

Validation of the Basel Extent of Rationing of Nursing Care Instrument

Maria Schubert ▼ Tracy R. Glass ▼ Sean P. Clarke ▼ Bianca Schaffert-Witvliet ▼ Sabina De Geest

Editor's Note

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- ▶ **Background:** Financial constraints and other forces affecting health care in many countries have led to nurses implicitly limiting their care in some instances. In the absence of an accepted definition and theoretical framework of implicit rationing of nursing care, a framework and the Basel Extent of Rationing of Nursing Care (BERNCA) instrument were developed. This instrument was used in the Swiss part of the International Hospital Outcome Study, in which implicit rationing of nursing care was studied.
- ▶ **Objective:** To examine the validity and reliability of the newly developed BERNCA instrument.
- ▶ **Methods:** Psychometric analysis was performed on data from 957 nurses in five Swiss acute care hospitals enrolled in a larger hospital organization study. An explanatory factor analysis with varimax rotation was used to investigate the instrument's internal structure, Spearman correlations were used to test relationships between implicit rationing and two related concepts, and Cronbach's alpha and interitem correlations were used to test the reliability of the scale.
- ▶ **Results:** Expert feedback confirmed that the BERNCA covered the *implicit rationing of nursing care* domain adequately and that its questions were fully comprehensible. The single-factor solution confirmed the instrument's unidimensional internal structure. A moderate to strong correlation in the expected direction was found between the BERNCA implicit rationing data and the quality of the nurse work environment as measured by the Nursing Work Index—Revised, particularly the perceived adequacy of nursing resources, although a significant but low correlation was also shown with patient-to-nurse ratios. Cronbach's alphas (.93) and interitem correlations indicated internal consistency and homogeneity.
- ▶ **Discussion:** Initial evidence of the validity and reliability of the BERNCA instrument was provided.
- ▶ **Key Words:** healthcare rationing · health resources · nursing care

Global healthcare costs are rising dramatically, alongside scientific and technological advances, demographic trends, and epidemiological shifts. Such costs often surpass the means of governments, insurers, and users to finance them. To contain the growth of public healthcare expenditures, cost-saving strategies have been implemented at national, regional, and local levels. Strategies include the following: (a) hospital budget cuts, often straining patient-to-nurse ratios and staff skill mixes; (b) changes in hospital utilization by shortening stay periods, or substitution of outpatient for inpatient care; and (c) efforts to maximize cost-effectiveness regarding medical practices (e.g., managed care) (Aiken, Clarke, & Sloane, 2001; Finlayson & Gower, 2002; McKee & Healy, 2002). However, restructuring, reorganizing, and reengineering strategies often lead to rationing of healthcare services (Bodenheimer & Grumbach, 2002; Ward, 2005), meaning the extent to which the tasks/measures are withheld is the purpose of the Basel Extent of Rationing of Nursing Care (BERNCA) instrument. This study is designed to validate this instrument.

Preliminary Evidence

An extensive literature review showed that the available empirical evidence on rationing of healthcare services was focused primarily on rationing of medical care and services and that, although various studies or reports (the majority in non-English articles) discussed implicit rationing of

Maria Schubert, MNS, is Research Assistant, Institute of Nursing Science; and Tracy R. Glass, MSc, is Biostatistician, Basel Institute for Clinical Epidemiology, University of Basel, Switzerland.

Sean P. Clarke, PhD, RN, is Associate Professor of Nursing, Center for Health Outcomes and Policy Research, University of Pennsylvania, Philadelphia.

Bianca Schaffert-Witvliet, MSN, is Advanced Nurse Practitioner (ANP), Hospital Limmattal, Schlieren, Switzerland.

Sabina De Geest, PhD, RN, is Professor of Nursing and Director, Institute of Nursing Science, University of Basel, Switzerland.

nursing care, the topic had neither an accepted definition nor a conceptual framework.

Still, it was readily apparent that, due to limited resources, nurses in hospitals could not always provide what they considered necessary care to all patients. In the IHOS study, for example, only 30%–40% of 43,329 nurses surveyed reported enough registered nurses were staffed to perform all required nursing tasks and to provide high-quality care. Furthermore, considerable numbers (from 10% to 54% across tasks and countries) reported that a number of nursing activities considered as markers of adequate nursing care, such as brushing patients' teeth, teaching patients and their families, and comforting or talking with patients had been left undone on their most recent shift (Aiken, Clarke, Sloane, et al., 2001).

