BMJ Open

Polish adaptation and validation of the Perceived Implicit Rationing of Nursing Care (PIRNCA) questionnaire: a cross-sectional validation study

Izabella Uchmanowicz ![ORCID],[1] Aleksandra Kołtuniuk,[2] Agnieszka Młynarska,[3] Katarzyna Łagoda,[4] Izabela Witczak,[5] Joanna Rosińczuk,[2] Terry Jones[6]

Correspondence to
Dr Izabella Uchmanowicz; izabella.uchmanowicz@umed.wroc.pl

ABSTRACT

Objectives To develop a Polish adaptation of the Perceived Implicit Rationing of Nursing Care (PIRNCA) questionnaire.

Design Cross-sectional validation study.

Settings Nurses working in surgical and cancer wards in Poland.

Participants A sample of 513 professionally active nurses was enrolled in the study.

Intervention To complete a Polish translation of the full original PIRNCA questionnaire.

Primary and secondary outcome measures The primary outcome was translation and adaptation of the full original PIRNCA tool and its validation to the Polish conditions. The secondary outcome was determination of relationships between sociodemographic variables, nurses' assessment of patient care quality and their overall job satisfaction on the one hand, and PIRNCA scores on the other.

Results The respondents' mean score was 1.27 points (SD=0.68) on a scale from 0 to 3. Cronbach's alpha for the entire instrument was 0.957. All items of the questionnaire were found to have a positive item-total correlation. The developed linear regression model showed that nurses' assessment of patient care quality and their overall job satisfaction were independent predictors of PIRNCA scores (p<0.05). 94.15% of nurses reported rationing at least one of the 31 care activities.

Conclusions The present findings indicate a high level of reliability and validity of the translated PIRNCA questionnaire, fully comparable to that of the original. The questionnaire can be used for the assessment of PIRNCA in Polish hospitals.

INTRODUCTION

Nursing consists of providing any and all health services (ie, care, assistance, health promotion and education, etc). required by a patient, to an extent depending on the patient's condition as determined in the Nursing Diagnosis Process.[1] Sadly, multiple studies on nursing conducted in recent years[2–12] demonstrated the occurrence of the phenomenon of the non-performance or

Strengths and limitations of this study

► This study is the first to translate and validate the Perceived Implicit Rationing of Nursing Care (PIRNCA) questionnaire in Poland.

► We used international standards for validating and adopting the PIRNCA questionnaire.

► This study is the first step in assessing the rationing of nursing care in Polish hospitals.

► All data used in this study were self-reported, including surgical and cancer wards.

► The study was conducted only in two university hospitals in Poland.

incomplete or delayed performance of tasks involved in providing holistic care for a hospitalised patient.

In literature, we can meet the differences terms to describe this phenomenon—nursing care left undone,[13] unfinished nursing care,[14] missed nursing care,[6] implicit care rationing,[5 15] task incompletion,[16] unmet nursing care needs,[17] care left undone,[18] work left undone,[19] nursing tasks left undone,[20] failure to maintain[21] or the unfinished task of nursing care.[22] All of them describe the situation when patients do not get enough care and attention which they require so in consequence, we observe that the overall process of care has adverse outcomes for patients.[23]

In this study, we want to validate the Perceived Implicit Rationing of Nursing Care (PIRNCA)—a tool that assesses the care rationing in nursing practice. The first time phenomenon of implicitly of care rationing was developed by Schubert from Switzerland in 2007.[15] She described the conceptual framework to explain implicitly of rationing care and created a new tool (Basel Extent Rationing of Nursing Care, BERNCA) to measure this phenomenon in practice. In 2014, Jones[24] from the USA adopted this

instrument and next, she presented a new questionnaire PIRNCA, which was validated by surgical nurses.

Care rationing occurs when resources are insufficient (typically due to staff shortages or lack of the required materials)[5 7 9] or when the so-called 'patient safety climate' is not ensured.[9] It is measured by the number of omitted or withheld nursing activity, which should be done. Patients are also more aware of their rights, as well as of nursing and treatment methods, which creates demand for more time and energy—and in a setting of nursing staff shortages, this may also result in some patient needs not being met.[25] As one can see, care rationing is contributed to by a number of factors, related to the employer, the employee and the patient (ie, characteristics of the hospital—budgets, number of beds), the employee (ie, skills, expertise of the staff, education level) and the patient (ie, type of diseases, severity, comorbidities).[2 3 6 7 9 10 25]

Alarmingly, studies performed so far demonstrated a detrimental impact of care rationing on treatment and nursing outcomes, including a higher mortality rate, more falls during hospitalisation and more reported hospital-acquired infections and bedsores and lower patients satisfaction.[4 5 26–28]

Rationing on nursing care also influences on staff outcomes. Kalisch et al[29] found that nurses who reported more missed care were less satisfied with their job and occupation. Also, Bekker et al[20] reported that the highest degree of job dissatisfaction is contacted with nursing tasks left undone. Tschannen et al[30] reported that nurses who more frequent missed care were more tend to leave and turnover. Zeleníková et al[31] shown that unfinished care correlated with overall job satisfaction and intention to leave the actual workplace.

