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ORIGINAL ARTICLE

The NORPEQ patient experiences questionnaire: Data quality, internal consistency and validity following a Norwegian inpatient survey

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Abstract

Aims: This article describes the development of a questionnaire designed for comparisons of patient experiences of hospital care within the Nordic countries. The results of testing for data quality, reliability, and validity are presented following a Norwegian survey. *Methods*: Following a literature review and consultation within an expert group six items were developed measuring patient experiences together with two items assessing global satisfaction and perception of incorrect treatment. The questions were included in a questionnaire that was mailed to 500 patients randomly selected from patients receiving inpatient treatment at a large university hospital in Norway. Principal component analysis was used to assess dimensionality. Reliability was assessed by the internal consistency and test–retest methods. Construct validity was assessed by the scale's correlation with variables known to be related to patient experiences. *Results*: A total of 244 (48.8%) patients responded. Levels of missing data ranged from 0.4% to 2.5%. The six items in the questionnaire that measured important aspects of patient experiences with the services contributed to a single scale with item-total correlations in the range 0.59–0.71 and a Cronbach's alpha of 0.85. The test–retest intraclass correlation was 0.88. *Conclusions*: The NORPEQ is a brief measure of patient experiences that covers important aspects of the healthcare encounter. It shows good evidence of reliability and validity and is relatively easy to apply alongside existing national surveys.

Key Words: *Patient experiences, patient satisfaction, survey, reliability, validity, international aspects*

Introduction

Patient experiences and satisfaction are now recognized indicators for assessing the quality of healthcare in different countries. This is reflected in a number of regional, national [1,2] and cross-national surveys [3–6]. There has been a call for a move from quality improvement efforts at the local and regional level to a more macro perspective with national and international quality measurement systems and comparisons [7].

Several studies have made cross-national comparisons of patient experiences. The Picker Patient Experience Questionnaire (PPE) was tested on patients from the UK, Germany, Sweden, Switzerland and the USA [6] and has been selected for inclusion in the standard questionnaire used in national surveys of NHS Trusts in England. Patients' perceptions of quality of care have been compared across England, France, Norway, and Sweden with English and French patients reporting significantly higher satisfaction than Scandinavian patients [5,8]. The authors state that cross-national comparisons can give valuable information as long as they are context-specific and confounders are controlled for. Age and education are confounders that have been found to have similar effects on patient satisfaction across countries [4]. However, these studies have not adequately demonstrated that such questionnaires are performing in the same manner across nations. Hence it is difficult to ascertain to

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what extent any differences in levels of satisfaction are attributable to differences in healthcare quality or differences in the performance of the questionnaires or instruments.

The Nordic countries have healthcare systems that have developed along very similar lines [9]. Traditionally the production of welfare services within these countries has been characterized by three general conditions: first that the state delegates responsibility for production of services to local authorities; second, that the state uses monetary incentives and various directives to influence the priorities of the service producers; and third, that the services are nearly free of charge for the users [10]. Furthermore, the healthcare systems share important characteristics such as a common view on patients' rights and a desire to enable patients to make demands on the health services. In recent years the Nordic populations have increasingly been presented with information relating to the performance of healthcare providers [11]. This has included the results of surveys of patient experiences and satisfaction, which have been made available through public reports and Internet sites designed to inform patient choice in relation to healthcare providers. Such information is intended to help users to understand and compare the quality of the services within each country but may also serve as basis for cross-national comparisons.

The Nordic countries all have a history of patient experiences and satisfaction measurement but approaches have differed according to the patient groups that have been surveyed, survey methods, and questionnaire content and design. In Denmark national surveys have been conducted among somatic inpatients every second year since 2001 [2]. In Norway large patient experiences surveys have been conducted since 1995. These surveys have included a variety of patient groups including somatic inpatients [13] and outpatients [14,15], psychiatric inpatients and outpatients [16,17], and paediatric patients [18]. Smaller scale studies have been conducted in Sweden with the Picker Patient Experience Questionnaire [6], in Finland with the Stakes questionnaire [19], and in Iceland with the MiniKUPP [8,20].

The Nordic Council of Ministers has initiated a collaboration to develop a set of indicators measuring quality of care, including patient experiences, that can be used for cross-national comparisons [11]. Researchers and healthcare administrators from each of the participating Nordic countries were invited to take part in a series of meetings to develop a short patient experiences questionnaire that would be appropriate for cross-national comparisons. The aim was to develop a core set of questions covering the most important aspects of patient experiences that can be used alongside existing national surveys of inpatients. This article describes this process of development and presents the results of a Norwegian survey, the purpose of which was to assess the questionnaire for levels of missing data, reliability, and validity.