Sixty-four percent of 2,510 nurses in the United Kingdom reported lacking the time to perform essential nursing tasks such as addressing patients' anxieties, fears, and concerns (19.7%–51.9%), treating their symptoms and conditions (15.4%–33.1%), or providing them and their relatives with necessary information (9%–50.7%) (West, Barron, & Reeves, 2005).

Thirty percent of 1,954 participating Swiss nurses indicated that, due to a lack of time resources, they had had to limit their necessary nursing care to keeping patients warm, well-fed, and clean. Time pressure primarily affected patient comfort and communication, followed by feeding and elimination functions, personal hygiene, dressing, and mobilization. Furthermore, many nurses indicated that they had insufficient time to monitor disoriented or confused patients carefully enough to ensure their safety and had therefore restrained them, given them sedatives, or both as protective measures (Kuenzi & Schaer-Moser, 2002).

Another Swiss survey of 20 administrative leaders in Swiss acute care hospitals linked the lack of qualified nursing personnel with the omission of necessary nursing therapies and discussions with patients, closing of beds, and increased error rates on a short-term basis, concurrent with decreased care quality on a long-term basis (Kindschi, Held, Lechmann, Karges, & Rechsteiner, 2001).

Little is known about the processes of how nurses decide which patients do not receive required nursing care when resources are scarce. In general, decision making is seen as a complex process that includes information collection, problem identification, consideration of alternative strategies, and selection of optimal actions. Factors influencing decision making and clinical judgment, priority setting, and triage processes in clinical nursing practice are as follows: (a) hospital-level organizational factors, (b) characteristics of the nurse work environment (e.g., patient-to-nurse ratios, amount of available time, and resources), (c) the philosophy of care, (d) the nurse's personal characteristics (e.g., education, experience, knowledge), and (e) patients' characteristics (e.g., number and urgency of health problems and condition) (Andersson, Omberg, & Svedlund, 2006; Bucknall, 2000; Currey & Botti, 2006; Hendry & Walker, 2004).

Although this evidence suggested the existence of implicit rationing of nursing care, no research was found on the extents and mechanisms of implicit rationing of nursing care in hospitals, or on its relationship with patient

and nurse outcomes, and no instrument was available to quantify it. To address this gap, as part of the IHOS study (Aiken, Clarke, & Sloane, 2002), the Rationing of Nursing Care in Switzerland (RICH) study was conducted. The BERNCA instrument was developed in preparation for the study, and the current study was designed to test its reliability and validity in accordance with accepted standards for educational and psychological testing (American Educational Research Association [AERA], American Psychological Association, & National Council on Measurement in Education, 1999).

Definition of Implicit Rationing of Nursing Care

The definition of implicit rationing of nursing care was based on the following general definition of rationing in medical care and healthcare: rationing is the allocation of scarce or limited healthcare resources, when standard measures expected to be beneficial have to be withheld from some individuals (Bodenheimer & Grumbach, 2002; Truog et al., 2006; Ubel & Goold, 1998).

Based on these definitions, implicit rationing of nursing care was defined as "the withholding of or failure to carry out necessary nursing measures for patients due to a lack of nursing resources (staffing, skill mix, time)" (Schubert et al., 2005). Within this definition, "necessary nursing measures" refers to a set of nursing tasks or treatment measures that are accepted—by clinical consensus and the attending nurse—as important for a patient to achieve the desired outcomes. Such tasks and measures can be classified according to the following aims: surveillance; therapy; support; prevention or prophylaxis; activation or rehabilitation; educational and instructional measures; and measures related to the application, documentation, and adaptation of nursing processes. These are influenced by the professional standards, educational levels, and cultural characteristics of the relevant regions or countries.

Conceptual Framework of Implicit Rationing of Nursing Care

Based on the available empirical evidence regarding factors influencing decision making and prioritization of nursing care, as well as patient and nurse outcomes, a conceptual framework was developed to explain the construct of implicit rationing of nursing care, with related constructs and influences (Figure 1).

