



Translation and psychometric testing of the Polish version of the Neonatal Extent of Work Rationing Instrument (NEWRI)

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Abstract

Objective. The aim of the study was to perform translation and cultural adaptation, as well as to assess the validity and reliability of the Polish version of the Neonatal Extent of Work Rationing Instrument (NEWRI) questionnaire for evaluating care rationing in neonatal intensive care units (NICUs) in Poland.

Materials and Method. Participants were prospectively recruited at the University Clinical Hospital in Wrocław, Poland, and the study conducted from January 2018 – June 2018. The adaptation process involved translation of survey items following the guidelines for cross-cultural translation and evaluation of psychometric properties, as well as an assessment of construct validity, reliability, and internal consistency of the NEWRI using Cronbach's alpha.

Results. 113 professionally active nurses (n=90) and midwives (n=23) were enrolled in the study. Cronbach's alpha for the entire instrument was 0.982. Results for subscales: life support and technology-oriented nursing care – Cronbach's alpha – 0.95, parental support and teaching and infant comfort care – 0.95, patient surveillance – 0.92, care coordination and discharge planning – 0.79. All items of the questionnaire were found to have a positive discriminatory power.

Conclusions. The present findings indicate a high level of reliability and validity of the translated questionnaire, fully comparable to that of the original. The questionnaire can be used for evaluating care rationing in NICUs.

Key words

psychometric evaluation, Polish validation study, neonatal nursing, care rationing, Neonatal Extent of Work Rationing Instrument

INTRODUCTION

The old principle '*Salus aegroti suprema lex*' – 'the wellbeing of the patient is the supreme law' – is an unquestionable foundation of all the ethical principles of patient care. In practice, however, the interpretation of the patient's best interest often proves to be difficult, if not impossible.

New knowledge and great advances made in the study of the foetus and neonate mean that newborns in an increasingly severe clinical condition are being saved in neonatal wards. The specific health and care-related problems of the neonatal population require special knowledge, competences, and skills from medical personnel, also in terms of work organization and patient discharge. Following discharge, parents must not only provide normal care to their baby, but also ensure the continuation of multidisciplinary health care initiated during hospitalization [1, 2].

Missed care, as defined by the American pioneers Kalisch et al. [3], involves any aspect of required patient care that is omitted or delayed. According to the authors, nursing care rationing occurs when the available resources are insufficient for the provision of required patient care.

As demonstrated by a literature review, the problem of

missed care is prevalent both in Poland and worldwide. The review of studies on care rationing shows that as many as 55–98% of nurses omit ≥ 1 nursing activities in patient care. Patient and family education and provision of emotional support are the most commonly omitted activities, attending to the patient's physiological needs – the least. Missed care is predicted more strongly by organizational factors, including poor working conditions and staff shortages, rather than by nurses' personality traits [4–7].

The very definition of care rationing provokes the question about whether it is ethical to omit care for newborns and their mothers to any extent. The broad scope of responsibilities and the limited resources force nurses to prioritize and focus on the most essential activities, while omitting or minimizing other duties. Decisions are moral dilemmas, resolved without the patient's participation [8, 9]. How, then, are these decisions made?

As emphasized by Scheunemann and White [10], rationing in health care is associated with a very well-defined part of allocation policy. Medical staff are required to make an informed decision on why some patients are excluded from an activity, while some are not, bearing in mind that the activity may save or extend the life of a patient or significantly increase the quality of life. Resource allocation and nursing care rationing are related concepts. In accordance with the care rationing philosophy by Scott et al. [11], nursing activities involve diagnostics, treatment, prevention, rehabilitation,

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and emotional support. The activities as such are not treated as equal, but are all expected by the patients.

Nursing staff shortages, widespread in Polish hospitals, undoubtedly exacerbate the problem of nursing care rationing. Many institutions implement strategies to cut health care costs, involving reductions of nursing staff numbers and of resources allocated to intensive care units. A review of available studies showed that staff shortages contribute to adverse patient outcomes [12].