Material and methods

Development of the NORPEQ

The questionnaire was developed following a review of existing questionnaires and consultations with researchers, health personnel, and health bureaucrats with knowledge of or interest in patient experiences measurement. The development of the questionnaire was informed by three face-to-face meetings with follow-up telephone meetings. Participants included 10 researchers and health personnel experienced in the measurement of patient experiences and satisfaction. This process was designed to ensure content validity or that the questionnaire covers important aspects of patient experiences in sufficient detail [21].

The first meeting determined the objectives and methods of developing the questionnaire. Questionnaire development followed three broad considerations. First, the questionnaire should include the most important aspects of patient experiences identified within the literature that are relevant to inpatients across the Nordic countries. Second, it should be brief, covering no more than a page in an acceptable size of typeface, hence the questions could supplement existing surveys. Third, the instrument would be developed in Norwegian and translated into the other Nordic languages using the forwards–backwards methodology [22]. Following this meeting the content of questionnaires used in previous surveys in the Nordic countries was reviewed [6,8,13,19,23–25] and the results emailed to members of the group for comments prior to a telephone meeting and a second face-to-face meeting that determined the final content of the questionnaire. The questionnaire was finalized following a further telephone meeting and a third face-to-face meeting.

The resulting eight-item questionnaire is shown in Table I. It comprises six items concerning experiences with health personnel including: whether the doctors were understandable, doctors' and nurses' professional skills, nursing care, whether the doctors and nurses were interested in the patient's problems, and information relating to tests. Two additional

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Table I. Level of missing data, frequencies, component loadings, and reliability.

Item	n	Missing n (%)	Mean (SD)	1	2	3	4	5	Component loading	Cronbach's alpha/ item-total correlation	Test-retest correlation[b]
NORPEQ scores[a]	243	1 (0.4)	74.37 (15.70)							0.85	0.88
Doctors understandable	238	9 (2.5)	4.00 (0.80)	(0.8)	(2.5)	(19.3)	(50.4)	(26.9)	0.71	0.59	0.83
Doctors' professional skills	239	5 (2.1)	4.13 (0.69)	(0.0)	(1.7)	(13.0)	(56.1)	(29.3)	0.76	0.63	0.45
Nurses' professional skills	242	2 (0.8)	4.07 (0.66)	(0.0)	(1.2)	(14.9)	(59.5)	(24.4)	0.76	0.64	0.46
Nursing care	243	1 (0.4)	4.14 (0.81)	(0.0)	(2.9)	(18.5)	(40.7)	(37.9)	0.73	0.60	0.79
Doctors and nurses interested in problem	241	3 (1.2)	3.73 (0.92)	(1.2)	(8.7)	(25.7)	(44.0)	(20.3)	0.81	0.71	0.59
Information on tests	241	3 (1.2)	3.80 (0.98)	(3.3)	(7.1)	(18.7)	(48.5)	(22.4)	0.78	0.66	0.78
General satisfaction	243	1 (0.4)	4.03 (0.86)	(1.6)	(2.9)	(16.5)	(48.6)	(30.5)			0.74
Incorrect treatment	238	6 (2.5)	4.56 (0.85)	(0.8)	(4.2)	(6.3)	(15.5)	(73.1)			0.52

[a]The NORPEQ total score is scored 0–100; 100 represents the best possible patient experiences. [b]Intraclass correlation coefficient.

items ask about general satisfaction and incorrect treatment, single items that have been widely used in Nordic [2,15] and international research [6]. All items use five-point descriptive scales with the response categories "not at all", "to a small extent", "to a moderate extent", "to a large extent", and "to a very large extent". For purposes of assessing test–retest reliability we also included a question about whether the respondent would be willing to participate in a follow-up survey.

The questionnaire was piloted through cognitive interviews with six somatic inpatients from different clinics at a large university hospital in Norway. This was designed to assess patients' acceptability and understanding of the items. The six patients taking part in the cognitive interviews found the items and scaling easy to understand and hence no changes were made following the interviews.

Data collection

The final questionnaire was mailed to the homes of 500 patients in April 2006. These were randomly selected from all somatic patients who received inpatient treatment at the same Norwegian hospital within a three-week period from 8 March 2006. Non-respondents were sent a reminder after three weeks. For purposes of assessing test–retest reliability 68 patients were sent a follow-up questionnaire 5–6 days following the return of the main survey.

