Received: 23 February 2022 | Accepted: 14 August 2022

DOI: 10.1111/scs.13119

Scandinavian Journal of Caring Sciences

EMPIRICAL STUDIES

Development and validation of the perioperative care and user participation (POUP) questionnaire

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Abstract

Aim: To validate a Perioperative User Participation questionnaire (POUP) that measures elective adult surgical patient experiences and evaluation of the significance of selected perioperative care items.

Materials and Methods: A generic perioperative user involvement questionnaire (POUP) was developed in the form of four psychometric scales based on the Fundamentals of Care (FoC) framework. The POUP is designed to capture patients' perceived and subjective importance of selected items of perioperative care. It was developed in Danish and comprehensive Danish–Norwegian translations were conducted. Face and content validation were conducted involving patients and expert nurses. The relevance of items was assessed by 68 patients, and the internal consistency of the scales was calculated.

Results: Danish and Norwegian patients assessed the POUP's face validity, and perioperative expert nurses reported no problems in clarity or ambiguity. However, a few reformulations of the questionnaire texts were suggested. None of the questions were reported as irrelevant or difficult to answer nor was any topic reported missing. Patients assessed all items as relevant, and the internal consistency for the three scales was between 0.8 and 0.9, and no differences between countries were found.

Conclusion: The POUP questionnaire has four scales; the items are valid, but the scales need further statistical validation and refinement. At present, the POUP might provide insight into how elective adult surgical patients value the significance of perioperative care.

KEYWORDS

fundamentals of care, internal consistency, nursing, peri-operative care, quality of care, questionnaire, surgical care, user involvement, validity

[Correction added on 7 September 2022, after first online publication: The Funding information, Acknowledgement and Ethical Statement have been corrected in this version.]

INTRODUCTION

In Scandinavian countries, the policy is to increase user participation and identify patients' preferences through person-oriented care (POC). This is a cornerstone of evidence-based practice (EBP) and an activity involving patients in their own health care [1, 2]. Where patients are truly engaged in service improvement, unexpected innovation occurs, and findings indicate that user engagement contributes to new knowledge based on their lived experience and values [3].

Core elements of perioperative nursing have previously been expressed either as nurse intervention or patient needs and nursing practice concentrated on physiological and physical safety [4]. The measuring of nursing care within perioperative settings has revealed a dearth of coherence in the body of evidence-based research and gaps within research on perioperative nursing with an adult surgical patient orientation, therefore, a research program within perioperative care has been launched [5].

Perioperative care has a long history of practice traditions and routines [6], it is delivered before, during, and after surgery and it takes place in various departments in hospitals, in surgical centres attached to hospitals, in freestanding surgical centres, or at healthcare providers' (HCP) offices. Thus, it covers the full patient pathway including nursing practice before, during, and after surgery. Also involved is the proficiency of nurses within different disciplines of specialised nursing, such as surgical and anaesthesia nurses who are team members in the operation room (OR), intensive care nurses, and registered nurses (RN) with or without specialised education [4]. The aim of perioperative care is to prepare the patient both physically and mentally for the surgical procedure, to support patients before, during, and after surgery to prevent complications, and enhance the benefit of surgery. This requires a nursing practice that yields positive, safe patient outcomes based on a supportive care environment and nurse proficiency [7].

Over the past decade, improvement in perioperative nursing care has relied on scientific literature about different topics such as hygiene or the time-limited encounter between a HCP and a patient [7]. Nevertheless, there is a lack of research on fundamental aspects of perioperative nursing [8] as well as a focus on certain elements of nursing or procedures in the perioperative settings [9–12]. Thus, perioperative nursing care has been researched fragmented, revealing a lack of coherence in evidence, knowledge, and gaps in perioperative nursing research on adult surgical patients.

In developing quality in existing perioperative care, there is a need to uncover patients' values and preferences and how they assess the care they receive. Patients' values and preferences have been described as the subjective importance (SI) of aspects of care and patients' assessment of the care received as patients' perceived reality (PR) [13]. Combining measurements of SI and PR makes it possible to identify congruence between SI and PR and establish gaps that can be researched.

