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## **ABSTRACT**

In Poland, since 1 January 2016 nurses who graduated from the master studies or hold a title of a specialist may ordain and prescribe specific medicines ("independent nurse prescribing" – INP). Nurses, who completed bachelor studies or hold a title of a specialist are allowed to prescribe drugs to continue the patient's treatment as ordered by a physician ("supplementary nurse prescribing" – SNP). The aim of this paper was to analyze the knowledge and attitudes of the Polish nurse specialists to their new professional rights in the independent ordaining of some drugs and drug prescribing.

902 women and 26 men. The age average was 42.4 (min. 26, max. 65, SD = 7.56, median: 43, mode: 40). 300 respondents – secondary medical education, 325 – the bachelor degree, 277 – the master degree. Own, validated questionnaire. Attitudes with answers based on the Likert scale (1-5) assessed by the nonparametric ANOVA Kruskal-Wallis test with the *post-hoc* analysis. The same statistical model was used in the evaluation of potential differences for the total scale of knowledge and attitudes.

On average less than half of answers about the knowledge were correct (average of difficulty index was 39%). Nurses believe that the introduction of nurse prescribing will increase the nurse's control of the therapeutic process (mean: 3.22/5). No significant differences between the attitudes of respondents with different education level ( $p = 0.206$ ;  $H = 3.160$ ). 55% of nurses supports the introduction of INP. Respondents with the master education significantly more frequently support INP than those with secondary education ( $p = 0.001$ ;  $z = 3.685$ ).

Conclusions: The knowledge of nurses on the extension of their professional rights is unsatisfactory and requires urgent complementation. The health policy makers should consider an extensive information campaign, especially in the group of nurses with advanced practice who will have prescribing competences. Nurses' attitudes to nurse prescribing are generally positive. Concerns expressed are the same as in the opinions of nurses from countries where the professional rights underwent extension earlier.

**Key words:** nurse's professional autonomy, prescriptions, medicines

## INTRODUCTION

One of the key challenges for the Polish healthcare system is the shortage of its medical personnel. It mainly concerns medical practitioners, with 128.5 thousand professionally active and 212.5 thousand nurses (1,2). Based on the OECD health data, the density of physicians is 2.2 and nurses 5.5 per 1000 population. The statistics place Poland respectively on the 30th and 27th positions among the 34 countries of the organization (3).

The consequence of such situation is, inter alia, the patients' limited access to health services (4). Their availability is to be improved by the reform of the nursing law which

grants certain groups of nurses new competences regarding drug prescription and issuing prescriptions (hereinafter "nurse prescribing").

Since 1 January 2016 nurses who graduated from the master studies or hold a title of a specialist may ordain and prescribe specific medicines (hereinafter "independent nurse prescribing" – INP). Moreover, nurses who completed bachelor studies or hold a title of a specialist are allowed to prescribe drugs to continue the patient's treatment as ordered by a physician (hereinafter "supplementary nurse prescribing" – SNP). A list of 30 active substances which may be contained in the drugs ordained by nurses was specified in the Regulation of the Minister of Health. (5).

A prescription may be issued by a nurse following a personal physical examination of the patient. However, there is an exception to this principle. Nurses authorised to ordain medicine may issue a prescription required for the patient's continued treatment or a prescription or an order to medical products as continued provision with medical products if it is justified by the patient's health as stated in the medical documentation (5).

In order to exercise these rights each nurse prescriber will have to complete an appropriate specialist course. Such courses are already being provided, also by Medical Universities, among other institutions. On the basis of the information by the Minister of Health of 31 December 2015, as many as ca. 100 nurses and midwives completed such course (6).

The success of the reform, among other things, will depend on the knowledge and attitudes of nurses to their new professional rights. For the actual implementation of the new competences nurse knowledge and willingness to use them is vital. One should also remember that the drug ordaining is to intended to be their right not a duty (5).

The aim of this study was to analyze the knowledge and attitudes of the Polish nurse specialists to their new professional rights in the independent ordaining of some drugs and drug prescribing.

