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

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\begin{itemize}
  \item A – Research concept and design, B – Collection and/or assembly of data, C – Data analysis and interpretation, D – Writing the article, E – Critical revision of the article, F – Final approval of article
\end{itemize}

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 ‘\textit{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,
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.

**OBJECTIVE**

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 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 Wroclaw, 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 ≤ α – excellent; 0.8 ≤ α < 0.9 – good; 0.7 ≤ α < 0.8 – acceptable; 0.6 ≤ α < 0.7 – questionable; 0.5 ≤ α < 0.6 – poor; and α < 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 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 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 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                        |              |
| Divorced                              | 7 (6.19%)    |
| Married                               | 74 (65.49%)  |
| 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%)  |
| more than 35 years                    | 1 (0.88%)    |
| Work experience in the current place of employment | | |
| 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%)    |
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 jejuno- stomy 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. 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                              | 0.867                |
| 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                              | 0.783                |
| 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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