The present validity process is part of an overall research program intended "to contribute to knowledge of fundamental care needs in non-university hospitals and is organized into three main parts with different aims and sub-studies" (5:1). The research program has three parts, and initially a baseline investigation is performed to establish a description of adult elective surgical patients' assessment of their experiences and how they value the importance of the perioperative nursing care already received [5]. The present validation process is part of the preparation for this baseline study. Following the baseline study, a collaboration and interpretation process of the baseline results with users and healthcare professionals on the need for mutual aims and competence development in staff is planned. Finally, actions need to be negotiated, planned, and executed based on the earlier aims, and competence needs to be decided on. This paper aims to describe the validation of a questionnaire, POUP, developed for a research program [5]. The POUP measures patients' perceived reality and the subjective importance of selected items in perioperative care in order to describe the congruency between patients' SI and PR during hospital admission.

THEORETICAL FRAME OF REFERENCE

The research program relies upon nursing care founded upon the ontological influence of publicly funded, free healthcare including the patient–nurse relationship [17]. In clinical practice, the two partners share experiences, expertise, and human vision and jointly explore opportunities for wellbeing. Person Centred Care (PCC) informs nursing staff and care needs on an aggregated level (e.g., what is the evidence for patients with a specific diagnosis or receiving a specific nursing intervention), whereas POC highlights the importance of patients' active participation and involvement in their care based on an individualised care approach in a context or environment that promotes and sustains POC [5, 17]. From a methodological perspective, we search for POC which means that nurses are searching for a meaning in the collaboration for the best benefit for persons in the role of patients participating before, during, and after elective surgical treatment [5]. The collaboration has two partners: the patient, perhaps together with a relative or significant other, and

the healthcare provider (together with their leaders). The program is informed by a Look-Think-Act framework [14, 15] initiated by a baseline questionnaire, aggregating patients' perceived reality and their subjective importance of care.

The Fundamentals of Care framework establishes the frame for both generic and specialised fundamental perioperative care [1, 2, 16]. The development of the FoC framework as a knowledge base was published to identify and collaborate on researchable questions to ensure that relational dimensions are maintained and also to ensure the application of new knowledge in nursing practice [1]. The FoC framework is meant to encourage and inform nurses to work collaboratively with patients, building relationships to generate, test, and implement meaningful ways of capturing nursing care practice around fundamental care issues. It also serves to ensure more integrated, holistic patient care in nursing practice [1]. The FoC has gathered care needs in four domains: the Psychosocial, Relational, Physical, and System levels.

The context for the research program is perioperative non-university hospital settings in rural parts of Norway and Denmark.

METHOD

The validation process of the POUP questionnaire is described in six steps (see Figure 1). In the first step, questions were selected and constructed; in the second step translation and back translation of the questions was carried out; in the third step, face and content validated the questions; in the fourth, an adjustment of questions was made; in the fifth step POUP was pilot tested; and in the sixth step, the questionnaire was formally evaluated.

The POUP has been developed in the form of four psychometric scales that have multiple items on an ordinal scale from which respondents choose to indicate their opinions, attitudes, or feelings about a particular issue (e.g., SI and PR). The advantages of questionnaires with scales summarising items are that (1) data can be gathered relatively quickly from large numbers of respondents, (2) they can provide highly reliable person ability estimates, (3) the validity of the interpretations made from Likert scales can be established through a variety of means, and (4) the data can be compared, contrasted, and combined with qualitative data-gathering techniques, (e.g. open-ended questions, participant observation, or interviews) [18, 19].

The content of the POUP

Psychometric scales, derived from the FoC domains and their sub-domains, are presented in Table 1, together with the number of items included in each of the psychometric scales and number of items measuring each sub-domain. A total of 71 items are included in the POUP, eight items giving the demographic background, 62 items included in four psychometric scales and one open-ended item encouraging patients to make any comment they wish on the questionnaire.

The Quality from the Patients' Perspective (QPP) questionnaire served as a model for designing the POUP [20–22]. The QPP questionnaire was developed and refined from a theoretical quality of care model based on earlier studies going back to 1994 and includes 47 items. It has been adapted to different clinical settings. The core elements of the QPP were to explore the relationship between quality of care from a patient perspective, patient satisfaction with the actual care delivered, and to calculate a quality score for each item. Each item of SI and PR is measured on a 5-point ordinal scale, within these domains: medical–technical competence, identity-oriented approach, physical–technical conditions, and sociocultural atmosphere [23].