This implicit rationing of nursing care occurs during the process of care when a nurses' resources are insufficient to provide what they consider necessary care to all patients under their care. The precise details of the rationing depend on individual processes of clinical decision making and judgment. The extent is expressed in the number and urgency of necessary nursing tasks withheld. It is influenced by the capacity of a nursing unit's resources to meet the patients' care needs and is precipitated when that capacity is surpassed. Imbalances may occur due to a range of organizational and individual factors influencing decision-making, judgment, and prioritization processes, along with triage.

Nursing care depends on problem-solving and decision-making processes, which include several steps: assessment of the patient situation and identification of

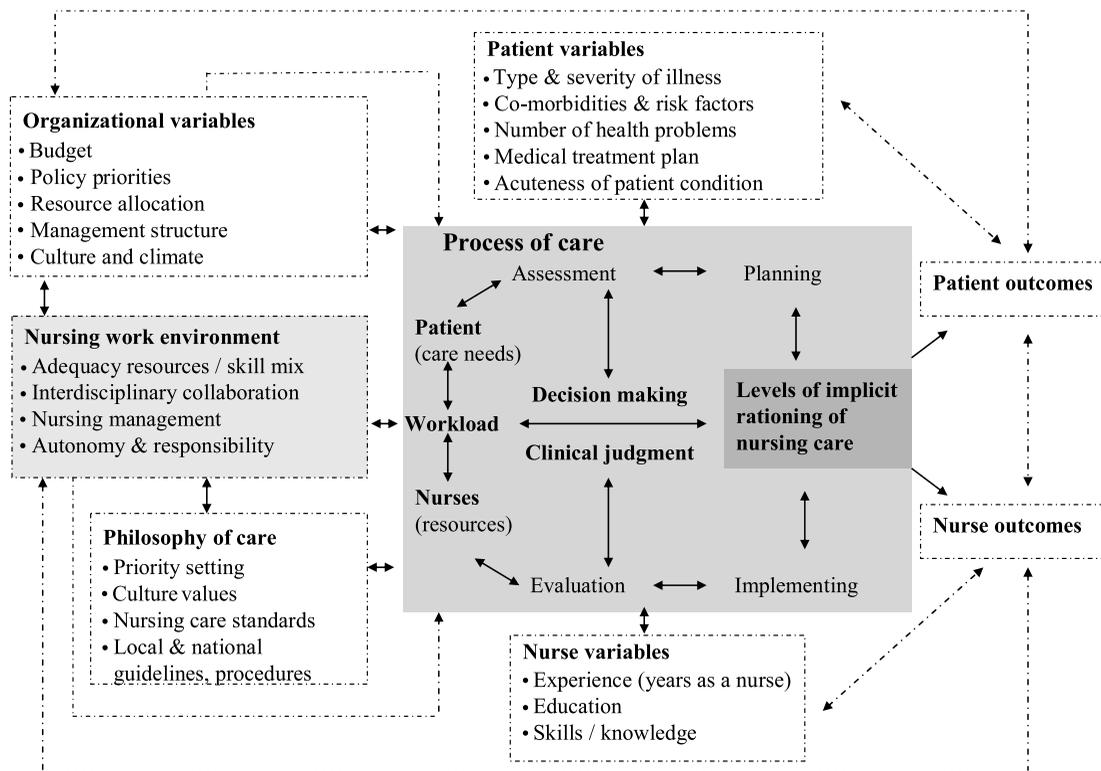


FIGURE 1. Conceptual framework: implicit rationing of nursing care.

the relevant problem, planning of the needed nursing care (measures and intervention), and implementation and evaluation of care. During this process, each nurse has to evaluate the needs of every patient under his or her care and has to judge and to decide whether to adhere to or adapt the existing care plan. Based on the overall workload on the unit and the individual patient case load and patient preferences, the nurse then has to assess if there are enough nursing resources to provide the needed care to all patients, or if he or she needs to withhold needed nursing care from some patients. It can be expected that, before a nurse withholds necessary nursing tasks, he or she will try to utilize other possibilities, including delegation, suboptimal execution, or simply postponement of the task.