Moreover, a lowering of the quality of nursing care and nurses' skills was associated with an increased number of adverse events and negative treatment outcomes. When fewer nurses must provide care to a larger number of patients, each nurse has less time to perform all their duties, thus being forced to prioritize tasks and/or omit some of them entirely [4, 13]. Without sufficient resources and management support, nurses start rationing care and rushing through their tasks, which affects the quality of their work.

Without a doubt, 'incomplete care' for neonatal patients is a growing problem, both clinical and ethical, requiring empirical studies as well as an ethical reflection by decision-makers in health care [14].

The development of a Polish version of the questionnaire to assess nursing care rationing in neonatal wards will surely assist in identifying the issue and investigating it further. To date, a validated version of the Neonatal Extent of Work Rationing Instrument (NEWRI) in Polish is not available and a need therefore exists for a translation, both for research and clinical activity.

OBJECTIVE

The purpose of the study was to perform an adaptation of the NEWRI questionnaire evaluating neonatal nursing care rationing into Polish, and to assess its utility through psychometric evaluation.

MATERIALS AND METHOD

The translation and psychometric testing of the NEWRI instrument was completed in 6 steps: 1) forward translation, 2) revision, 3) back translation, 4) revision, 5) pilot testing, 6) data collection and psychometric testing. Steps 1–4 included the back-translation process.

Study participants. The NEWRI pilot-testing was performed between January – June 2018, in a group of 113 respondents, of whom 79% were Registered Nurses (RNs) (n=90) and 21% were Registered Midwives (RMs) (n=23), all working at Neonatal Intensive Care Units (NICUs), at the University Clinical Hospital in Wrocław, Poland. The study group was recruited using targeted selection. For the psychometric testing of the questionnaire, participants were included if they stated that they spent most of their working time on the unit. The time it took participants to complete the questionnaire was not measured. All respondents were instructed that participation was strictly voluntary and anonymous, and were informed of the study purpose. Lack of consent to participate was the only exclusion criterion. The participants completed a questionnaire that was a Polish translation of

the full original NEWRI questionnaire. The Polish version also had a visual format identical to that developed by the author of the original. Psychometric analyses only included fully completed questionnaires.

Ethical considerations. The study was approved by the Bioethics Committee of the Medical University in Wrocław, Poland (Approval No. KB-394/2018). All respondents provided written informed consent prior to participation in the study. In the national survey, participation equaled written informed consent.

Research Tool. The Neonatal Extent of Work Rationing Instrument (NEWRI) questionnaire is an instrument for the evaluation of nursing care rationing in neonatal wards, published by Rochefort in 2010 [13]. It comprises 59 items related to nursing activities in neonatal care. Four subscales can be identified:

- 1) life support and technology-oriented nursing care (15 items);
- 2) parental support and teaching and infant comfort care (12 items);
- 3) patient surveillance (7 items);
- 4) care coordination and discharge planning (6 items).

Each item is rated using a 1–4 scale, where 1 = 'very rarely', 2 – 'rarely', 3 – 'often', and 4 – 'very often'. Subsequently, results are transposed as necessary using a 4-point Likert-type scale. Higher scores in each subscale indicate more difficulty in performing the necessary nursing tasks, based on the patients' condition and/or needs, due to insufficient time or resources (e.g. support, assist or encourage parents in performing infant's care, assess patient signs and symptoms).

Translation and Language Validation. The language validation procedure was carried out in accordance with published guidelines [15,16], following formal, written approval by the original author. The importance of the 2 main parts of the translation, language and content, was emphasized. Each question from the English original version was translated into Polish by 2 bilingual independent translators; their translation was then combined into one Polish version. The second step was to discuss and revise the translation of the Polish version. This was carried out by designated experts, one of whom worked in clinical practice (NICUs) and another as a researcher at the University Hospital. Neither of these evaluators had seen the original version of the survey. Their suggestions, which were minor, were then taken into consideration. A professional translator further reviewed and corrected this version to ensure that there were no remaining linguistic inconsistencies, which might have occurred during translation from English into Polish.