Statistical analysis

Questionnaire evaluation followed recommendations relating to measures of patient satisfaction [15,26] and patient outcomes measurement more generally [27]. Items were assessed for data quality including levels of missing data and floor and ceiling effects. Principal component analysis using varimax rotation was used to assess the underlying dimensionality of the six items that measured patient experiences. Internal consistency was assessed by item-total correlation and Cronbach's alpha. The former measures the association between an item and the remainder of its scale while the latter assesses the overall correlation between items within a scale. Intraclass test–retest correlations were used to assess item and scale test–retest reliability.

Construct validity assesses the extent to which a questionnaire measures what is intended through comparisons with variables that following empirical and theoretical considerations have expected associations with patient experiences or satisfaction [26]. Previous research has shown patient perceptions of general satisfaction [28], incorrect treatment [15], fulfilment of expectations [29], health status, health outcomes [28], and admission type [28,30] to be significantly associated with patient satisfaction. Health status was assessed using the first question from the SF-36 relating to general health perception [31]. The health outcomes questions relate to general and physical health and were derived following a review of existing questionnaires [31–33]. It was hypothesized that scale scores would correlate in the range 0.6–0.8 with general satisfaction. It was hypothesized that scale scores would correlate in the range 0.4–0.6 with patient perceptions of incorrect treatment and the extent to which expectations were met. It was hypothesized that

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Table II. Means (SD) for characteristics of respondents and non-respondents.

	Respondents		Non-respondents	
	n	Mean (SD)	n	Mean (SD)
Age	243	56.67 (19.42)	255	55.85 (21.80)
Length of hospital stay	243	3.54 (4.87)*	255	4.84 (8.16)
Gender				
Male	120	49.38%	133	52.16%
Female	123	50.62%	122	47.84%
Admission type				
Planned	109	44.86%	95	37.25%
Emergency	134	55.14%	160	62.75%

Asterisks denote statistical significance: $*p < 0.05$.

scale scores would correlate in the range 0.1–0.3 with patient perceptions of general health, general health outcomes, and physical health outcomes. Finally, following previous findings it was hypothesized that age would have a small but positive correlation with scale scores [28].

Results

Data collection

Of the 500 patients sent a questionnaire, 244 (48.8%) responded. The respondents' mean age was 56.7 (SD=19.42) years and 49.4% were male. Table II shows that differences in age and gender between respondents and non-respondents were small and not statistically significant. Compared with the respondents, non-respondents had significantly longer hospital stays with mean number of days in hospital being 3.5 (4.87) and 4.8 (8.16) respectively (Table II). Emergency patients constituted a larger group among the non-respondents compared with the respondents; however,the difference was not significant.

Statistical analysis

The highest level of missing data at 2.5% was for the items relating to whether doctors were easy to understand and perception of incorrect treatment (see Table I). Items relating to care from nurses and general satisfaction had the lowest levels of missing data at 0.4%. Score distributions for items were skewed towards positive experiences with item means ranging from 3.7 to 4.1 for the items relating to whether health services staff were interested in the patient's problem and nursing care respectively on the 1 to 5 scale. The largest ceiling effect was 37.9% for the item relating to nursing care.

Principal component analysis produced a single component comprising all six patient experiences items. These explained 57.7% of the variation between patients with an eigenvalue of 3.46. Component loadings ranged from 0.71 to 0.81 (see Table I). Item-total correlations ranged from 0.59 to 0.71. Cronbach's alpha was 0.85 for the six-item scale henceforth referred to as the NORPEQ, which meets the criterion of 0.70 for assessing groups. The final score was calculated by adding the responses for the six items and transforming the scores to a 0–100 scale where 100 represents the best possible experiences of care. Mean scores were imputed if three or more items were completed. The mean NORPEQ score was 74.4 (15.70).

Of the 68 patients sent a test–retest questionnaire, 47 patients (69.1%) responded. Intraclass correlations ranged from 0.45 to 0.79 for the items relating to doctors professional skills and nursing care respectively. The test–retest correlation for the total NORPEQ score was 0.88.