As described above, no data on the relationship between implicit rationing of nursing care on patient and nurse outcomes was found to have been published before the current research was undertaken. However, based on the results of several studies demonstrating significant relationships between the nurse work environment, staffing and skill mix, and patient and nurse outcomes (Aiken, Clarke, Cheung, Sloane, & Silber, 2003; Aiken, Clarke, Sloane, Sochalski, & Silber, 2002; Kovner & Gergen, 1998; Needleman, Buerhaus, Mattke, Stewart, & Zelevinsky, 2002), a hypothesis was formed: implicit rationing, which occurs at the level of the nurse-to-patient interface, would be related directly to patient and nurse outcomes. Also, the lower quality of nurse work environments and higher workloads would be related to higher levels of implicit rationing of nursing care and poorer patient and nurse outcomes.

Methods

Development of the BERNCA Instrument

The development of the BERNCA instrument was based on the previously described conceptual framework of implicit rationing of nursing care, as well as on preliminary evidence, clinical expertise of members of the research team, and the Swiss Red Cross (Schweizerisches Rotes Kreuz; SRK) framework for nursing education (SRK, 1992). In Switzerland, no national nursing standards exist, but the Swiss Red Cross framework, which is nonprescriptive, describes the scope and responsibilities of nursing education and, to a large extent, of nursing in general. The SRK framework does not specify necessary nursing measures but provides a basic structure for their planning, implementation, and evaluation.

As a first step, an initial list of 20 questions was generated on necessary nursing tasks indicated in the literature and the experience of the research team as those most likely omitted during nursing resource shortfalls. The list was sent to 20 qualified nursing specialists from the German-speaking part of Switzerland. These experts have at least a Swiss or equivalent foreign nursing diploma, and the majority have completed advanced education in nursing (Level 1 or 2), or bachelor's, master's, or doctoral degrees in nursing. All were working in direct patient care in hospitals or had a minimum of 2 years' experience in this area. (No nursing administrators were included.) These experts were asked to indicate whether all significant aspects of the construct of implicit rationing of nursing care had been included, and whether all content was relevant and the formulation was clear. Based on their

evaluation, no questions had to be excluded or added, but two questions were rephrased.

In the final version of the questionnaire, the 20 questions were divided into five dimensions according to their aims in relation to the categories provided in the SRK framework. These were (a) Activities of Daily Living, (b) Caring and Support, (c) Rehabilitation and Instruction and Education, (d) Monitoring and Safety, and (e) Documentation (Table 1). Using a 4-point Likert scale (*never* = 0, *rarely* = 1, *sometimes* = 2, *often* = 3), nurses assessed how often they had been unable to carry out the listed nursing tasks in the previous 7 working days. To interpret the test scores, it was necessary to calculate the overall rationing score and the mean.

The BERNCA was further pilot tested in two phases. In the first, 10 students at the Institute of Nursing Science (University of Basel, Switzerland), all of whom were experienced professional nurses having worked for at least 2 years in direct patient care in Swiss acute care hospitals, evaluated the clarity and comprehensibility of the items' wording. Subsequently, a group interview was conducted with four of the respondents to discuss these

points further. As a result, a number of minor changes were made. In a second phase, the BERNCA was given to 14 registered nurses from one hospital to evaluate the clarity of the questions and wording. No further changes were required.

Validity and Reliability Testing

Estimates of the BERNCA's validity and reliability were based on the Standards (AERA et al., 1999), as a prescriptive guideline and framework of validity testing among four of five possible validity dimensions.

Validity Testing Evidence based on test content was explored through a logical analysis of the adequacy with which the test content represented the content domain of implicit rationing of nursing care and the relevance of the content domain to the proposed interpretation of the test score. This also involved expert judgments and further pilot testing (previously discussed in the description of the scale development).