The POUP is designed as four psychometric scales, one for each of the FoC domains. Items measure sub-domains as illustrated in Table 1. Some of the items are, with permission from the licence holder, derived from QPP and others were developed by the authors. Based on patients' responses on the SI and the PR scales, the POUP is intended to give a total

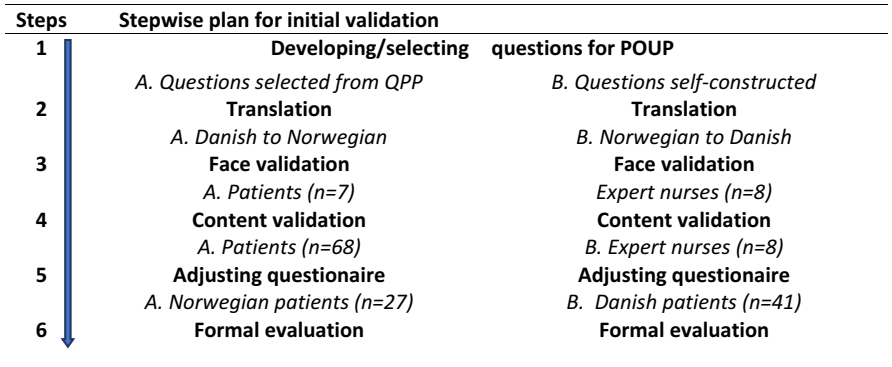

FIGURE 1 Overview of the validation process

TABLE 1 Content of POUP domains and sub-domains being measured and source of items

Psychometric scales from FoC Domains and their sub-domains	FoC sub-domains being measured within each domain	Items from QPP	Items - self-developed	Total number of items in each scale
Psychosocial				15
Keeping you				
Calm				
Coping				
Hopeful				
Respected	Respected		1	
Involved	Involved	2	1	
Informed	Informed	5	2	
Dignified	Dignified	1	3	
Relational				13
Being				
Empathic	Empathic	3	2	
Respectful	Respectful	3		
Compassionate	Compassionate	2		
Consistent	Consistent	1		
Ensuring				
Goals are set	Goals are set		2	
Continuity				
Physical				24
Keeping you				
Safe				
Clean	Personal hygiene	1	1	
Warm	Warm		6	
Fed	Fed		2	
Hydrated	Hydrated		2	
Mobile	Elimination		2	
Rested	Rested		2	
Dressed				
Comfortable	Comfortable			
	• freezing/sweating		3	
	• comfortable bed		2	
	• pain management		2	
	• breathing easily		1	
System level				10
Resources	Resources	3		
Leadership	Leadership	3		
Culture	Culture	4		
Evaluation and				
Feed back				
Total items		28	34	62

score for SI and PR for each domain. Thus, the scales can be used separately or all together. Furthermore, the scores will enable researchers to identify congruency or incongruence between patients' SI and PR.

The scores are expressions of patients' points of view on the congruence or incongruence of the care delivered and their preferences in the specific situation. They do not necessarily reflect a high or low quality of care but can

provide important information in the continuous development of staff competencies [5].

Translation

The POUP was initially developed in Danish and translated to Norwegian. The translation was carried out by a bilingual Norwegian physiotherapist and a Danish nurse fluent in speaking, writing, and understanding Norwegian and Danish. In the process of translation, the instrument should be equally acceptable, and the method to achieve this was to use forward and back translation.

The research group selected relevant QPP questions, decided on the appropriate scales based on the property measured, and then added further self-developed questions. The first forward translation from Danish to Norwegian and back to Danish was done independently. To apply relevant and creative strategies to reduce errors and pitfalls it was crucial to achieve semantic equivalence [24,25]. The authors translated and re-translated the "POUP-questionnaire in process" eight times forward and back to ensure an equal understanding of the purpose of each question between the two target languages. Some semantic corrections were made to nuance the related languages, and adjustments were made during the process to find the best synonymous understanding. A total semantic equivalence cannot be achieved; however, researchers considered the final versions in both the Danish and Norwegian target languages to be replications of the instruments [26].

Validation

The POUP is constructed with seven demographic questions, 62 questions regarding the FoC of perioperative care and one open-ended question to allow patients to comment on the questionnaire or any aspects of their admission and care. The demographic data (age, sex, marital status, educational background, work or pension matters, waiting time for admission, and length of stay) were all closed-ended items.

SI and PR were both measured on ordinal scales from 4 to 0. SI scales asked patients to assess "This is how important this is to me … (e.g., to be able to have a conversation in private with a nurse) Four represented "Very important for me" and one "little or no importance for me" on the SI scale and 0 represented not relevant. On PR scales patients were asked "This is what I experience…" (e.g., To be able to have a conversation in private with a nurse). Four represented "fully agree" and 1 represented "Do not agree" and "0" represented not relevant.