## **MATERIAL AND METHODS**

The questionnaire survey was conducted from 3 March 2015 to 26 May 2015 during the national state specialty examinations at the Centre for Postgraduate Education of Nurses and Midwives (Conference and Training Centre of the Nowe Horyzonty Foundation, ul. Bobrowiecka 9, Warsaw, Poland). The participation in the survey was voluntary and anonymous.

In the 2015 Spring examinations there were 18 specialty examinations conducted in 18 nursing areas, with a total of 2487 participating nurses. The survey was taken during 14 examinations with the participation of 2203 nurses. The survey return rate was 44%.

### ***Research group***

The total of nurses who took their specialty examinations and participated in the survey was 968. The examined group meets the representativeness criteria for a group of Polish nurse specialists.

The survey was conducted among 902 women and 26 men. The age average was 42.4 (min. 26, max. 65, SD = 7.56, median: 43, mode: 40). The professional experience was on average 20.2 years (min. 0, max. 40, SD = 8.16, median: 20, mode: 20). 300 respondents had secondary medical education, 325 held the bachelor degree, and 277 held the master degree. The largest number of nurses worked in the city/powiat/province hospital – 468 or in a teaching hospital – 256. Fewer respondents worked in long-term care – 54 and in outpatient health care – 66.

### ***Ethical considerations***

The Ethical Committee consent for presented research is not required. According to the statement of the Ethical Committee of the Medical University of Warsaw: "*The Committee does not provide opinions on surveys, retrospective studies or other non-invasive research*" (7).

### ***Questionnaire***

The authors of this paper prepared their own questionnaire which was subject to validation prior to its use in the presented study (8). The questionnaire comprises three parts. Part One contains questions on the knowledge of the new professional rights and consists of 13 closed-ended single-choice questions with 3, 4 or 5 options to choose from. Part Two of the questionnaire is about the attitudes to the new professional rights and consists of 38 statements in total: 18 statements on the impact of the changes on the operation of the health system in Poland, 8 statements on the nurses' competences, and 10 on self-evaluation of nurse preparation to the changes, and 2 on their practice in drug ordaining. All statements were graded in the 5-point Likert scale, where 1 meant strongly disagree and 5 strongly agree. The last part of the questionnaire contained questions regarding demographic data, education and present place of employment.

The filled out questionnaires were digitalized at the Division of Teaching and Outcomes of Education of the Faculty of Health Sciences of the Medical University of Warsaw with the software ABBYY FlexiCapture 10 (license of the Medical University of Warsaw, Warsaw, Poland).

### ***Statistical Analysis***

The questionnaire's reliability in the part concerning attitudes was evaluated with the Cronbach's alpha coefficient. Based on the Nunnally's criterion the adopted acceptable

reliability level for  $\alpha > 0.70$  (9). To estimate the interscale consistency of particular statements correlation coefficients were also determined for each position in the scale, and the adopted criterion of reliability was  $r > 0.40$  (22).

In case of questions on attitudes with answers based on the Likert scale, the nonparametric ANOVA Kruskal-Wallis test was applied with the *post-hoc* of multiple comparisons of medium ranks. The same statistical model was used in the evaluation of potential differences for the total scale of knowledge and attitudes. To estimate the effect size of the observed significant differences the eta-squared H ( $\eta^2_H$ ) coefficient was determined. Calculations were performed in a statistical set of STATISTICA 12.5 (StatSoft<sup>®</sup>, Inc.) according to the MUW licence. For all analyses, the relevance level assumed *a priori* was  $\alpha = 0.05$ .

## **RESULTS**

### ***Reliability of measurement with the use of attitude scale***

The analysis of the reliability of the scale to evaluate the nurses' attitudes indicates a high degree of internal consistency ( $\alpha$ -Cronbach = 0.892). Although there were negative correlations in three statements with the total result for the attitude scale (Pearson's correlation in the range from -0.04 to -0.03), and for the three following ones the correlation level was smaller than the threshold value of 0.40, the applied tool meets the Nunnally's requirements for the reliability of a psychometric test.