Evidence based on response processes was explored through an assessment of each question and the entire

TABLE 1. BERNCA Questions and Results of the Factor Analysis (Method Principal Component Analysis, One-Factor Solution)

Items questionnaire abbreviated	Factor loading	Mean	SD
1. Activity of Daily Livings (ADLs)			
(1a) Bathing/skin care	.580	0.58	0.71
(1b) Perform oral or dental hygiene for patients	.648	0.62	0.76
(1c) Eating	.563	0.33	0.63
(1d) Mobilization/changing positions	.687	0.66	0.76
(1e) Managing body waste (urine, stool, vomit)	.562	0.20	0.48
(1f) Changing bed linen	.663	0.71	0.76
2. Caring–Support			
(2a) Emotional or psychosocial support	.723	1.30	0.83
(2b) Conversations with patients or their families	.745	0.90	0.83
3. Rehabilitation–Instruction–Education			
(3a) Toilet training	.643	0.58	0.82
(3b) Activating/rehabilitating care	.749	0.92	0.82
(3c) Education of patients/their families about self-care	.705	0.55	0.71
(3d) Preparation for hospital discharge	.734	0.80	0.76
4. Monitoring–Safety			
(4a) Adequate monitoring of patients vital signs	.616	0.70	0.81
(4b) Adequate monitoring of confused/impaired patients	.590	0.76	0.90
(4c) Coping with the delayed response of a physician	.579	0.96	0.92
(4d) Respond promptly to patient calls	.563	0.84	0.86
(4e) Adequate hand hygiene	.571	0.70	0.77
5. Documentation			
(5a) Review patient documentation at the beginning of the shift	.622	0.87	0.85
(5b) Formulate/update patient care plans	.713	1.14	0.86
(5c) Documentation of performed nursing care	.713	0.86	0.79

scale in relation to missing values and specific patterns of responses, as well as through an analysis of the relationships between parts of the test. Given the anonymity of the surveys, it was not possible to ask the respondents about their thought processes in answering the questions.

To explore evidence based on internal structure of the BERNCA and to investigate the construct of implicit rationing of nursing care based on the conceptual framework, the following hypothesis was formulated and tested: (H1) There is a moderate to strong positive correlation among the test items and the overall construct of implicit rationing of nursing care.

The evidence of the BERNCA based on relations to other variables was explored through an examination of the relationship between implicit rationing of nursing care and two related constructs: quality of the nurse work environment and patient-to-nurse ratio. To test this evidence dimension, two hypotheses were developed: (H2) There is a negative correlation between implicit rationing of nursing care (measured with the BERNCA) and the quality of the nurse work environment (measured with the Nursing Work Index—Revised [NWI-R]). The correlation will be stronger between implicit rationing of nursing care and the underlying dimensions of nursing resources and nursing autonomy than between the two underlying dimensions of nursing leadership and professional development, and interdisciplinary collaboration and competence. (H3) There is a moderate positive correlation between implicit rationing of nursing care (measured with the BERNCA) and the patient-to-nurse ratio.

The *quality of nurse work environment* was measured with the NWI-R, an instrument used in the IHOS study (Aiken, Clarke, & Sloane, 2002; Aiken & Patrician, 2000; Lake, 2002), containing 51 questions, each of which used a 4-point Likert scale (ranging from *strongly agree* to *strongly disagree*) to record the extent to which each identified element was present in the respondent's current position. A factor analysis of the current dataset resulted in a solution involving three factors: (a) nursing leadership and professional development, (b) nursing resources and autonomy, and (c) interdisciplinary collaboration and competence. Seventeen questions were excluded because of commonalities of less than 0.30. Cronbach's alphas of the three subscales ranged between .72 and .90. To calculate the quality of the nurse work environment, the scores for items, total scale, and subscales were summarized and the means calculated.

Patient-to-nurse ratio, the number of patients each nurse was personally responsible for on the last shift worked—viewed here as a proxy for workload—was measured using an item developed for the IHOS study (Aiken, Clarke, & Sloane, 2002). The NWI-R and other instruments from the IHOS used in the RICH nursing study were translated from English to German using the adapted Brislin protocol (Jones, Lee, Phillips, Zhang, & Jaceldo, 2001).

Reliability Testing To test the reliability of the BERNCA and to explore the consistency and precision of the test results of the measurement process, the following hypothe-

sis was formulated: (H4) The BERNCA instrument is internally consistent and homogenous. Possible sources of measurement error were investigating using summary statistics.