To date, several questionnaires have been developed to assess the extent of care rationing,[15 24 32] though none of these were available in Polish, and therefore, could not be used to evaluate this issue in Polish hospitals reliably.

The purpose of the study was to develop a Polish version of the PIRNCA questionnaire and to evaluate its psychometric properties concerning the assessment of the PIRNCA among Polish nurses.

MATERIALS AND METHODS
Study group and settings
The present cross-sectional validation study with convenience sampling and a survey method of data collection was performed between April and July 2018. The PIRNCA questionnaire was distributed among 700 nurses working in surgical and cancer wards in two public university clinical hospitals. These hospitals are located within two neighbouring regions of Poland, namely the Silesian Region (the city of Katowice) and the Lower Silesia Region (the city of Wrocław). Each of the hospitals has about 600 beds. In the first hospital, questionnaires were distributed among nurses in four surgical and oncological wards, while in the second one, in eight different surgical and oncological wards. Each ward has about 40 beds.

Qualification procedure
Inclusion criteria were: at least 1 year of experience working in a surgical or cancer ward, and provision of informed consent to participate in the study. Exclusion criteria were: work in a management position and lack of consent to participate. The final study group included 513 nurses (survey return rate: 73%). Respondents' mean age was 42.33±7.8 years, and their mean work experience was 19.77±9.25 years. Most of the studied nurses had bachelor's degrees (87.52%) and were employed full time (91.81%). Participation was strictly anonymous and voluntary, and all participants were informed about the study purpose.

Patient and public involvement
Neither patients nor public were involved in the design or planning of this study.

All participants who were included in the study gave written informed consent after a thorough explanation of the procedures involved.

Research tool
The PIRNCA questionnaire derives from the BERNCA Questionnaire, which was created by Schubert in 2007 in Switzerland.[24] The original version of BERNCA contains 20 statements which were divided into five domains–the activity of daily livings, caring support, rehabilitation—instruction—education, monitoring—safety and documentation.[15] Later the instrument was revised—now it contains 32 Likert type questions (BERNCA-R).[9]

The PIRNCA questionnaire comprises 31 statements describing nursing activities that the respondents could not complete due to insufficient resources (ie, staff or time shortages) during their last seven shifts. Each item in the PIRNCA questionnaire is on a scale of 0–3, where 0 is 'never', 1 is 'rarely', 2 is 'sometimes' and three is 'often', and the total result, that is, the assessment of care rationing rate, is the average of the items If none of the patients assigned to a nurse during these seven shifts required the relevant activity, the respondent should mark 'not applicable'. The final PIRNCA score is the mean score for all questions where a scored answer has been chosen (ie, questions marked 'not applicable' are excluded). Thus, the total score ranges between 0 and 3, and may be interpreted as follows: higher scores indicate more implicit rationing of nursing care. The questionnaire also includes two additional questions. One concerns the nurses' assessment of patient care. It is scored between 1 and 10 using a Likert-type scale, where 1 indicates the dangerously low quality of care, whereas 10 indicates very good quality of care. The other question concerns overall job satisfaction. Again, the response is provided using a 10-item Likert-type scale, where 1 means 'it's terrible', while 10 means 'I love it' (online supplementry appendix 1).

Translation and language adaptation
The language validation procedure was carried out following published guidelines,[33–35] following formal,

written approval by the original author. The questionnaire was translated into Polish by two independent translators. The two versions were verified and corrected by a designated expert, fluent in English and having specialist knowledge on nursing terminology, thus producing a Polish version of the questionnaire that was then back-translated into English. The back-translations were compared with the original to check whether the Polish translation adequately reflects the meaning of the English original. As the meanings of each item remained the same as in the original, the translated questionnaire was used in a pilot study with a representative sample.