Face validity

Seven former adult patients who had experienced a perioperative period within the last 3 months face-validated the POUP. As test respondents, they were probed for their understanding, the acceptability, and relevance of the items and to detect confusing or misleading parts. The test group was asked to fill out the POUP based on the instruction given in the questionnaire. They were asked to mark items that were confusing, not easy to understand, whether the response categories were hard to understand or not appropriate, or if the item was not relevant. At the end, they could comment on the questionnaire in general or if they missed items. When they handed in their responses, their scores were discussed to clarify their understanding of each of the questions. Changes were then made in accordance with the patients' comments.

Content validity

Experts

Four Norwegian and four Danish nurses, specialists in surgical wards, the operating theatre or recovery room, content validated the POUP. All had worked for a minimum of 2 years in perioperative nursing, either in surgical wards, in operating theatres, or recovery rooms. They all had a master's degree or a PhD in nursing and some had previously constructed, tested, and validated questionnaires. The expert nurses were asked to assess the relevance of each of the items in the questionnaire and whether any items were missing. Each item was scored for relevance on a scale from 1 to 5, 1 represented "not relevant at all" and 5 represented "very relevant". If the mean grading for an item was 3 or more, the item was maintained as a part of the questionnaire.

Patient content validation of the POUP

A convenience sample of 68 patients from four non-university hospitals in Denmark and Norway, representing surgical patients who had abdominal, gynaecology, orthopaedic, or urological surgical procedures, were included. They were asked to fill out the questionnaire and, as a part of that report, the relevance of items in both the SI and the PR section. At the end of the questionnaire, they could make comments. The questionnaire was handed out by a nursing student and returned in a closed envelope just before discharge.

Ethical issues

The research project was notified to the Norwegian Centre for Research Data (NSD) following Norwegian legal

requirements, under the following project number 61358. An informed consent was signed by the participants and stored as agreed with the hospital concerned. All patients received oral and written information about the purpose of the study, together with the questionnaire and an unmarked envelope. If they did not want to participate, they could just return a blank questionnaire in the envelope.

Statistics

The experts' content validity scores were calculated by hand for each item, and the results were presented as a mean score for items included in a psychometric scale and as minimum and maximum scores for items in the actual psychometric scale. Psychometric scales were considered to be ratio scales and data were analysed and presented using parametric statistics (mean, SD and t-test) when normally distributed. Distribution was tested with the f-test. Data on patients' content validity was processed in SPSS version 26. Age is presented as mean and standard deviation. Nominal and ordinal scaled data are presented as numbers and frequency. Patients' scoring of the relevance of items in relation to SI and PR within a psychometric scale is presented as the mean frequency and minimum and maximum frequency of items scored as "not relevant" within the psychometric scales. Internal consistency was calculated for each of the four psychometric scales by the Cronbach's Alpha coefficient. Cronbach's alpha is a statistic commonly quoted to demonstrate that tests and scales that have been constructed or adapted for research projects are fit for purpose. The alpha coefficient was calculated as recommended for each of the psychometric scales and not for the total instrument [28]. Cronbach's alpha reliability coefficient normally ranges between 0 and 1. However, there is no lower limit to the coefficient. The closer Cronbach's alpha coefficient is to 1.0, the greater the internal consistency of the items in the scale. In a previous study, the alpha coefficient has been classified as excellent when $\alpha > 0.9$, good when $\alpha = 0.9–0.8$, acceptable $\alpha = 0.79–0.7$, questionable $\alpha = 0.69–0.6$, poor $\alpha = 0.59–0.5$, and unacceptable $\alpha < 0.5$ [28].

In all the items, "4" represented "Very important" for me on SI scores or "Fully agree" that is the care that I received on PR scores and a positive aspect of care delivered representing importance to patients. However, "1" represented not important or that this was absent in the care delivered. In the Psychosocial scale, four items within PR had to be recoded as "4" represented some negative aspect of care, something patients stated was important to them and that the nurses did not do. To be able to calculate total scores and internal consistency for the psychosocial scale, patients' responses had to be transformed in the following way: "4" was changed to "1", "3" to "2", "2" to "3", and "1" to "4". For each psychometric scale, a total score was calculated summarising scores from each item on the scale. Not relevant and missing scores were coded as "0". Differences in total score between countries were tested using Student's *t*-test, and the difference between PR and SI scores was tested using independent sample *t*-tests. A confidence interval of 95% level is given. The significance level was set to $p < 0.05$.