The back-translation was carried out by a professional translator who had not seen the original version of the instrument. The level of agreement with the English original version was considered good. Finally, the English version was translated back into the Polish language by two bilingual PhD-prepared nurses (blinded to the previous Polish version, as well as the original English version). All versions of the instrument included 59 questions. As the meanings of each item remained the same as in the original, and no text or item was rated as different in terms of wording and content, the translated instrument was used in a pilot study (Supp. 1).

Statistical analysis. Statistical data analyses were performed using R package, version 3.4.2. (R Foundation for Statistical Computing, Vienna, Austria) [17]. Internal consistency (IC) was checked with Cronbach's alpha coefficient and discriminatory power was calculated as the deleted item-total correlation (ITC). Cronbach's alpha (α) values should optimally range between the recommended values of 0.60–0.90. The following thresholds for internal consistency were used: $0.9 \leq \alpha$ – excellent; $0.8 \leq \alpha < 0.9$ – good; $0.7 \leq \alpha < 0.8$ – acceptable; $0.6 \leq \alpha < 0.7$ – questionable; $0.5 \leq \alpha < 0.6$ – poor; and $\alpha < 0.5$ – unacceptable. All items of the Polish version of the NEWRI were assessed using this approach, and Cronbach's α values >0.70 were considered satisfactory.

RESULTS

Socio-demographic data. Respondents' characteristics including their gender, age, marital status, place of residence, type of education, profession, work experience as a nurse/midwife and work experience in the current place of employment, are summarized in Table 1.

Internal consistency analysis. Internal consistency for the entire scale, as measured by Cronbach's alpha, was 0.982, which indicates the instrument is highly reliable. For the 'life support and technology-oriented nursing care' subscale, Cronbach's alpha was 0.958 (Tab. 2), for 'parental support, and teaching and infant comfort care; – 0.951 (Tab. 3), 'patient surveillance' – 0.928 (Tab. 4), 'care coordination and discharge planning' – 0.798 (Tab. 5).

The results were reproducible and did not occur randomly. Alpha values above 0.7 are considered indicative of a reliable scale [18]. All questionnaire items were found to have a positive discriminatory power, i.e. a positive correlation with other items, which is a very good result.

DISCUSSION

The testing of the NEWRI instrument from the English version into Polish was successfully carried out in 6 steps which included a back-translation process and psychometric testing. To date, 2 questionnaires exist for surveying missed nursing care: the Basel Extent of Rationing of Nursing Care (BERNCA) [19] and the Perceived Implicit Rationing of Nursing Care (PIRNCA) [20] (currently undergoing Polish adaptation), but neither is specific to NICUs. Without appropriate evidence to demonstrate that nursing care can be compromised due to a poor working environment, staff shortages, or insufficient resource allocation, it is difficult to secure the support required to improve these factors. No previous studies have described the association between the characteristics of the staff and the working environment on the one hand, and care rationing in NICUs on the other. Any similar studies only involved adult surgical and intensive care patients [21, 22].

Therefore, the primary motivation for adapting the NEWRI questionnaire was a need resulting from the lack of a properly constructed instrument for measuring the issue. The performed analyses confirmed that the Polish version of the NEWRI fulfills the required reliability and validity

Table 1. Respondents' characteristics (n=113)

Characteristic	Values
Gender	Female 111 (98.23%)
	Male 2 (1.77%)
Age group	20–30 years 31 (27.43%)
	31–40 years 35 (30.97%)
	41–50 years 44 (38.94%)
	51–60 years 3 (2.65%)
Marital status	Married 74 (65.49%)
	Divorced 9 (7.96%)
	Single 30 (26.55%)
Place of residence	Urban >200,000 residents 49 (43.36%)
	Urban 25–200,000 residents 33 (29.20%)
	Urban <25,000 residents 9 (7.96%)
	Rural 22 (19.47%)
Education level	Vocational 8 (7.08%)
	Bachelor's degree 52 (46.02%)
	Master's degree 51 (45.13%)
Profession	Nurse 91 (80.53%)
	Midwife 22 (19.47%)
Work experience as a nurse/ midwife	Up to 1 year 7 (6.19%)
	2–5 years 24 (21.24%)
	6–10 years 21 (18.58%)
	11–20 years 29 (25.66%)
	21–30 years 31 (27.43%)
Work experience in the current place of employment	more than 35 years 1 (0.88%)
	Up to 1 year 15 (13.27%)
	2–5 years 33 (29.20%)
	6–10 years 26 (23.01%)
	11–20 years 25 (22.12%)
21–30 years 13 (11.50%)	
more than 35 years 1 (0.88%)	