Design and Sample

Data from 957 nurses working in five acute care hospitals in the German-speaking part of Switzerland who took part in the RICH nursing study were used in these analyses. The RICH nursing study included a convenience sample of hospitals, which had more than 100 beds and offered surgical, medical, or gynecological services and whose directors had provided written consent for participation. All nurses working in the participating hospitals' medical, surgical, or gynecological units were invited to participate. Inclusion criteria for nurses were as follows: (a) a Swiss nursing diploma (DN I or DN II¹) or an equivalent foreign nursing diploma and (b) a minimum of 3 months' experience in direct patient care at the current hospital and of 1 month on the current unit. Student nurses, nursing assistants, and float pool nurses were excluded specifically.

Data Collection and Data Management

Data collection was conducted consecutively in the five participating hospitals between the fall of 2003 and the summer of 2004. Nurses were surveyed voluntarily and anonymously. All nurses who fitted the inclusion criteria were invited to fill out the nurses' questionnaire. The questionnaires were distributed by the research team and contact persons in the respective hospitals and were collected in a closed box placed on the participating units. Informed consent of nurses was implied by the completion and return of the questionnaires. Approval was obtained from the four local ethics committees responsible for the five participating hospitals.

Data Analysis

Descriptive statistics (frequencies, medians, interquartile ranges, means, standard deviations (*SD*), variances, graphs, and cross-tabulations) were used to depict the nurse sample and to investigate response processes, possible systematic answer patterns, missing values, and measurement errors. Cronbach's alpha and interitem correlations were used to test the reliability of the instrument's overall scale and extracted subscales. To evaluate the internal structure of the BERNCA and the NWI-R, various factor extraction types and rotation methods were tested. The factor extraction was based on eigenvalues and scree plot. Spearman correlations with two-sided significance levels were used to test the relationship between implicit rationing of nursing care (BERNCA) and the two related constructs of quality of the nurse work environment and patient-to-nurse ratio. Statistical data analyses were performed using SPSS 13 software (Chicago, IL).

¹DNI = Diploma Level I with 3 years' training and DN II = Diploma Level II with 4 years' training.

Results

Of the 1,435 nurses invited to participate, 957 (67%) returned completed questionnaires. Characteristics of the participating nurses are described in Table 2.

Validity

Evidence Based on Test Content As previously discussed in the "Methods" section, evidence based on test content was established through a logical analysis of the content and the judgments of nursing experts who confirmed that the BERNCA represented the domain of implicit rationing of nursing care and that the included questions were relevant. Further pilot testing was conducted also as discussed previously.

Evidence Based on Response Processes Although it was not possible to ask the respondents about their thought processes in answering the questions, each individual question and the entire scale were assessed with respect to missing values, specific patterns of responses, and the relationships among parts of the test. A low frequency of missing values among items was observed (1.3%–5.7%). Positively skewed distributions were observed in 15 of the 20 item response sets, which occurred because the majority of the nurses indicated that these items never or rarely applied; that is, that they had rarely or never been unable to carry out the listed necessary nursing tasks in the last 7 working days. Floor effects (52.6%–82.7%) were observed for items 1a, 1b, 1c, 1e, 3a, and 3c. The mean for the entire scale was 0.77 ($SD = 0.52$) and the median score was 0.70 (25–75th quartile = 0.34, 0.70, 1.13; possible range: 0–3).

Among the individual questions, the mean ranged from 0.20 ($SD = 0.47$; item 1e) to 1.30 ($SD = 0.83$; item 2a; Table 1).

Evidence Based on Internal Structure The evidence based on internal structure of the BERNCA was explored with various factor extraction types and rotation methods. The Kaiser–Meyer–Oblimin test result of sampling adequacy was 0.95, and the Bartlett's test ($\chi^2 = 7919.78$, $p = 0$) indicated that the correlations among the items were significant and the correlation matrix was factorable. The factor analysis (principal component analysis) showed three initial factors with eigenvalues greater than one and two factors close to one (Kaiser Guttman rule; Backhaus, Erichson, Plinke, & Weiber, 2003). However, only one dominant factor was reflected in the eigenvalue and scree plot. The one-factor solution accounted for 42% of the total item variance and showed stable to very stable factor loadings for all 20 items ($>.50$; Table 1).