TABLE 2 Summarised content validity scores from experts

Domains	Mean scores	Minimum–Maximum scores
Psychosocial	4.65	3.50–5.00
Relational	4.62	3.50–5.00
Physical	4.58	3.87–5.00
System level	4.71	3.87–5.00

RESULTS

Face validity was assessed by seven former patients from Norway and Denmark: two women and five men of ages 21–76 years who had been admitted for different surgical procedures in four different surgical specialities. They had a stay in hospital from 1 to 6 days. They reported on the relevance, clarity, simplicity, and ambiguity of filling out the questionnaire. For each question, the patients had to respond on how they experienced the care received (PR) and how they valued that specific part of the nursing care (SI), e.g. "If you wanted to speak with the nurse in private, was that possible?" Patients reported that they had no problems making two scores, one representing SI and one PR. They reported that the questions were clearly stated, that they knew how to score each item, that they found the questions relevant, and they did not report problems with ambiguity. Furthermore, patients did not report that they found specific topics important for them in relation to perioperative care to be missing.

Content validity by experts

The experts' assessment of the scales is presented in Table 2. None of the items had a mean score below 3.5 for relevance. The experts did not report problems about clarity or ambiguity in the items, but a few reformulations were suggested. They reported that the questions were understood, no items were found to be irrelevant, none were difficult to answer, and no topic was missing.

Content validity by patients

Demographic data of the patients are given in Table 3. Each question could be rated "not relevant". The mean number of "not relevant" responses within the four domains is given in Table 4. In total, patients rated 9.7%–18.2% of the PR items and 9.5%–20.7% of SI items as not relevant. Some specific items had a high number of "not relevant" scores. In the open-ended question at the end of the questionnaire, the only comments from some patients were that the questionnaire was very long. No one suggested other items. The item: "I have received information on how to prevent constipation after discharge.", was scored "not relevant" by 25 (41.5%) patients on the PR item. Among patients admitted for 1 day 68% scored this item as "not relevant". Other items in the physical psychometric scale had a relatively higher score of "not relevant" among patients that were admitted for 1 day.

TABLE 3 Characteristics of patients included in the pilot test in Norway, Denmark, and in total

	Norway	Denmark	Total
	***n* = 27**	***n* = 41**	***n* = 68**
Gender			
Male (*n*, %)	15 (55.8)	20 (48.8)	35 (51.5)
Female (*n*, %)	12 (44.4)	21 (51.1)	33 (48.5)
Age (Years)			
Mean (SD)	60.9 (20.1)	55.2 (13.4)	57.7 (16.7)
Min–max.	(23–89)	(19–76)	(19–89)
Marital status			
Living alone (*n*, %)	12 (44.4)	12 (29.3)	24 (35.3)
Education			
Basic (*n*, %)	8 (29.6)	23 (56.1)	31 (45.6)
High school (*n*, %)	12 (44.4)	11 (26.8)	23 (33.8)
University level (*n*, %)	7 (25.9)	7 (17.1)	14 (20.6)
Civil status			
Studying (*n*, %)	0	1 (2.4)	1 (1.5)
Working/ unemployed (*n*, %)	11 (40.7)	26 (63.4)	37 (54.4)
Retired/sick pension (*n*, %)	15 (55.6)	11 (26.8)	26 (38.2)
Other (*n*, %)	1 (3.7)	3 (7.3)	4 (5.9)
Waiting time for admission			
<7 days (*n*, %)	4 (14.8)	8 (19.5)	12 (17.6)
7–30 days (*n*, %)	5 (18.5)	8 (19.5)	13 (19.1)
31–90 days (*n*, %)	8 (29.6)	14 (34.1)	22 (32.4)
91–180 days (*n*, %)	4 (14.8)	10 (24.4)	14 (20.6)
>180 days (*n*, %)	5 (18.5)	1 (2.4)	6 (8.8)
Missing (*n*, %)	1 (3.7)	0	1 (1.5)
Length of stay			
Less than 1 day (*n*, %)	4 (14.8)	39 (95.1)	43 (63.2)
2–3 days (*n*, %)	15 (55.6)	1 (2.4)	16 (23.5)
4–9 days (*n*, %)	7 (25.9)	1 (2.4)	8 (11.8)
More than 9 days (*n*, %)	1 (3.7)	0	1 (1.5)

Mean scores

Total mean scores from each country are presented in Table 5. No differences between mean scores from Norwegian and Danish patients were present in PR scores for items on the Psychosocial ($p = 0.87$), Relational items ($p = 0.50$), Psychical items ($p = 0.87$) or System-level items ($p = 0.49$). For SI items, no differences were detected in either Psychosocial ($p = 0.18$), Relational items ($p = 0.52$), Physical items ($p = 0.34$) or System-level items (PR $p = 0.17$).