criteria, and can therefore be used for measuring the extent of nursing care rationing in NICUs.

The reliability of the Polish version of the NEWRI was tested by calculation of Cronbach's alpha and discriminatory power. Cronbach's alpha is a measure of an instrument's internal consistency. According to literature data, Cronbach's alpha values should optimally exceed 0.90. The following thresholds for results are used: ≥ 0.80 – good, ≥ 0.70 – acceptable, ≥ 0.60 questionable, ≥ 0.50 – poor, and ≤ 0.50 – unacceptable [23]. In the presented study, Cronbach's alpha for the Polish version was 0.98, which is a very high value. For the 4 subscales identified in the analysis, the values ranged between 0.79 – 0.95. Similar alpha values were obtained by the authors of the original questionnaire, Rochefort and Clarke [13] (for life support and technology-oriented nursing care subscale – 0.93, parental support and teaching and infant comfort care – 0.93, patient surveillance – 0.83, and care coordination and discharge planning – 0.81). Considering the internal consistency results obtained both by the authors of the presented study and by Rochefort and Clarke [13], with alpha values above 0.70 found for all subscales confirming a good level of reliability and validity, the scale is recommended for use in NICUs.

Table 2. Cronbach's alpha values for 'life support and technology-oriented nursing care' subscale

Item	Alpha value with the item excluded	Discriminatory power
Bottle feed an infant.	0.956	0.684
Tube feed an infant through a nasogastric, naso-jejunal, gastrostomy or jejunostomy tube.	0.955	0.726
Administer total parenteral nutrition (i.e. TPN).	0.954	0.787
Perform or assist with medical procedures, treatments or diagnostic tests (e.g. dialysis, peritoneal dialysis, ECG, ECMO, phototherapy or abdominal, lumbar and/or pleural puncture or tap, etc.).	0.955	0.752
Prepare and administer medications (PO, IV, SC, IM, or other) or oxygen.	0.952	0.865
Prepare and administer a blood transfusion or blood products.	0.953	0.834
Take or obtain a venous, arterial, capillary, urinary, faecal or other sample for laboratory analysis within a prescribed time.	0.953	0.825
Insert or assist with the insertion of an oropharyngeal or nasopharyngeal airway, an endotracheal tube or a tracheostomy or with initiation of mechanical ventilation.	0.952	0.875
Collaborate with or insert a peripheral, central or umbilical venous and/or arterial catheters, or perfusions and / or a PICC line.	0.953	0.859
Insert or assist with the insertion of nasogastric, thoracic, peritoneal, urinary, or other tubes.	0.952	0.864
Apply or assist with the application of splints, casts, tractions or restraints.	0.964	0.289
Perform care specific to endotracheal tubes, tracheostomies or ventilator therapy (e.g. verify tube and patient positioning, suction secretions, perform mouth care or chest physiotherapy, verify or change tubes or ventilator settings, etc.). (Does not apply to my nursing unit: _____).	0.953	0.817
Perform care for patients with peripheral, arterial or umbilical venous and/or arterial lines or a PICC line (e.g. verify insertion site and catheter positioning, verify patency, change dressings or tubing, monitor rate, type and quantity of solution, etc.).	0.953	0.862
Perform care for patients with nasogastric, thoracic, peritoneal, urinary, suprapubic tubes or surgical drains (e.g. inspect and clean skin and insertion site, verify tube and drainage system positioning, secure connections, assess patency, monitor drainage characteristics, irrigate the tube, change dressings, verify suction, empty drainage bag or system, etc.).	0.953	0.856
Perform care specific to splints, casts, tractions or restraints (e.g. assess skin integrity, warmth, colour, sensation, pulses and capillary refill, mobilize and position the patient and the equipment, change dressings, etc.).	0.96	0.492