The adaptation was performed using the standard methodology. The Polish adaptation is based on the English-language version of the scale. Having received the authors' approval, the questionnaire was translated into Polish by two independent translators. Then, the translations were evaluated by a panel of experts, which comprised a cardiologist, a general practitioner, two specialist cardiology nurses and a psychologist. The panel verified the phrasing and meaning of all questions, as well as the clarity and correctness of the

instructions. The version selected by the panel subsequently underwent back-translation and the result was submitted for approval by the authors of the original English version. Once approved, the preliminary version was used in a pilot study on a group of 30 nurses. The pilot study resulted in the final Polish version of the PIRNCA questionnaire, validated in the present study.

Statistical analysis

The analyses were performed using the R V.3.5.1.[36] Five hundred and thirteen participant's responses were analysed. Comrey and Lee[37] to suggest a sample size of 500 participants as a 'very good' rule of thumb for Confirmatory Factor Analysis (CFA). Internal consistency was

Table 1	Respondents' characteristics
Characteristic	**Values**
Sex	
Female	476 (92.79%)
Male	11 (2.14%)
No data	26 (5.07%)
Age (years)	
Mean±SD	42.33±7.8
Median	43
Quartiles	39–48
Education	
Vocational school	18 (3.51%)
Bachelor's degree	449 (87.52%)
Master's degree	17 (3.31%)
No data	29 (5.65%)
Work experience as a nurse (years)	
Mean±SD	19.77±9.25
Median	21
Quartiles	14–27
Work experience in surgical/cancer wards (years)	
Mean±SD	11.25±8.75
Median	13
Quartiles	8–16
Employment	
Full time	471 (91.81%)
Part time	9 (1.75%)
Self-employment	2 (0.39%)
Contract	2 (0.39%)
No data	29 (5.65%)

Table 2	Confirmatory factor model loadings of individual items of the PIRNCA tool	
Item	**Loading**	**P value**
1	0.532	<0.001
2	0.558	<0.001
3	0.564	<0.001
4	0.561	<0.001
5	0.675	<0.001
6	0.673	<0.001
7	0.668	<0.001
8	0.599	<0.001
9	0.615	<0.001
10	0.593	<0.001
11	0.655	<0.001
12	0.677	<0.001
13	0.619	<0.001
14	0.642	<0.001
15	0.608	<0.001
16	0.634	<0.001
17	0.708	<0.001
18	0.617	<0.001
19	0.718	<0.001
20	0.693	<0.001
21	0.675	<0.001
22	0.553	<0.001
23	0.647	<0.001
24	0.617	<0.001
25	0.726	<0.001
26	0.753	<0.001
27	0.701	<0.001
28	0.716	<0.001
29	0.690	<0.001
30	0.673	<0.001
31	0.704	<0.001

PIRNCA, Perceived Implicit Rationing of Nursing Care.

assessed using Cronbach's alpha and dimensionality was examined by assessing goodness of fit statistics and dimensionality was examined by assessing goodness of fit statistics and loadings on a unidimensional factor analysis model CFA (ie, all items loading onto a single latent factor).

For the CFA, Hu and Bentler's[38] methods and associated cut-offs were used. Since the PIRNCA items are expressed on an ordinal rather than continuous scale, diagonally weighted least squares weighted was used for model estimation.

Multivariate analysis of the independent impact of the studied variables on the quantitative variable was performed using linear regression. The results are shown as regression model parameter values with a 95% CI. Variable distribution

normality was verified using the Shapiro-Wilk test. All analyses used a significance threshold of 0.05.

RESULTS

The study included 513 nurses working in surgical and cancer wards in hospitals in Silesia and Lower Silesia, Poland. Table 1 shows the participants' characteristics.

Dimensionality

The CFA was performed for internal consistency and demonstrated the following parameters: root mean square error of approximation=0.06; Comparative Fit Index=0.981; Tucker-Lewis index=0.98; standardised root mean square residual=0.088 and the loadings (or

Table 3 Distribution of answers by question (%)

