the form of sten values and, in turn, the sten values were presented in the form of a qualitative variable allowing the results to be assigned to low, average, and high values. Sten 1-4 indicates low scores, 5-6 average and 7-10 high. When analysing nurses' willingness to prescribe medicines for 6 statements

Table 3. Generalised sense of self-efficacy (GSES) of nurses working in primary care facilities

Item number and name of the GSES statement	M	SD	Factor loads
1. I am always able to solve difficult problems if I try hard enough	3.39	0.49	0.67
2. Even when someone opposes me, I am able to find a way to achieve what I want	3.11	0.78	0.69
3. I am able to easily stick to my goals and achieve them	3.46	0.64	0.79
4. I am confident that I would be able to deal effectively with unexpected events	3.26	0.58	0.81
5. Thanks to my ingenuity and resourcefulness, I know how to deal with unexpected events	3.35	0.62	0.82
6. I am able to solve most problems if I put enough effort into it	3.38	0.66	0.65
7. When I face adversity, I am able to remain calm because I can rely on my coping skills	3.27	0.45	0.67
8. When I am struggling with a problem, I am usually able to find several ways to solve it	3.40	0.52	0.72
9. When I am in trouble, I'm usually able to work out how to overcome it	3.41	0.49	0.80
10. I am usually able to cope with what I encounter	3.52	0.50	0.82
Total	33.55 points	4.26 points	0.99
% explained variance 55.48			

Table 4. Sense of Generalised Self-Efficacy (GSES) versus having the competence to write prescriptions

Item number GSES	Possesses competences – sten values Me (IQR)	Does not possess competences – sten values Me (IQR)	p-value*
1	4 (1)	3 (1)	0.006**
2	3 (1)	3 (1)	0.103
3	4 (1)	3 (1)	0.038**
4	3.5 (1)	3 (1)	0.011**
5	4 (1)	3 (1)	0.177
6	4 (1)	3 (1)	0.130
7	3 (1)	3 (1)	0.001**
8	4 (1)	3 (1)	0.102
9	4 (1)	3 (1)	0.040**
10	4 (1)	3 (1)	0.005**
Total score – sten value	9 (2)	8 (2)	0.005**

*Mann-Whitney U test, ** $p < \alpha$, $\alpha = 0.05$

($p < \alpha$) and for the overall sten score ($p = 0.005$), the distribution of the analysed variable was statistically significantly higher in the group of nurses with the additional competencies (Table 4).

It can be assumed that completing additional courses or a course of study supplemented by new learning outcomes gives a higher sense of self-efficacy.

Among the nurses surveyed, the lowest sten value for the whole factor was obtained at level 5, so for further analysis the results were presented as 2 variants: average and high. High GSES scores were more common among nurses possessing the competencies (35; 83.33% vs. 112; 76.71%).

Seeking answers in terms of nurses' willingness to use new competencies, a logistic regression model

was created with the aim of finding out the predictors affecting the attitudes of the nurses surveyed. Additional competencies of nurses (a dichotomous variable taking 2 variants: having or not having professional competencies) were indicated as the dependent variable in the logistic regression model. The construction of the model was preceded by a preliminary selection of predictors by assessing their quality using Cramer's V coefficient. At this stage, some of them were rejected, and the rest were included in the sequential construction of the logistic regression model. Forward stepwise regression was used for this purpose, and the significance of the difference between the sequentially built models was evaluated using the LR (likelihood ratio) test. In the final step, another group of variables that proved to be insignificant were discarded. The statistical significance of the predictors was verified using the Wald test.

Based on the estimated logistic regression, the likelihood of willingness to prescribe medication is 10 times higher in nurses who are competent in relation to those who are not (OR = 9.934, 95% CI: 3.067-32.172, $p < 0.001$), who have a higher sense of self-efficacy (OR = 3.559, 95% CI: 1.463-8.653, $p = 0.005$), and are convinced that prescribing medications will improve the quality of patient care (OR = 9.409, 95% CI: 1.661-23.310, $p = 0.011$). A nurse who has acquired the additional qualifications will be able to provide information on medicine dosage and on the disease (OR = 3.932, 95% CI: 1.250-12.368, $p = 0.019$). According to the respondents, after the introduction of the e-prescribing system, the chance of a doctor spending more time on a thorough diagnosis of a patient decreases (OR = 0.166, 95% CI: 0.051-0.538, $p = 0.003$). The results of multiple logistic regression are presented in Table 5.

Table 5. Predictors influencing nurses' use of the new competencies

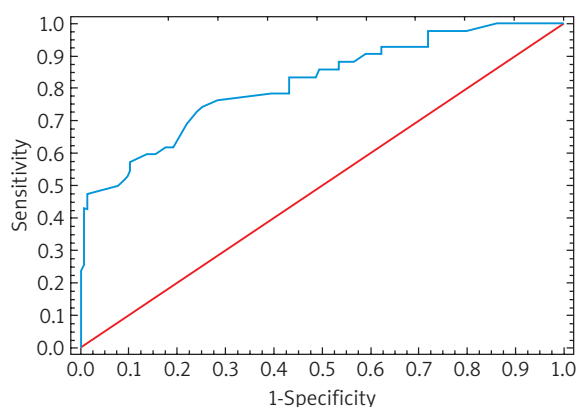
Variable – baseline option	Estimated logistic regression parameter	OR (95% CI)	p-value*
Offset	-4.081	0.121 (0.017-0.002)	< 0.001
Readiness to prescribe medication	2.296	9.934 (3.067-32.172)	< 0.001
Sense of self-efficacy	1.269	3.559 (1.463-8.653)	0.005
The doctor will have more time to accurately diagnose patients after e-prescription is introduced	-1.796	0.166 (0.051-0.538)	0.003
Patient will be given accurate information about the illness by the nurse	1.369	3.932 (1.250-12.368)	0.019
Prescribing will improve the quality of patient care	2.242	9.409 (1.661-23.310)	0.011

The final form of the logistic regression model with qualitative explanatory variables indicated the determinants influencing the phenomenon studied. Verification of the good fit of the model was done using the Hosmer-Lemeshow test; the value of the HL statistic (12.9760) with a *p*-value (0.113) indicates that model fits the data well of the logistic regression model. Based on the analysis of the area under the ROC curve, it can also be concluded that the model is a good fit to the data (area is AUC = 0.816) and has good predictive ability (Fig. 1).