Evidence Based on Relations With Other Variables The evidence based on relations with other variables was explored by examining the relationship between implicit rationing of nursing care and two related constructs: the quality of nurse work environment and the patient-to-nurse ratio. According to the conceptual framework and previous research, negative correlations were expected between implicit rationing of nursing care (measured with the BERNCA) and nurse work environment quality (measured with the NWI-R; H2). As expected, the correlation between implicit rationing of nursing care and the underlying dimension of nursing resources and autonomy was stronger ($r = -.46$, $p = .01$) than the correlation between implicit rationing and the two other underlying dimensions [nursing leadership and professional development ($-.31$, $p = .01$) and interdisciplinary collaboration and competence ($-.26$, $p = .01$)]. A significant low correlation in the expected direction was found between implicit rationing of nursing care and the patient-to-nurse ratio ($r = .14$, $p = .01$; H3).

Reliability

The internal consistency and homogeneity of the BERNCA was investigated using Cronbach's alpha, interitem correlations, and summary statistics. Results of the summary statistics are described in the "Evidence Based on Response Process" section and Table 1. As predicted, the BERNCA was internally consistent and homogeneous (H4). The interitem correlation mean of 0.39 (range: 0.19–0.63) indicated the good consistency of the scale. The Cronbach's alpha was .93.

Discussion

The purpose of this study was to evaluate the reliability and validity of the newly developed BERNCA instrument, which was developed to measure the levels of implicit rationing of nursing care in Swiss acute care hospitals. In a first step, a conceptual framework of implicit rationing of nursing care was developed, based on the conceptual framework of the IHOS study and empirical evidence. Building on this framework, expert knowledge, and the principles of the Swiss SRK framework of nursing

TABLE 2. Characteristics of the Nurse Sample

Nurses ($N = 957$)	(%)
Female	91
Non-Swiss nationality	22
Age (in years)	
20–30	43
31–40	29
41–50	20
>50	8
Education (%)	
Specialized ^a	31
Graduate and postgraduate ^b	1
Number of years working	Mean (SD)
as a nurse	10.32 (9.19)
in a hospital	7.53 (7.64)
at a unit	5.66 (6.43)

Note. SD = standard deviation.

^aSpecialized education; e.g., intensive care, higher education in nursing (Level 1), clinical teacher. ^bGraduate and postgraduate education; e.g., advanced education in nursing (Level 2), advanced education, or university degree in nursing management, pedagogic, science, or public health.

education, the BERNCA instrument was developed. Initial validity and reliability of the BERNCA were established along lines of evidence as suggested in the Standards (AERA et al., 1999).

The literature review indicated the existence of implicit rationing of nursing care in hospitals, a factor which had not been systematically studied. This study provides a leveled systematic measurement tool to measure implicit rationing of nursing care. As the conceptual framework shows, implicit rationing of nursing care occurs during the process of care at the point of nurse to patient interaction. This makes it a very influential factor, which is linked directly with patient outcomes and the quality of care and not limited to dilution processes. The BERNCA instrument can be used in outcome research to define the effects of this factor on patient and nurse outcomes and to explain the interaction between this factor and other known outcome-influencing factors. This would extend the current knowledge in related fields and might allow the definition of the most significant factors of clinical practice relating to patient safety, quality of care, and cost-saving strategies. Additionally, it could help to isolate the economic factors, which should be monitored most closely.

The BERNCA can be used in clinical practice to monitor the effects of organizational changes on patient and nurse outcomes and quality of care. Further research is needed to determine the precise point at which implicit rationing begins to affect patient and nurse outcomes negatively. This would allow purposive monitoring of organizational changes and would indicate when interventions were necessary for the protection of patients and nurses.

The *evidence based on test content* of the BERNCA was confirmed by nursing experts from the German-speaking part of Switzerland and by a logical analysis of the content. It has to be noted that the content of the BERNCA instrument is focused on the necessary nursing tasks that are omitted in the experience of Swiss nursing experts and in the literature, most frequently when resources are scarce. It is a limitation of this study that it does not address the entire domain of nursing care activities that might be omitted and would affect usefulness in the situations mentioned above. Based on available evidence, which indicates an internal prioritization of necessary nursing measures (Morin & Leblanc, 2005; Schopper, Baumann-Hölzle, & Tanner, 2001a, 2001b), it may be valuable to extend the BERNCA instrument and to include other necessary nursing tasks such as medical, technical, and therapeutic treatment measures. Although the involved nursing experts indicated that the formulations of the questions were clear, a division of the questions with double content into single-content questions is necessary so that the nurses' assessments can be assigned explicitly to the respective nursing tasks. This may also improve the skewed distribution, the low interitem correlation of some items, and possibly measurement errors related to double content.