Question		N/a		Never		Rarely		Sometimes		Often		No answer	
		%	n	%	n	%	n	%	n	%	n	%	n
1	Hygiene	19.3	99	14.8	76	22.2	114	31.7	163	11.3	58	0.6	3
2	Skin care	17.9	92	16.3	84	26.3	135	28.2	145	9.7	50	1.4	7
3	Bedding	17.1	88	13.6	70	24.3	125	25.5	131	17.7	91	1.6	8
4	Walking assist	21.6	111	7.6	39	19.1	98	24.5	126	25.5	131	1.6	8
5	Positions	17.5	90	12.1	62	26.3	135	29	149	13.8	71	1.2	6
6	Bladder or bowel	19.6	101	18.1	93	27.6	142	25.3	130	8.4	43	0.8	4
7	Food intake	18.7	96	18.3	94	25.3	130	25.5	131	10.3	53	1.8	9
8	Physical comfort	16	82	17.5	90	29.2	150	22.6	116	12.3	63	2.3	12
9	Medications	13.4	69	43.2	222	27.2	140	12.1	62	2.7	14	1.2	6
10	Nutrition	25.5	131	36.6	188	22	113	10.7	55	2.5	13	2.5	13
11	Wound care	13.6	70	29.6	152	31.5	162	19.1	98	5.1	26	1	5
12	Intravenous port	12.6	65	32.7	168	33.1	170	16.7	86	2.9	15	1.8	9
13	Safe practices	15.4	79	19.6	101	24.1	124	21.6	111	17.3	89	1.8	9
14	Infections	5.8	30	41.8	214	29	149	15.2	78	6.4	33	1.6	8
15	Education	9.1	47	8.9	46	18.9	97	25.3	130	36.2	186	1.4	7
16	Preparation	9.7	50	21	108	30.4	156	27.4	141	9.1	47	2.1	11
17	Emotional	9.5	49	9.1	47	28.8	148	29	149	21	108	2.3	12
18	Physiological	10.7	55	37.2	191	28	144	17.7	91	3.5	18	2.7	14
19	Behavior	15.4	79	16.1	83	31.7	163	19.8	102	13.8	71	2.9	15
20	Safety	9.7	50	25.9	133	29.4	151	24.3	125	7.8	40	2.7	14
21	Missed requests	12.8	66	19.8	102	34.2	175	23.5	121	6.6	34	2.7	14
22	Waiting time	14	72	13.2	68	25.9	133	25.1	129	18.5	95	3.1	16
23	Member team	11.1	57	10.3	53	28.6	147	29	149	17.9	92	2.9	15
24	External unit	15.4	79	11.5	59	24.3	125	30	154	16	82	2.7	14
25	Family member	12.8	66	10.1	52	28.2	145	31.5	162	14.8	76	2.3	12
26	Delegations	11.7	60	16.9	87	31.1	160	25.7	132	10.7	55	3.7	19
27	Patient data	7	36	18.7	96	30	154	26.5	136	13.6	70	4.1	21
28	Care plan	12.6	65	20	103	26.1	134	28	144	9.9	51	3.1	16
29	Assessment	8.6	44	23.2	119	29.8	153	25.3	130	9.3	48	3.7	19
30	Nursing process	12.1	62	19.5	100	28	144	25.7	132	12.1	62	2.5	13
31	Nursing plan	12.8	66	16.5	85	26.3	135	26.5	136	14.2	73	3.5	18

CFA-implied item-total correlations) of individual items ranged from 0.532 to 0.753 (table 2), which were statistically significant (p<0.05). The values of the fit statistics and the strong loadings on the main factor are in line with a unidimensional interpretation for the tool's Polish adaptation.

Validity
Missing data
The missing data rates for specific items ranged from 0.6% (item 1) to 4.1% (item 27). The overall missing data rate was 2.24%. Detailed data are shown in table 3.

Total score distribution
The mean score was 1.27 (SD=0.68), indicating that care tended to be rationed 'rarely' rather than 'sometimes'. The median score was 1.29 points, that is, half of the respondents scored below, and half scored above 1.29 points. The first and third quartile were 0.73 and 1.77 points, respectively, that is, standardised scores in the studied group ranged between 1.37 and 1.77 points. It was also shown that the percentage of nurses who neglect

at least one activity is high and amounts to 94.15%. The average number of points for assessing the quality of care was 6.50 (SD=2.10) out of 10, which means that nurses highly evaluate the quality of the services they provide. The average score for job satisfaction was 5.49 (SD=2.19), which means that the nurses surveyed are satisfied with their current job.

The analysis of the study material showed that the PIRNCA score does not correlate (p>0.05) with the studied sociodemographic variables (age, gender, seniority, education, specialisation). On the other hand, the level of care rationing significantly correlates with the nursing evaluation of the quality of patient care (r=−0.492, p<0.005) and the evaluation of job satisfaction (r=−0.375, p<0.001). This means that the higher the subjective assessment of the quality of nursing services and the assessment of job satisfaction, the lower the level of rationing of care is observed. Also, the linear regression model showed that independent predictors of PIRNCA score are (p<0.05): nursing evaluation of the quality of patient care (each additional point decreases PIRNCA score by 0.131 points on average) and overall job satisfaction (each additional point decreases PIRNCA score by 0.04 points on average). Detailed data are presented in table 4.