The total SI score was higher than the total PR score ($p < 0.000$) on the Psychosocial scale and Physical scale ($p = 0.009$). No differences were detected between mean scores of PR and SI on the Relational scale ($p = 0.41$), and System-Level scale ($p = 0.95$). The summarised mean scores were between 55–75% of the maximum score on the individual scale.

Internal consistency

The internal consistency (Table 5) was assessed to be between $\alpha = 0.78$ and $\alpha = 0.84$ for the combined PR items from Denmark and Norway. For SI measures, the combined internal consistency ranged from $\alpha = 0.58$ to $\alpha = 0.92$. Running a test for deletion of items revealed that removing one or more items from a scale would only significantly change the internal consistency scale for the System-level scale. On this scale, the combined scores for SI were $\alpha = 0.58$, removing one item would change the internal consistency score for Norway to $\alpha = 0.76$, and Denmark to $\alpha = 0.72$, and the total to $\alpha = 0.74$ (CI 95%: $\alpha = 63{:}82$). The item ("My relatives and friends are treated with respect") was identified in this test as the item that was a threat to the internal consistency.

DISCUSSION

The POUP questionnaire is the first comprehensive tool based on the FoC and developed and validated for the evaluation of patient experiences of their care. It is a generic

TABLE 4 Patients' assessment of items' not relevance on each of the scales

Domains	Norway *n* = 27	Denmark *n* = 41	Total *N* = 68
Psychosocial			
Questions PR[a] mean %	6.7	11.6	9.7
(Min–Max)	(0–14.8)	(0–24.4)	(0–20.6)
Questions SI[b] mean %	8.4	10.7	9.5
(Min–Max)	(0–18.5)	(0–24.4)	(0–17.6)
Relational			
Questions PR mean %	5.7	12.1	10.6
(Min–Max)	(0–17.2)	(0–31.7)	(0–26.0)
Questions SI mean %	4.2	10.0	7.9
(Min–Max)	2.2–13.5	10.5–25.2	7.3–20.5
Physical			
Questions PR mean %	15.1	22.1	18.2
(Min–Max)	(3.7–33.3)	(4.9–48.8)	(5.9–41.2)
Questions SI mean %	17.5	22.9	20.7
(Min–Max)	(3.7–33.3)	(9.8–48.8)	(7.4–42.6)
System level			
Questions PR mean %	12.1	20.4	17.1
(Min–Max)	(3.7–33.9)	(4.9–48.8)	(4.4–35.3)
Questions SI mean %	12.4	19.0	17.1
(Min–Max)	(3.7–33-3)	(9.8–48.8)	(8.8–36.7)

[a]Perceived reality.

[b]Subjective importance.

questionnaire designed to capture patients' PR of the care they were offered and SI of selected items of perioperative care on four psychometric scales that provide insight into whether there is congruency between patients' SI and PR of actual care needs during hospital admission. Thus, it forms the basis for future research and development of evidence-based perioperative nursing.

Person Oriented Care (POC) informed the methodological basis of the POUP questionnaire. The questionnaire was designed to include items within the psychosocial, relational, physical, and system-level domains in the FoC framework. Thus, this identifies congruence and incongruence in patients' assessment of care received and what patients hold as important and can provide insight into how to prioritise resources, training and further develop staffs' competencies within perioperative care.

Developing the POUP was partly based on experiences and reports from developing and adapting the QPP questionnaire. The QPP is a generic instrument that has been developed, adapted to, and validated in many clinical settings and numerous languages over the last 25 years. It measures the dimensions of perceived reality – how patients experience the care received and subjective importance, – patients' preferences, and the measures reflect the patients' perception of care needs, which is in line with the intention of the POUP [20–23]. Furthermore, the POUP is based on a well-argued theoretical framework as a part of a research program [5], the items have been included based on a theoretical framework for patients' needs, and the layout is in accordance with a very well-validated international questionnaire. Thus, the POUP is well-argued for and has now been through a first test and validation.