### ***Evaluation of knowledge***

On average less than half of answers about the knowledge of the implemented changes in the nursing law were correct in the examined nurse group (the average of

difficulty index was 39%). A large majority of respondents knew that drug ordaining and prescription will only be the nurses' right, not an obligation. Over half of them knew that the assigned rights will depend on the nurse's education. Less than half of respondents were aware when the new law enters into force and what criteria must be met for nurse prescribing in continuity of treatment. Detailed information on the nurses' knowledge is presented in Table 1.

The total evaluation of the nurses' knowledge was compared against their education. The ANOVA test on ranks, Kruskal-Wallis test indicated significant differences between respondents with different levels of education ( $p = 0.012$ ;  $H = 8.795$ ;  $\eta^2_H = 0.01$ ). The multiple comparisons test (*post hoc*) nurses who completed their master studies had considerably more extensive knowledge on the implemented changes from those with secondary education ( $p = 0.012$ ;  $z = 2.876$ ). No statistically significant differences were found in the knowledge of nurses with secondary and bachelor education ( $p = 0.131$ ;  $z = 2.018$ ) or between bachelor and master education ( $p = 1.000$ ;  $z = 0.923$ ).

### ***Attitude evaluation***

Majority of respondents are of opinion that allowing nurses to prescribe drugs and write out prescriptions will positively influence patients. It will facilitate patient care; improve patients' wellbeing and access to health advice and save time, both for patients and physicians. The analysed group also believes that the introduction of nurse prescribing will increase the nurse's control of the therapeutic process (mean: 3.22/5). To a lesser degree an increase of their prestige as a professional group is expected (3.07/5). On the other hand, a vast majority of nurses is convinced that it will be their another duty which

has been the physicians' only responsibility so far (3.57/5) and that their legal and professional liability will increase (3.67/5).

Nurses are divided when it comes to the influence of nurse prescribing on the growth of medical errors (2.63/5) or a quality decrease in the health care (2.61/5). Very differentiated opinions were expressed in the question on the decrease of physician's control of the therapeutic process (2.75/5). 23% of respondents were against the introduction of nurse prescribing in Poland. Detailed information is presented in Figure 1.

Nurses' opinions on the introduction of nurse prescribing on the healthcare system were also compared against their education. The ANOVA test on ranks, Kruskal-Wallis test showed no significant differences between the attitudes of respondents with different education level ( $p = 0.206$ ;  $H = 3.160$ ).

A great majority of nurses supports the introduction of INP, and slightly less of them support SNP. In both cases the ANOVA test on ranks, Kruskal-Wallis test demonstrated statistically significant differences in education (INP:  $p < 0.001$ ,  $H = 15.701$ ,  $\eta^2_H = 0.016$ ; SNP:  $p < 0.001$ ,  $H = 19.950$ ,  $\eta^2_H = 0.021$ ). Based on the multiple comparisons test (*post hoc*) respondents with the master degree significantly more frequently support INP than those with secondary education ( $p = 0.001$ ;  $z = 3.685$ ). Regarding SNP the differences are both in the secondary and master level education ( $p < 0.0001$ ;  $z = 4.267$ ), as well as between the bachelor and master education levels ( $p = 0.041$ ,  $z = 2.468$ ). In both cases more educated nurses were more likely to positively evaluate the reform.

Nurses' opinions are divided on the preparation of their professional group to nurse prescribing. It applies both to INP and SNP. No major differences were found among



nurses with various levels of education (INP:  $p = 0.628$ ,  $H = 0.931$ ; SNP:  $p = 0.305$ ,  $H = 2.372$ ). Detailed information is presented in Figure 2.

## **DISCUSSION**

In the world's scientific literature on nursing the issue of nurse prescribing is often discussed and analysed. The PubMed/Medline database (key words: "*nurse prescribing*", search period: 1.1.2005 – 1.07.2015, language of search: English) lists many articles on the evaluation of nurses's rights to prescribe drugs and write out prescriptions (5,6,13-21). The articles are about the consequences of introduction of drug prescription and issuing prescriptions in some countries. Majority of publications emphasize the positive influence of such changes not only in the patients' opinion, but also resulting from the actual health results from the nurses' new prescribing rights. Some articles however indicate an issue of lack of preparation of nurses and midwives to prescribe medicines.