Table 4	Analysis of linear regression of the PIRNCA score		
Variable	**Regression parameter**	**95% CI**	**P value**
Sex			
Female	Ref. item		
Male	−0.053	−0.419 0.313	0.776
Age			
---	−0.006	−0.021 0.009	0.406
Education			
Medical high school	Ref. item		
Bachelor's degree	−0.129	−0.479 0.22	0.467
Master's degree	−0.098	−0.561 0.366	0.679
Years of work			
---	0.006	−0.007 0.019	0.365
Specialisation and other			
Yes	Ref. item		
No	−0.121	−0.245 0.004	0.057
Main shifts in work			
7.00–15.00	Ref. item		
7.00–19.00	0.006	−0.135 0.146	0.938
Other	−0.169	−0.451 0.113	0.239
Nursing evaluation of the quality of patient care			
---	−0.131	−0.165 −0.097	<0.001
General work satisfaction			
---	−0.04	−0.071 −0.008	0.015

PIRNCA, Perceived Implicit Rationing of Nursing Care.

Reliability
The analysis performed for all items in the Polish version of the PIRNCA questionnaire yielded a Cronbach's alpha value of 0.957 for the entire scale, indicating high reliability. All items were found to have a positive item-total correlation, meaning that they correlated positively with the remaining items of the scale, which is a very desirable characteristic. Detailed data are shown in table 5.

DISCUSSION
Studies performed so far demonstrated that nursing care rationing is a serious issue, present in Western European states,[2 4 5 8 9] the USA[10 11 24 27] and Australia.[12] All these countries are highly developed and have incomparably higher healthcare spending than Poland,[39] possibly suggesting that problems with resource allocation or staff shortages may be less severe there than in Poland. Therefore, the development of a Polish version of a questionnaire measuring the PIRNCA was warranted in order to investigate this issue in Polish settings. For this purpose, the American PIRNCA questionnaire by Jones was adapted,[24] as it has been demonstrated to be a valid and reliable instrument for evaluating care rationing levels in a relevant validation study.

In the present study, Cronbach's alpha for the entire scale was 0.957, which indicates high reliability and is similar to the value reported by the original author.[24] This result confirms the credibility of the Polish version of the PIRNCA questionnaire in the assessment of the phenomenon of implicit rationing of nursing care in Polish hospitals.

Table 5 Interscale correlations for PIRNCA items

	How often did it happen in the last 7 working days?	Alpha value with the question excluded	Item-total correlation
1	You could not carry out routine hygiene in patients (eg, bath, oral hygiene, dental care) or to ensure that the task was performed by delegating it to another health care worker?	0.957	0.527
2	You could not perform routine skin care to a patient or to ensure that the task was performed by delegating it to another health care worker?	0.956	0.553
3	You could not change the bedding stained with blood or body fluids in a timely manner or ensure that the task was performed by delegating it to another health care worker?	0.956	0.555
4	You could not assist a patient in need of walking or ensure that the task was performed by delegating it to another health care worker?	0.96	0.553
5	You could not mobilise a patient or change the position of a patient with limited mobility or ensure that the task was performed by delegating it to another health care worker	0.955	0.665
6	You could not provide quick assistance in emptying the bowel or bladder (eg, using a bedpan, toilet chair) or toilet or ensure that the task was performed by delegating it to another health care worker?	0.955	0.663
7	Could not provide help for a patient unable to eat or drink unassisted, regardless of the manner of food intake or ensure that the task was performed by delegating it to another health care worker?	0.955	0.654
8	You could not implement measures promoting physical comfort (eg, timely administration of painkillers, adjusting temperature, back or neck massage) or ensure that the task was performed by delegating it to another health care worker?	0.956	0.589
9	You could not administer drugs (including intravenous therapy) in accordance with the recommendations and principles of safe pharmacotherapy?	0.956	0.62
10	You could not administer enteral or parenteral nutrition as prescribed and in accordance with nursing safe practices?	0.955	0.597
11	You could not provide sufficient care of sores (including changing dressings) as prescribed by a doctor/according to the health unit standards or when you find it necessary?	0.956	0.65
12	You could not change the venous access site, the tube and/or dressings within prescribed time or according to the standards of the health unit or when you find it necessary?	0.956	0.673
13	You could not fully adhere to the guidelines for safe nursing practices (eg, use of assistive equipment and lifts and/or additional personnel)?	0.956	0.607
14	You could not fully adhere to the guidelines for infection control (eg, hand hygiene, aseptic technique, isolation)?	0.956	0.633
15	You could not offer enough time to educate a patient and family, which in your opinion was necessary?	0.956	0.599
16	You could not prepare patients properly for treatment, tests or other medical procedures?	0.956	0.616
17	You could not offer the level of emotional or psychological support to a patient (or family) that you felt was needed?	0.956	0.69
18	You could not monitor patient's physiological condition (eg, vital signs, laboratory values) according to doctor's prescription/ health unit standards or when you found it necessary?	0.956	0.601
19	You could not monitor the emotions and behavior of a patient (eg, medication compliance, eating habits, social contacts, and mood) according to doctor's prescription/ health unit standards or when you found it necessary?	0.955	0.701
20	You could not monitor the physical safety of a patient according to the doctor's prescriptions/health unit standards or when you considered it necessary?	0.955	0.674
21	You could not monitor changes in patient's condition, missed requests for intervention (including assessment or referral) or unclear requests?	0.955	0.657