The POUP has been face-validated involving patients from the intended population. This part of the validation process ensured that patients could understand the questions, understood the scoring of responses, could distinguish between the responses to the questions on the PR and SI dimensions, and whether some of the questions were ambiguous, unnecessary, and whether we had missed items that were important for them [29]. Content validation with healthcare professionals ensured that all relevant questions from a professional point of view were included. Neither the patients nor the specialists reported problems with the clarity of the questions or ambiguity making the distinction between the two sections of questions. This supported the content validity of the POUP questionnaire on the item-level.

TABLE 5 Mean scores and internal consistency scores and confidence interval of the psychometric scales

	Norway	Denmark	Total
Domains	***n* = 27**	***n* = 41**	***N* = 68**
Psychosocial			
15 items Min–max score (0–60)			
PR-items			
Mean score (SD)	40.5 (8.7)	40.3 (9.2)	40.3 (8.9)
Mean/max score	68%	67%	67%
Internal Consistency α	0.86	0.79	0.83
(CI 95%)	(0.77–0.92)	(0.72–0.87)	(0.75–0.88)
SI-Items			
Mean score (SD)	44.7 (10.8)	48.0 (9.3)	46.7 (10.4)
Mean/max score	74%	80%	77%
Internal Consistency α	0.87	0.79	0.83
(CI 95%)	(0.78–0.93)	(0.68–0.87)	(0.76–0.88)
Relational			
13 items Min–max score (0–52)			
PR-items			
Mean score (SD)	40.1 (8.1)	38.7 (8.4)	39.3 (8.2)
Mean/max score	77%	74%	75%
Internal Consistency α	0.83	0.79	0.80
(CI 95%)	(0.71–0.91)	(0.68–0.87)	(0.72–0.86)
SI-items			
Mean (SD)	39.0 (8.6)	37.5 (9.0)	38.1 (8.8)
Mean/max score	75%	72%	73%
Internal Consistency α	0.83	0.81	0.82
(CI 95%)	(0.73–0.91)	(0.71–0.88)	(0.71–0.87)
Physical level			
24 items Min–max score (0–96)			
PR-items			
Mean score (SD)	53.6 (14.7)	53.0 (16.3)	53.2(15.5)
Mean/max score	56%	55%	55%
Internal Consistency α	0.85	0.84	0.84
(CI 95%)	(0.76.92)	(0.76.90)	(0.78.89)
SI-Items			
Mean (SD)	64.1 (18.8)	59.4 (20.1)	61.3 (19.6)
Mean/max score	67%	62%	63%
Internal Consistency α	0.90	0.95	0.92
(CI 95%)	(0.72–0.98)	(0.81–0.99)	(0.82–0.98)
System level			
10 items – Min–max score (0–40			
PR-items			
Mean (SD)	29.4 (8.5)	30.4 (8.5)	30.0 (8.4)
Mean/max score	74%	75%	75%
Internal Consistency α	0.79	0.78	0.78
(CI 95%)	(0.66–0.89)	(0.66–0.87)	(0.70–0.85)

(Continues)

TABLE 5 (Continued)

Domains	Norway *n* = 27	Denmark *n* = 41	Total *N* = 68
SI Items			
Mean (SD)	30.3 (7.8)	29.9 (10.7)	0.30.1 (9.6)
Mean/max score	75%	75%	75%
Internal consistency α	0.79	0.51	0.58
(CI 95%)	(0.65–0.89)	(0.25–0.70)	(0.41–0.71)

No patients added new items, though some of the items within the physical psychometric scale were rated as "Not relevant" by 48% of the patients. This could be explained by the heterogeneity between the Norwegian and Danish patients. A larger proportion of Danish patients (95%) had a length of stay less than 1 day, compared to 14% of the Norwegian patients, and 70.3% of the Norwegian patients had a higher education (high school and university), compared to 43.9% of the Danish patients. Some of the questions (e.g., help for personal hygiene, meals, sleep) will only be relevant for stays of more than 1 day and therefore were not relevant for most Danish patients. Furthermore, patients might not know the connection between post-operative care needs in their specific situation and risk of a late post-operative complication. A normal defecation pattern might first be established approximately 9–18 days after elective surgery [27, 30].

As the summarised mean scores on each of the scales were between 55–75% of maximum scores (Table 5) it is not likely that a substantial proportion of individuals will obtain either maximum or minimum scores, which indicate a low risk of floor or a ceiling effect.