Table III gives the results of the tests of validity. All the correlations with the NORPEQ scores are significant and range from a low to a high level for age and general satisfaction respectively. The correlation between NORPEQ scores and incorrect treatment is of a moderate level. Compared with patients who stated that they had not received any incorrect treatment, those reporting that they had received incorrect treatment to a small or larger extent had scores that were 10.3 points lower on the 0–100 scale. The correlation with patient perceptions of whether their expectations were met is of a slightly higher moderate level. The correlation was smaller for the question relating to their expectations relating to health outcome. The correlations with the health status and health outcome variables were all significant and ranged from 0.19 to 0.27, which follows previous findings. Finally, the correlation with age was low, which follows previous findings.

Discussion

Main findings of this survey

The NORPEQ is a short self-completed questionnaire with good data quality, internal consistency, and test–retest reliability and construct validity. The methods of development were decided following expert consensus, which was followed by a literature review and a series of meetings. The resulting questionnaire was acceptable and easy to understand for patients taking part in the cognitive interviews.

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Table III. Mean (SD) NORPEQ scores by perceptions of general satisfaction, incorrect treatment, extent to which expectations were met, health status, and outcome.

Variable	Response scale	*n*	NORPEQ scores (SD)	Correlation
General satisfaction	Not at all	4	47,97 (21,02)	
	To a small extent	7	44,05 (11,50)	
	To some degree	40	58,88 (12,17)	
	To a large degree	118	73,40 (9,91)	
	To a very large degree	73	88,78 (9,25)	
Incorrect treatment	Not at all	173	78,50 (13,93)	
	To a small extent	37	68,15 (12,11)	
	To some degree	15	58,61 (14,30)	
	To a large degree	10	61,67 (19,12)	
	To a very large degree	2	64,58 (38,30)	
Expectations: treatment and care	Much worse	6	47,22 (16,60)	,51**
	Somewhat worse	21	55,96 (16,73)	
	As expected	127	73,31 (13,76)	
	Somewhat better	41	79,41 (10,95)	
	Much better	44	85,07 (11,13)	
Expectations: outcome	Much worse	2	39,58 (20,62)	,32**
	Somewhat worse	17	64,71 (12,34)	
	As expected	155	73,17 (15,67)	
	Somewhat better	35	78,90 (12,58)	
	Much better	25	83,28 (13,21)	
General health	Poor	31	67,01 (17,97)	
	Fair	65	72,53 (16,62)	.19**
	Good	86	76,04 (15,01)	
	Very good	45	78,32 (12,40)	
	Excellent	13	75,32 (14,97)	
General health compared with before admission	Much worse	5	63,33 (9,03)	.22/
	Somewhat worse	11	66,29 (16,50)	
	As expected	55	76,44 (14,02)	
	Somewhat better	32	74,92 (14,54)	
	Much better	16	79,69 (10,19)	
Physical health compared with before admission	Much worse	14	62,50 (12,76)	.27**
	Somewhat worse	12	72,22 (9,62)	
	As expected	65	77,11 (14,03)	
	Somewhat better	16	74,85 (14,97)	
	Much better	14	78,87 (14,10)	
Age	18–38	50	72,05 (16,57)	
	39–58	72	72,67 (15,94)	
	59–78	79	75,55 (15,49)	
	79–98	42	77,83 (14,27)	

NORPEQ scores range from 0 to 100 where 100 represents the best possible patient experiences. Asterisks denote statistical significance: $^{**}p<0.01$, $^{*}p<0.05$. [a]Spearman's correlation.

Taken together with the questionnaire's brevity this evidence shows that the questionnaire meets the objective to develop a short questionnaire covering the most important aspects of patient experiences within the Nordic countries. Hence, following forward–backward translation procedures, it should function as an appropriate questionnaire for use in cross-national surveys and as a supplement to existing surveys in these countries.

The NORPEQ includes what are judged to be the most important aspects of experiences including communication, information, and staff conduct [28]. The items were found to be relevant to patients taking part in cognitive interviews. Also, the levels of missing data were very low across the eight items, further indicating that the questionnaire is acceptable to patients. The results of the principal component analysis show that the six items measuring patient experiences are unidimensional. Item-total correlations and Cronbach's alpha for the resulting scale met widely accepted criteria. Moreover, the questionnaire shows good evidence of test–retest reliability.