Table 5	Continued		
How often did it happen in the last 7 working days?		Alpha value with the question excluded	Item-total correlation
22	You had to keep a patient or family member waiting for more than 5 minutes from the moment they signalled the request (eg, by alert light)?	0.956	0.535
23	You could not have an important conversation with another member of the multidisciplinary team regarding a particular patient care, or this conversation was postponed?	0.955	0.636
24	You could not have an important conversation with an external unit regarding a particular patient care, or this conversation was postponed	0.955	0.609
25	You could you not have an important conversation with a patient or a family member about the instructions related to the hospital discharge, or the conversation was postponed?	0.955	0.709
26	You could not monitor or track the completion of delegated activities?	0.956	0.73
27	You could not review the interdisciplinary records of a patient to obtain comprehensive patient data?	0.955	0.681
28	You could not document the initial or modified care plan?	0.955	0.69
29	you could not document all activities referring to monitoring and assessment of patient's condition?	0.955	0.666
30	You could not document the entire process of nursing care in detail?	0.955	0.646
31	You could not assess the nursing care plan properly (using critical thinking) to determine validity and / or effectiveness of the intervention and to introduce recommended changes?	0.956	0.678

PIRNCA, Perceived Implicit Rationing of Nursing Care.

In Jones's studies,[24 40] respondents' mean score was 1.12 or 1.15 (SD=0.67 or SD=0.66). The present study yielded very similar scores, indicating that care was rationed 'rarely'. The studies[24 31 40 41] showed that approximately 95%–98% of nurses indicate that they neglect at least one of the 30 listed nursing activities during patient care. A similar percentage was also obtained in this study, which means that regardless of the latitude, nurses show a lack of ability to perform all the tasks entrusted to them during the care of the patient.

In literature, the most frequently rationing nursing activity are: timeliness of response to requests,[24 40 41] emotional and psychological support[9 31] and comfort/talk with patients.[16 18 20] In this study—the education of patients and families and emotional support were the most frequently reported nursing activity which was rationing during shift. Many authors[24 31 40 41] have shown that the care activities least frequently rationed included administering enteral nutrition and medication administration which confirmed the results of this study.

In this study, the correlation between PIRNCA results and nursing evaluation of the quality of patient care (r=−0.492, p<0.005) and job satisfaction evaluation (r=−0.375, p<0.001) was also shown, which is also confirmed by the results obtained by Jones[24] and Zeleníková et al.[31] Although the level of care rationing is statistically significant, it revealed a fair relationship with the nursing evaluation of the quality of patient care and the evaluation of job satisfaction.[42]

The main strength to be drawn from this study is that the PIRNCA is a very useful tool when monitoring the phenomenon of rationing nursing care, including the identification of care activities that are more often omitted. Expanding knowledge in this area, the PIRNCA can support nurse managers' efforts to facilitate the process of nursing care. It is anticipated that the PIRCNA tool will be useful in reducing negative effects of care left undone for patients and nurse practitioners.

Limitations
This study has some potential methodological limitations to be mentioned. The primary limitation is that all data used in this study were self-reported, which is one of the most widely used methods of collecting data in terms of patients' state of health, their assessment of the quality of health services, but also the assessment of medical personnel in various aspects of their professional work; however, flawed and with potential risk of bias. Furthermore, the study was conducted only in two university hospitals in the region; thus, it is difficult to generalise the findings on the entire population of nurses in Poland; thus, our findings should be interpreted with caution. Finally, another limitation that should be considered is relatively small sample size; however, the sample size was calculated and it was similar to the original validation study.