Due to the anonymity of the questionnaire, validity based on *evidence of response processes* cannot be ensured; no data exist regarding the strategy and assessment criteria the nurses used when they filled out the survey. The

evaluated answer pattern indicates that the evidence based on response process was appropriate, and very few missing values were noted. The anonymous survey provided some protection against response biases such as social desirability or acquiescence being responsible for the skewed distribution and the floor effect. It is possible that recall errors contributed to the skewed distribution and the low reported levels of implicit rationing of nursing care. However, a finer scaling of the BERNCA could improve such floor effects, along with the skewed distribution.

The hypothesized moderate to strong positive correlation between the test items and the construct of implicit rationing of nursing care (H1) was confirmed via the explanatory factor analysis. The results indicated a strong relationship between the individual items and the overall factor of implicit rationing of nursing care (*evidence based on internal structure*).

The hypothesized relation between implicit rationing of nursing care and the related construct of quality of the nurse work environment was confirmed (H2; *evidence based on relation to other variables*). In the study, the factor analysis of the NWI-R provides different solution from other international studies. Nevertheless, all three NWI-R subscale scores, particularly regarding the staffing and resource dimension, were moderately to strongly related with implicit rationing (in the expected direction), indicating that, as expected, particularly with regard to the perceived adequacy of staffing and resources, a lower rating of the quality of the nurse work environment is related with higher levels of implicit rationing of nursing care. The factor structure underlying the NWI-R is still under discussion. In a current study, questions were raised regarding the reliability and validity of the NWI-R, using Lake's scale as a measure of the nursing practice environment (Cummings, Hayduk, & Estabrooks, 2006). In turn, other researchers in non-North American countries have reported a factor structure similar to Lake's (Gunnarsdottir, Clarke, Rafferty, & Nutbeam, 2007; McCusker, Dendukuri, Cardinal, Laplante, & Bambonye, 2004). Predominantly, the staffing and resource adequacy dimension appears consistently across linguistic and cultural adaptations.

The hypothesized relation between implicit rationing of nursing care and the related construct of patient-to-nurse ratio was confirmed (H3), yet the correlation was very low. In this study, the patient-to-nurse ratio was used as a proxy for workload and analyzed it in terms of each nurse's personal last-shift workload. As such, the patient-to-nurse ratio may be insufficiently refined to show a strong relationship with implicit rationing of nursing care. As shown by the conceptual framework, and by other studies, workload is influenced by a range of factors including the amount and type of nursing resources needed to care for each patient and the patient case mix and complexity, the acuity of the patient situation, the adequacy of staffing, and resources vis à vis high-quality patient care (O'Brien-Pallas, Meyer, & Thompson, 2005). Further studies are needed to accumulate more evidence regarding the relation between the construct of workload and implicit rationing of nursing care, and the mechanism between these constructs. In a study conducted in intensive care units, four levels of

nursing workload (unit, job, patient, and situation) were identified (Carayon & Gürses, 2005). Acknowledging different levels of workload might be a useful approach for further studies to investigate the relationships among workload, implicit rationing of nursing care, and its effect on outcomes and patient safety.

Conclusion

In view of patient safety and quality of care, implicit rationing of nursing care is an important construct that allows researchers and administrators to compare the degree to which specific nursing measures are restricted in acute care hospitals because of lack of resources and to investigate the association between the measured levels of rationing and patient outcomes. Initial evidence was provided in the results of the validity and reliability of the BERNCA instrument. The results indicate that the BERNCA is a research tool that can be used for assessing the levels of implicit rationing of nursing care in acute care hospitals. Future studies are needed to investigate the predictive evidence of the BERNCA instrument and the tool's value to measure and predict changes in the quality of care and patient outcomes. To enhance the reliability and validity of the BERNCA for use in other countries and areas, revisions of the instrument are recommended to reflect cultural and regional differences. ▀

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Corresponding author: Sabina De Geest, PhD, RN, Institute of Nursing Science, University of Basel, Basel, Switzerland (e-mail: sabina.degeest@unibas.ch).

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