Due to the fact that the questionnaire was administered when the nurse prescribing was not implemented yet, the issue should be considered new in Poland. So far there have been only a few papers published on this subject (8,10,11,12). These articles are mainly published in specialist periodicals and refer only to the scope of rights, the implementation procedure and preparation of the health care system to such changes. There are very few academic works, especially on the knowledge and opinions of the interested parties, i.e. nurses and midwives concerning nurse prescribing. The only works with such topic were published by the team of authors (10-12).

The nurses' knowledge on the implemented changes in their professional competences in the presented research is unsatisfactory. It is worrying that only every fourth respondent knows when the new law enters into force. Majority of nurses have no

knowledge what criteria must be met to be granted particular rights in INP or SNP. This is a threat to the actual implementation of the reform. With no proper information campaign in the nursing profession, the number of nurses who will prescribe medicines and issue prescriptions may turn out to be negligible.

Yet it should be emphasized that respondents answered to the questionnaire questions over six months before the new competences' implementation. One might hope that the knowledge of nurses and midwives will gradually increase. It should result from among other things, specialist courses which will be mandatory to be assigned new prescribing rights.

The above research results may be compared with those obtained by the Authors in their pilot study (11). The analyzed group of 23 ward nurses who answered to the same set of questions, their knowledge on nurse prescribing was considerably greater (about half of correct answers), although still unsatisfactory. Over half of ward nurses knew the criteria necessary to be assigned new rights and 16/23 knew where to look for the list of medicines for independent prescribing.

Nurses' knowledge on the legal changes in nurse prescribing was analysed in the countries where such rights were implemented and then extended, e.g. in the UK. An example of such research is the qualitative analysis by Hey, Bradley and Nolan (13). In the UK in 2003 except the INP category, SNP was introduced which was granted the right to prescribe a wider range of medicines according to clinical management plan established by the physician in cooperation with the patient. In 6 focus groups physicians and nurses had a superficial knowledge of the SNP competences. Majority of them knew only that such nurse will have the right to modify the dose of a drug independently. A completely correct

answer was given by only one person. The above example demonstrates that lack of awareness of the implemented changes also among the most interested parties is not an obscure issue.

Greater knowledge in the group of nurses with the master education is not surprising as it is a prerequisite to have the INP status. Nurses with secondary education may not be interested in nurse prescribing if these rights are not directly applicable to them.

The results of the research demonstrated moderately positive nurses' opinions on the implementation of nurse prescribing in Poland. Respondents are convinced it will positively influence the patients and availability of healthcare. Some concerns are reported in the aspect of additional workload or increased liability. Their opinions in many aspects are inconclusive.

Such moderately positive opinions should be considered as a promising result in the prescribing rights implementation. It should be remembered that all changes are received with some reservations and a reliable evaluation of the reform will be only possible after some time following the new law entering into force.

The Authors' findings may be directly compared with Kroezen et al. (14) who also examined nurse attitudes with the 5 degree Likert scale where (similarly as in this paper) "1" meant strongly disagree and "5" strongly agree. Kroezen divided the representative group of 992 nurses into 617 registered nurses (RN) and 375 nurse specialists (NS). In the analysed study nurses primarily believed that nurse prescribing will increase their autonomy (RN = 3.6/5; NS = 4.2/5), increase their professional prestige (RN = 3.7; NS = 4.1), and on the other hand it will increase their workload (RN = 3.7; NS = 3.3) and

professional liability (RN = 4.2; NS = 4,4). When comparing our study with the results above, Polish nurses responded similarly, although slightly more cautiously. In the threat of the patients' safety, Kroezen's respondents stated ambiguous opinions (RN = 2.7) or disagreed with such statement (NP = 1.9). The result of our study (2.67) approximates the opinion of Dutch RN.

Nurses' attitudes to assigning them with drug prescription rights and issue prescriptions were also studied in Spain. Romero-Collado (15) requested 87 nurses with such rights to state their opinion on nurse prescribing influencing their professional identity. Two third of respondents believed that nurse prescribing will give them greater power in decision-making, and over 70% that it is an achievement that should make nurses proud. But every fourth respondent believed that the only beneficiary of nurse prescribing will be physicians, who will see a decline in the bureaucratic work of writing prescriptions. The results demonstrate that the evaluation of the implementation of the prescribing rights in Spain is more enthusiastic than in Poland. But it should be taken into consideration that due to the selection and number of the studied group the results may not be representative.