Implications
The main practical implication of this study is that the PIRNCA is a very useful instrument for monitoring the

level of rationing of nursing care including identification of nursing activities which are omitted more often. The knowledge about this phenomenon and its reasons can help nurse managers' to take action in improving the process of nursing care. It is anticipated that the PIRNCA tool will be useful in the reduction of negative patients and nurses' outcomes. We recommend further research on the rationing of nursing care; thanks to Polish adaptation it will be possible among Polish nurses. Rationing of nursing care is a plaque of today's times resulting from shortages of nursing staff. That is why it is so important to be able to continue research in this area.

CONCLUSION

The present study was the first to translate and validate the PIRNCA questionnaire in Polish nurses. Our results show that the Polish version of the PIRNCA questionnaire is a reliable and valid instrument for monitoring the extent of nursing care rationing in Polish hospital wards. The validation and adaptation of PIRNCA is the first step in assessing the rationing of nursing care in Polish hospitals.

Author affiliations
[1]Department of Clinical Nursing, Wroclaw Medical University, Wroclaw, Poland
[2]Department of Nervous System Diseases, Wroclaw Medical University, Wroclaw, Poland
[3]Department of Gerontology and Geriatric Nursing, Medical University of Silesia, Katowice, Poland
[4]Department of Clinical Medicine, Medical University of Bialystok, Bialystok, Poland
[5]Department of Economics and Quality in Health Care, Wroclaw Medical University, Wroclaw, Poland
[6]Department of Adult Health and Nursing Systems, Virginia Commonwealth University School of Nursing, Richmond, Virginia, USA

Competing interests None declared.

Patient consent for publication Not required.

Ethics approval This study was carried out in accordance with the tenets of the Declaration of Helsinki and was approved by the independent Bioethics Committee of the Wrocław Medical University in Poland.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available on reasonable request.