Internal consistency was low within the System-level scale as the total alpha coefficient for the scale was below 0.8 for PR items and 0.58 for SI items. When one item was deleted from the scale, the SI total score increased to 0.74, which is acceptable. However, the item was very important as it was related to the culture in the department as it measured patients' perspectives on staff attitudes when meeting the patients' relatives or friends.

The convenience sample of Norwegian and Danish patients assessed the relevance of items as high and the overall internal consistency as good for the three of the four scales included in the POUP questionnaire. Future development will focus on refining and reducing the number of items and consider moving items between the scales. This process will continue with the participation of former surgical patients and HCP from perioperative settings [5].

As the intention of the POUP questionnaire is to examine the complex relationship between the patients´ experiences of care as delivered and the care as valued in a perioperative setting, the POUP questionnaire contributes new insights into how this relationship might be better measured and understood in a perioperative setting. Further studies are needed to research the feasibility and applicability of the POUP questionnaire within perioperative healthcare.

Strength and limitations

A questionnaire developed and validated in one population may not be easily transposed to another population; however, the development and validation of the questionnaire were carried out in two Scandinavian countries with rather similar health care systems. As a part of the design and validation process, the POUP questionnaire was forward–backwards translated several times with the involvement of bilingual healthcare workers.

As the POUP is a generic instrument, we did not distinguish between the relevance of items in terms of surgical specialties nor the length of stay. Patients could respond "not relevant" to an item in the PR dimension but rate the same item as "very important" in the SI dimension. This was interpreted that the patients did not find the question relevant at this specific admission, but that it reflected what patients in general hold as SI. Therefore, it was decided to keep all the questions in the questionnaire until it has been further tested.

As the POUP is a generic questionnaire, a strength is that the content validation included 68 patients from four surgical specialties from two countries, discharged after surgical procedures. Patients' ages were 19–89 years; thus, gender and the length of stay reflect that of surgical patients in non-university hospitals. Furthermore, patients had different marital statuses, different educational backgrounds, and attachment to work, education, or pension. Thus, the sample can be considered to represent surgical patients admitted for elective surgical procedures in Norwegian and Danish non-university hospitals.

The tested questionnaire is the first version of POUP, and before it is a valid instrument, it needs further

testing. The next step is to test in a larger population and evaluate the findings with a group of former surgical patients and staff in order to refine the scales and perhaps to reduce the number of questions. Furthermore, more in-depth psychometric testing e.g., factor analysis, and consideration of how to deal with missing data is required.

CONCLUSION

The POUP questionnaire has been validated on item and scale levels and might as such provide insight into surgical patients' experience of perioperative nursing care received and how they as individuals value the significance of perioperative nursing care during admittance to hospital. The present study was designed as a first step to validate the independent item and the four psychometric scales. The results indicate that the POUP questionnaire can be developed into a valid survey instrument on the item and scale levels, but further refinement and testing is needed. The scales need further refinement and tests before they finally can be considered valid.

AUTHOR CONTRIBUTION

PUP and LU designed the idea and the original study together with senior members of the Norwegian research group in: *Specialised healthcare user and healthcare providers perspective*. K I, IGK, and MKP collected data with contributions from PUP and LU. PUP and LU framed and initiated the analysis which was performed in full by PUP and MKP. The paper was drafted by IGK and PUP, and all authors revised and approved the paper that presents the findings of the research.

ACKNOWLEDGEMENT

The study is financed by Nord University and Aalborg University. Thanks to Susanne Friis Søndergaard, PhD Aarhus University for her scientific input while creating the questionnaire and for her comments on steps 1–5 in designing the study. Thanks to Monica Christin Hansen MscN, Nord University for support in the data collection.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

ETHICAL STATEMENT

All data management was in line with General Data Protection Regulation (GDPR).

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[Correction added on 30 September 2022, after first online publication: The ORCID ID for Ingjerd Gåre Kymre, Lisbeth Uhrenfeldt and Kari Ingstad have been included in this version.]

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[Correction added on 7 September 2022, after first online publication: The order of references for 27 to 30 have been corrected in this version.]

How to cite this article: Kymre IG, PhD LU, Pedersen MK, Ingstad K, Pedersen PU. Development and validation of the perioperative care and user participation (POUP) questionnaire. Scand J Caring Sci. 2022;00:1–12. https://doi.org/10.1111/scs.13119