The evaluation of the need to implement nurse prescribing as INS and SNP is closely related with the nurse preparation to perform such competences. Our study demonstrates that nurses support the extension of their professional rights. On the other hand, they do not feel prepared to their performance. A trend of a more positive reaction to INP than to SNP among respondents may be observed. This applies both to the justification of implementation and preparation to their new role. It may result from their concern for extra administration work related to the issuance of prescriptions as continued treatment.

In the meta-analysis conducted by Darvishpour et al. (16), 9 works included in the work review positively reviewed assigning nurses with prescribing rights. The advantages of nurse prescribing are facilitation of access to healthcare, shorter waiting time, potential savings, and also, although it is less obvious, a better quality of care or improvement in compliance with medications. It may result from the nurse greater involvement in care and longer examination time which are mentioned in the review by Gielen et al. (17). For nurses it is more autonomy, professional development, facilitation of care and better well-being in the therapeutic team (16). These results correspond with those obtained in our study.

On the other hand, critical opinions are expressed in the literature. Kroezen quotes studies which indicate that nurse prescribing shifts the focus from care to cure (18). Also the nurse preparation to take over some responsibilities of physicians is questionable. Concerns for the adequate pharmacological knowledge among others are reported by Bradley et al. (19), Buckley et al. (20), and Horton (21). Yet nurses themselves are often worried by an increased administrative workload (16).

To conclude, it should be stated that the results of the study conducted by the Authors may be considered representative only for the group of Polish nurse specialists and not for all Polish nurses and midwives. Therefore there is a need to advance the research in the representative group for the entire population of Polish nurses and midwives.

## **CONCLUSIONS**

1. The knowledge of nurses on the extension of their professional rights is unsatisfactory and requires urgent complementation. The health policy makers

should consider an extensive information campaign, especially in the group of nurses with advanced practice who will have prescribing competences. More extensive knowledge of nurses with the master education may mean that as nurses whose new rights are directly applicable to them, they are more interested in nurse prescribing.

2. Nurses' attitudes to nurse prescribing are generally positive. Concerns expressed are the same as in the opinions of nurses from countries where the professional rights underwent extension earlier.
3. Verification of concerns for the preparation of nurses will only be possible after the prescribing rights are implemented. Nevertheless modification of the nurse training program will be necessary, especially in the pharmacological and legal aspects.

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Table 1. Nurses' knowledge of their new professional competences. Correct answers were written **in bold**.

Question	Answer	N / (%)
Which act is amended by extension of professional rights of nurses and midwives in independent prescription of some drugs and writing out prescriptions?	to the Act of 12 May 2011 on the reimbursement of medicinal products, special purpose dietary supplements and medical devices	146 (15%)
	<b>to the Act of 15 July 2011 on the professions of nurse and midwife</b>	<b>385 (40%)</b>
	to the Act of 1 July 2011 on self-government of nurses and midwives	32 (3%)
	to the Act of 5 July 1996 on the professions of nurse and midwife	76 (8%)
	don't know	280 (29%)
	no answer	49(5%)
When will be valid the changes on the extension of professional rights of nurses and midwives in Poland in independent prescription of some drugs and writing out prescriptions?	from 1 July 2017	38 (4%)
	from 1 January 2017	71 (7%)
	from 1 July 2016	159 (16%)
	<b>from 1 January 2016</b>	<b>238 (25%)</b>
	don't know	423 (44%)
	no answer	39(4%)
Is independent prescription of some drugs and writing out	Yes	125 (13%)