Table 3. Cronbach's alpha values for the 'parental support, and teaching and infant comfort care' subscale

Item	Alpha value with the item excluded	Discriminatory power
Assist parents or family members to understand child's medical condition, its signs and symptoms, usual course, laboratory analyses or diagnostic test results and treatment plan.	0.945	0.816
Assist parents or family members to understand actual or planned care treatments, medications or procedures, as well as their intended and side-effects. Perform pre- and post-operative teaching.	0.943	0.857
Teach parents or family members how to administer medications or perform care, treatments or procedures. Teach about their goals or action mechanisms, primary and secondary effects.	0.943	0.867
Teach parents how to perform infant care (i.e. bath, umbilical cord care, feeding, etc.) and about the development characteristics/needs of the infant.	0.943	0.873
Inform parents or family members about available community resources.	0.95	0.64
Encourage parent-infant attachment process (e.g. Encourage parents and family members to hold, touch or talk to the infant, teach Kangaroo care, facilitate visitation, etc.).	0.945	0.803
Support, assist, encourage or accompany parents in performing infant's care.	0.943	0.867
Offer emotional support or a reassuring presence to parents or family members when appropriate.	0.943	0.88
Support parents or family members in issues related to death, dying and palliative care.	0.949	0.676
Engage in active or empathic listening/encourage parents or family members to express their feelings verbally when appropriate.	0.947	0.731
Touch the infant (i.e. hold, touch or rock the infant, perform massages of its forehead, cheeks or back, etc.).	0.951	0.621
Help or counsel breastfeeding mothers/support or promote breastfeeding.	0.953	0.531

Table 4. Cronbach's alpha values for the 'patient surveillance' subscale.

Item	Alpha value with the item excluded	Discriminatory power
Assess infant development (e.g. weight, height, gestational age, head circumference, etc.).	0.917	0.763
Perform neonatal physical exam, monitor physiological/haemodynamic function, vital signs, intake and output.	0.905	0.885
Monitor results of laboratory analyses/diagnostic tests.	0.93	0.634
Assess patient's signs and symptoms.	0.904	0.899
Monitor intended and side-effects of medications or treatments, including signs of medication toxicity, allergic, or transfusion reactions or shock.	0.916	0.78
Inspect the skin, mucous membranes and eyes to prevent ulcerations, wounds or infections, and to detect changes in colouration (e.g. jaundice, erythema), temperature or oedema.	0.912	0.821
Regularly modify infant's position to prevent musculoskeletal abnormalities associated with immobility or poor positioning.	0.931	0.629

Table 5. Cronbach's alpha values for the 'care coordination and discharge planning' subscale

Item	Alpha value with the item excluded	Discriminatory power
Communicate to the medical team relevant information/abnormal findings about infant health status, development and response to medications, treatments, laboratory analyses/diagnostic tests.	0.83	0.261
Participate in multi-disciplinary team meetings or in meetings with the medical team and the family.	0.76	0.579
Plan or organize patient's discharge, follow-up, appointments, transport or transfer to home, operating theatre, another nursing unit/another hospital.	0.725	0.714
Organise or coordinate patient care services (e.g. organize diagnostic tests/medical, social services or psychological consultations, pastoral visits; obtain instruments/medical equipment, etc.).	0.72	0.737
Transfer or transport an infant to another nursing unit/ operating theatre/another hospital.	0.775	0.513
Collaborate to perform an exchange transfusion. (Does not apply to my nursing unit: ____).	0.77	0.537

CONCLUSIONS

The Polish version of the NEWRI questionnaire is a useful tool for describing and monitoring the extent of neonatal nursing care rationing. Further studies are warranted to investigate the determinants of nursing care rationing in neonatal intensive care units.

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Declaration of conflict of interest

The authors declare no conflicts of interest.

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