The above provides an opportunity to improve the quality of medical services, while at the same time indicating the need to acquire new competences in prescribing medication by nurses who do not have such competences. It is important to note that the impact on whether nurses can use the new competences is largely dependent on the organisation and operation of the given health facility and on the management team. The human aspect is also an important factor – nurses, as pointed out earlier, are afraid of liability for a wrongly prescribed medication or expect additional remuneration.

DISCUSSION

Self-efficacy is a topic that is increasingly emerging in various areas of life. It is important in the daily functioning of every person. Individuals with a high sense of self-efficacy are characterised by greater motivation to take action, treat every task as a challenge, and persevere to achieve their goal despite arising obstacles and problems. The concept of self-

**Figure 1.** ROC curve for logistic regression model determining nurses' willingness to use the new competencies

efficacy is also emerging in healthcare. It affects both patients and medical staff [8]. Professional work is an important element in people's lives. It can be a source of satisfaction, contentment, and self-esteem, but also depression and stress. Nursing is a profession which, due to being overburdened with many responsibilities, is exposed to high levels of stress, which can result in low levels of self-efficacy [9]. A high sense of self-efficacy is linked to the perception of obstacles arising at work. Such individuals are much better able to cope with difficult situations and improve their skills [10].

Bartosiewicz *et al.* conducted a study in 2016 among 756 Polish nurses working in primary health-care facilities. It assessed their readiness to develop and deepen their knowledge, taking into account new competences such as prescribing medication independently and continuing treatment. An original survey questionnaire was used to conduct the study, which asked about sociodemographic data, as well as knowledge and opinions on prescribing medication. The Readiness of Employees for Learning and Development (RELD) questionnaire was used to find out nurses' views on whether they were ready for learning and development in their workplace. This questionnaire contains 48 statements, which are divided into 6 subscales. They relate to readiness for changes in the environment, the ability to notice changes in the labour market, to expand one's professional skills, and opportunities for development. The analysis shows that nurses with higher education and additional qualifications show a higher level of readiness. Having these qualities is associated with greater willingness to take on new tasks such as prescribing medication. Age and length of service were important factors influencing nurses' willingness to continually expand their knowledge. Among older people and those with more seniority at work, interest in expanding their knowledge is declining. According to a report by the Supreme Council of Nurses and Midwives, the average age of nurses in Poland

is over 53 years, so it is extremely important to create conditions for their development and to motivate them to take on new tasks and roles [11, 12]. A study by Soudagar *et al.* examined self-efficacy and the associated factors. The study involved 264 nurses from 5 hospitals affiliated with Shiraz University of Medical Sciences. The GSES was used to assess self-efficacy. Higher rates of self-efficacy were observed in nurses with more than 16 years of work and among those with more professional experience [13].

A positive impact of high self-esteem on nurses' competence was confirmed in a study by Tsai *et al.* A total of 762 nurses from 2 regional and 3 district hospitals in Taiwan with more than 6 months of professional work participated. The analysis suggests that a sense of self-efficacy relating to nurses' work engagement may be a factor leading to an increase in their competence and may also have a positive impact on the quality of nursing and medical care [14].

In looking for various factors that may be a barrier to nurses undertaking the task of writing prescriptions, the sense of generalised self-efficacy was analysed. The study used the GSES. Nurses across the group had a higher mean score compared to the mean scores of the normalisation sample. They were characterised by a high sense of self-efficacy. However, significantly higher scores were recorded in the group of nurses who were competent to write prescriptions. The analysis shows that nurses are able to cope with the problems they encounter and are consistent in pursuing their goals.

In looking for factors influencing nurses' willingness to use the new competences, a logistic regression model was created. The likelihood of willingness to prescribe medication is 10 times higher in nurses who are competent relative to those who are not ($p < 0.001$), those with a higher sense of generalised self-efficacy (OR = 3.559, $p = 0.005$), and those who believe that prescribing medication in their subjective opinion will improve the quality of patient care (OR = 9.409, $p = 0.011$) and the patient will receive accurate information about the disease (OR = 3.932, $p = 0.019$). Interestingly, according to the respondents, after the introduction of the e-prescribing system, the chance of a doctor spending more time on a thorough diagnosis of a patient decreases (OR = 0.166, $p = 0.003$).

CONCLUSIONS

Nurses with competences to prescribe medication were characterised by higher scores of generalised self-efficacy, indicating the need to strengthen this area during pre- and postgraduate training. The inclusion of the new competencies in career paths can help improve the sense of self-efficacy and contribute to motivation to use the new powers.

The conclusions that can be drawn from this work may be of interest to those involved in developing training programs for future nurses, to consider increasing the hours during which nurses learn to write prescriptions and prescribe medications, so that they feel that they have the right knowledge and are fully prepared to use the skills they have acquired in practice. Managers of primary health care facilities should ensure that adequate conditions are provided for the use of the new competencies by organising the office so that the nurse can conduct a physical examination.

Disclosure

The authors declare no conflict of interest.

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