prescriptions a duty of each nurse and midwife?	<b>No</b>	<b>664 (69%)</b>
	don't know	170 (17%)
	no answer	9(1%)
Will every nurse and midwife be able to prescribe some drugs independently and write out prescriptions?	yes, every nurse and midwife	43 (4%)
	only nurse and midwife with completed master studies	131 (14%)
	only nurse and midwife with completed master studies and completed appropriate specialist course	196 (20%)
	<b>only nurse and midwife with completed master studies or specialty, as well as completed appropriate specialist course</b>	<b>378 (39%)</b>
	don't know	196 (20%)
	no answer	24 (2%)
Will every nurse and midwife be able to 'extend' prescription of some drugs independently and write out prescriptions for them?	yes, every nurse and midwife	44 (5%)
	only nurse and midwife with completed bachelor studies	48 (5%)
	only nurse and midwife with completed bachelor studies and completed appropriate specialist course	177 (18%)
	<b>only nurse and midwife with completed bachelor studies and completed appropriate specialist course and nurse and midwife with the right to prescribe drugs</b>	<b>350 (36%)</b>
	don't know	317 (33%)
	no answer	32 (3%)
	prescription of OTC drugs	29 (3%)
	prescription of refunded drugs	58 (6%)

Changes in the extension of professional rights of nurses and midwives will concern:	<b>prescription of drugs, special purpose dietary supplements and medical devices</b>	<b>259 (27%)</b>
	prescription of drugs and medical devices at physician's order	224 (23%)
	don't know	365 (38%)
	no answer	33 (3%)
Nurses and midwives who completed first degree studies (bachelor) and second degree studies (master) will have a different level of professional powers in independent prescription of some drugs and writing out prescriptions.	<b>yes</b>	<b>489 (51%)</b>
	No	169 (17%)
	don't know	286 (30%)
	no answer	23 (2%)
List of drugs which may be prescribed independently by nurses and midwives and subject to writing out prescriptions for them will be determined in	<b>regulation of the Minister of Health</b>	<b>415 (43%)</b>
	new Act on the professions of nurse and midwife	130 (13%)
	act on the amendment to the Act on the professions of nurse and midwife	191 (20%)
	don't know	198 (21%)
	no answer	33 (3%)