The study produced good results despite a relatively small sample and the results of validity testing were in line with what has been found

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following national surveys that have used longer questionnaires comprising several scales relating to different aspects of patient experiences and satisfaction [16,34]. The results followed the hypotheses and hence were in line with previous findings [13,15,28]. The highest correlation was between the NORPEQ experiences scale and general satisfaction with treatment and care. NORPEQ scores were also moderately correlated with whether treatment and care met the patient's expectations. Previous research has shown the granting of patients' wishes to be an important determinant of satisfaction [28]. There were low but significant correlations with health status and health outcomes, which also follows previous findings [28] including those relating to longer questionnaires within Norway [15,16,18].

What is already known on this topic

In recent years patient experiences and satisfaction measurement has gained in importance with local and national surveys taking place within many countries [1,15,35]. However, there have been few cross-national comparisons. Existing research suggests that there are cross-national variations in patient satisfaction but there is a lack of evidence as to whether this reflects differences in culture or health systems or actual differences in quality as perceived by patients [4–6]. International comparisons present researchers with new methodological problems such as demographic differences and translation difficulties, as well as cultural and health system differences [3]. Given that there is now a rather large body of research relating to regional and national surveys of patient satisfaction, it is important that the focus on international comparisons increases.

What this study adds

The present study includes countries that are highly comparable due to similarities in healthcare delivery. Taken together with similarities in language this may help overcome some of the difficulties commonly associated with international comparisons that previous research has faced. Furthermore, to our knowledge no other studies have been conducted to develop a new instrument specifically designed to make cross-national comparisons of patient experiences or satisfaction.

Taken together with the two items that measure general satisfaction and perception of incorrect treatment, the NORPEQ provides three broad indicators for cross-national comparisons. The current study has shown that it is possible to produce a short-form measure of patient experiences that covers important aspects of the healthcare encounter. Such a questionnaire is relatively easy to translate and evaluate. The eight-item questionnaire is acceptable to patients and is easy to complete. Its brevity makes it ideal for inclusion as part of existing national surveys, including a Norwegian national survey of somatic inpatients in the autumn of 2006. Following forwards–backwards translation [22] and piloting the questionnaire will be evaluated for comparable measurement performance including data quality, internal consistency, and validity in the other Nordic countries. Following application in national surveys the results will be compared for the Nordic countries after adjusting for age, health status, and other variables known to be consistently associated with patient experiences and satisfaction scores [28].

Limitations of the study

Non-response is a common problem within patient satisfaction research. In the present study the response rate was 49%. Response rates in the region of 40% to 50% have previously been reported by several other surveys among somatic patients [14,36,37] but there are also studies reporting higher response rates [38]. Within the present study respondents and non-respondents were similar in terms of age, gender, and admission type but non-responders tended to have longer hospital stays. Previous research has suggested that length of hospital stay may be related to non-response in mail surveys [39] but the evidence is inconclusive about the impact of length of stay on patient experiences [28]. Low participation is still a major concern in patient experiences and satisfaction research and it is necessary to develop strategies to increase response rates within the field [40]. Follow-up surveys of non-respondents are also necessary. It will be important to compare the characteristics of respondents and non-respondents within the other Nordic countries to see if they have the same differences as found in this Norwegian survey.

The present study found that the majority of patients reported good experiences of care in the upper region of the scale. This would suggest that the present results, which follow previous findings relating to hospital inpatients in Norway [13] and in other countries [6], are a result of high levels of care rather than the methods of measurement. However, patients in the present study who reported mean NORPEQ scores of 74.4 and 10.3% scored 50 or

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below, which indicates that there is considerable scope for improvement in the delivery of services.

The NORPEQ is brief but includes items that assess important aspects of the healthcare experience that are directly related to the treatment and care patients receive at the hospital. Items that have been used in longer questionnaires relating to hospital access, hospital equipment, or standards of patient facilities [13,15] are not included. However, the results of testing for validity including the high level of correlation with responses to the general satisfaction item, follow previous findings relating to longer questionnaires [13,28]. The focus on important aspects of care that sum to form a single score is a strength of the NORPEQ, facilitating its application in cross-national comparisons of hospital care. Moreover, the brevity of the questionnaire makes it suitable for use alongside existing questionnaires including those used within national surveys or other forms of patient-reported outcome.

In conclusion the NORPEQ has acceptable data quality, reliability, and validity within this Norwegian sample of inpatients. The questionnaire has been translated into Icelandic and Swedish using the forwards–backwards methodology [22]. It is currently being assessed by means of cognitive interviews with patients within these countries and will be further tested through pilot surveys. Similar work is being planned in Denmark. The results from each country will be compared before the NORPEQ is included in national surveys prior to cross-national comparisons.

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