ORCID iD
Izabella Uchmanowicz http://orcid.org/0000-0001-5452-0210

REFERENCES

1 Shamian J. The role of nursing in health care. *Rev Bras Enferm* 2014;67:867–8.
2 Bragadóttir H, Kalisch BJ, Tryggvadóttir GB. Correlates and predictors of missed nursing care in hospitals. *J Clin Nurs* 2017;26:1524–34.
3 Griffiths P, Recio-Saucedo A, Dall'Ora C, et al. The association between nurse staffing and omissions in nursing care: a systematic review. *J Adv Nurs* 2018;74:1474–87.
4 Schubert M, Clarke SP, Aiken LH, et al. Associations between rationing of nursing care and inpatient mortality in Swiss hospitals. *Int J Qual Health Care* 2012;24:230–8.
5 Schubert M, Glass TR, Clarke SP, et al. Rationing of nursing care and its relationship to patient outcomes: the Swiss extension of the International Hospital outcomes study. *Int J Qual Health Care* 2008;20:227–37.
6 Kalisch BJ. Missed nursing care: a qualitative study. *J Nurs Care Qual* 2006;21:306–13.
7 Kalisch BJ, Xie B. Errors of omission: missed nursing care. *West J Nurs Res* 2014;36:875–90.
8 Bragadóttir H, Kalisch BJ. Comparison of reports of missed nursing care: registered nurses vs. practical nurses in hospitals. *Scand J Caring Sci* 2018;32:1227–36.
9 Schubert M, Ausserhofer D, Desmedt M, et al. Levels and correlates of implicit rationing of nursing care in Swiss acute care hospitals--a cross sectional study. *Int J Nurs Stud* 2013;50:230–9.
10 Kalisch BJ, Landstrom G, Williams RA. Missed nursing care: errors of omission. *Nurs Outlook* 2009;57:3–9.
11 Kalisch BJ, Lee KH. Missed nursing care: magnet versus non-Magnet hospitals. *Nurs Outlook* 2012;60:e32–9.
12 Hegney DG, Rees CS, Osseiran-Moisson R, et al. Perceptions of nursing workloads and contributing factors, and their impact on implicit care rationing: a Queensland, Australia study. *J Nurs Manag* 2019;27:371–80.
13 Aiken LH, Clarke SP, Sloane DM, et al. Nurses' Reports On Hospital Care In Five Countries. *Health Aff* 2001;20:43–53.
14 Sochalski J. Is more better?: the relationship between nurse staffing and the quality of nursing care in hospitals. *Med Care* 2004;42:67–60.
15 Schubert M, Glass TR, Clarke SP, et al. Validation of the Basel extent of rationing of nursing care instrument. *Nurs Res* 2007;56:416–24.
16 Al-Kandari F, Thomas D. Factors contributing to nursing task incompletion as perceived by nurses working in Kuwait general hospitals. *J Clin Nurs* 2009;18:3430–40.
17 Lucero RJ, Lake ET, Aiken LH. Nursing care quality and adverse events in US hospitals. *J Clin Nurs* 2010;19:2185–95.
18 Ausserhofer D, Zander B, Busse R, et al. Prevalence, patterns and predictors of nursing care left undone in European hospitals: results from the multicountry cross-sectional RN4CAST study. *BMJ Qual Saf* 2014;23:126–35.
19 Leary A, White J, Yarnell L. The work left undone. understanding the challenge of providing holistic lung cancer nursing care in the UK. *Eur J Oncol Nurs* 2014;18:23–8.
20 Bekker M, Coetzee SK, Klopper HC, et al. Non-nursing tasks, nursing tasks left undone and job satisfaction among professional nurses in South African hospitals. *J Nurs Manag* 2015;23:1115–25.
21 Bail K. O2-01-04: 'Failure to Maintain' Dementia Patients in Hospital: a new Method of Quality Outcome Measurement Related to Nursing Care. *Alzheimer's & Dementia* 2016;12:P222.
22 Kebede M, Endris Y, Zegeye DT. Nursing care documentation practice: the unfinished task of nursing care in the University of Gondar Hospital. *Inform Health Soc Care* 2017;42:290–302.
23 Kalánková D, Žiaková K, Kurucová R. Approaches to understanding the phenomenon of missed/rationed/unfinished care - a literature review. *Cent Eur J Nurs Midw* 2019;10:1005–16.
24 Jones TL. Validation of the perceived implicit rationing of nursing care (PIRNCA) instrument. *Nurs Forum* 2014;49:77–87.
25 Uchmanowicz I, Gotlib J. What is rationing of nursing care? *Współczesne Pielęgniarstwo i Ochrona Zdrowia* 2018;7:46–7.
26 Recio-Saucedo A, Dall'Ora C, Maruotti A, et al. What impact does nursing care left undone have on patient outcomes? review of the literature. *J Clin Nurs* 2018;27:2248–59.
27 Kalisch BJ, Tschannen D, Lee KH, et al. Missed nursing care, staffing, and patient falls. *J Nurs Care Qual* 2012;27:6–12.
28 Papastavrou E, Andreou P, Efstathiou G. Rationing of nursing care and nurse-patient outcomes: a systematic review of quantitative studies. *Int J Health Plann Manage* 2014;29:3–25.
29 Kalisch B, Tschannen D, Lee H, et al. Does missed nursing care predict job satisfaction? *J Healthc Manag* 2011;56:117–34.
30 Tschannen D, Kalisch BJ, Lee KH. Missed nursing care: the impact on intention to leave and turnover. *Can J Nurs Res* 2010;42:22–39.

Open access

31 Zeleníková R, Gurková E, Friganovic A, *et al*. Unfinished nursing care in four central European countries. *J Nurs Manag* 2019:jonm.12896.

32 Kalisch BJ, Williams RA. Development and psychometric testing of a tool to measure missed nursing care. *J Nurs Adm* 2009;39:211–9.

33 Beaton DE, Bombardier C, Guillemin F, *et al*. Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine* 2000;25:3186–91.

34 Sousa VD, Rojjanasrirat W, Translation RW. Translation, adaptation and validation of instruments or scales for use in cross-cultural health care research: a clear and user-friendly guideline. *J Eval Clin Pract* 2011;17:268–74.

35 Erkut S. Developing multiple language versions of instruments for Intercultural research. *Child Dev Perspect* 2010;4:19–24.

36 R Core Team. *R: a language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing, 2017.

37 Comrey AL, Lee HB. *A first course in factor analysis*. 2nd Edn. New York, USA: Routledge, 2016.

38 Hu Li-tze, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal* 1999;6:1–55.

39 OECD. *Health statistics 2018*, 2018.

40 Jones TL. A descriptive analysis of implicit rationing of nursing care: frequency and patterns in Texas. *Nurs Econ* 2015;33:144–54.

41 Jarošová D, Zeleníková R. Unfinished nursing care - the first pilot study in the Czech Republic. *Kontakt* 2019.

42 Portney LG, Watkins MP. *Foundations of clinical research: applications to practice*. 3rd edn. Upper Saddle River, N.J: Prentice Hall, 2009.