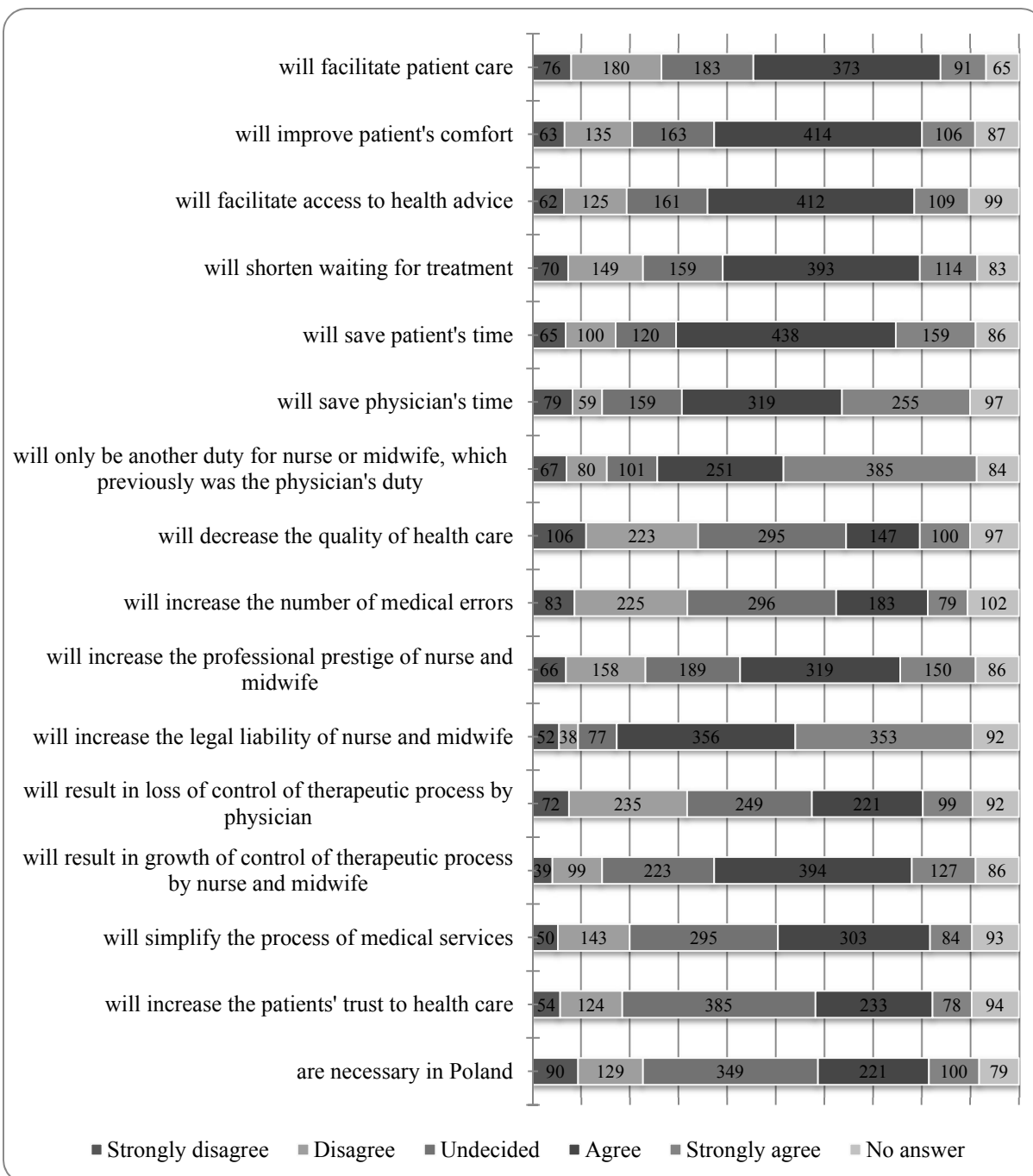


Figure 1. Opinions of nurses on the influence of introduction of nurse prescribing to the healthcare system in Poland.

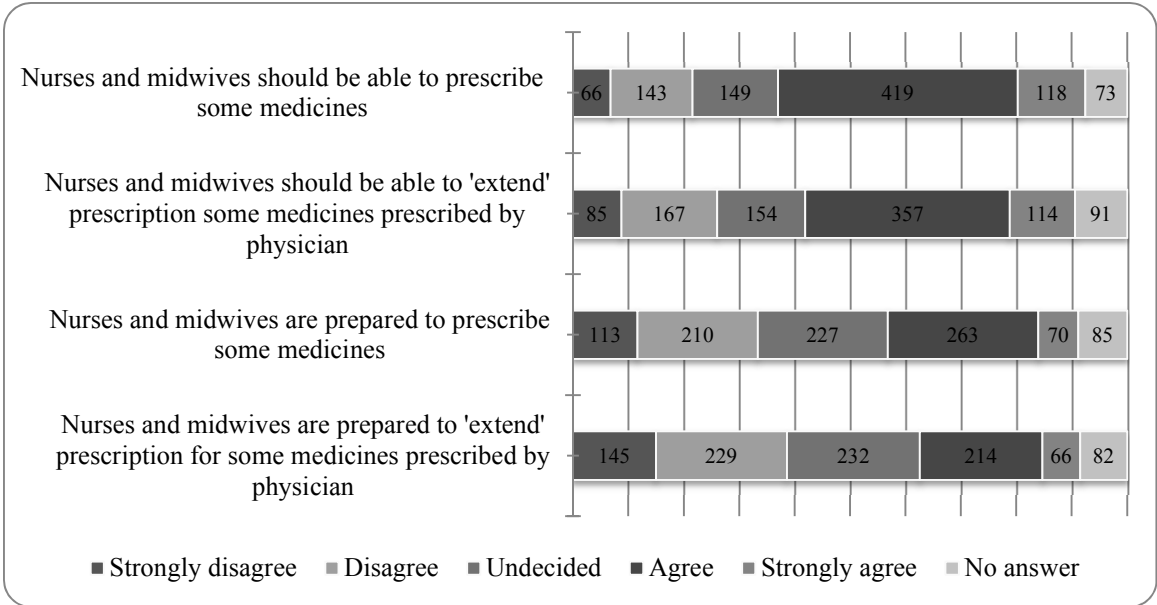


Figure 2. Nurses' opinions on preparation and validity of introducing nurse prescribing.