Paper II

doi: 10.1111/j.1471-6712.2008.00639.x

Cancer patients' barriers to pain management and psychometric properties of the Norwegian version of the Barriers Questionnaire II

Berit Taraldsen Valeberg RN, CRNA, MSc[1,2], **Berit Rokne Hanestad** RN, PhD[2], **Pål Klepstad** MD, PHD[3], **Christine Miaskowski** RN, PhD, FAAN[4,5], **Torbjørn Moum** PhD[6] and **Tone Rustøen** RN, PhD[1,4]

[1]Oslo University College, Faculty of Nursing, Oslo, Norway, [2]Department of Public Health and Primary Health Care, University of Bergen, Bergen, Norway, [3]Department of Anaesthesia and Emergency Medicine, St. Olav University Hospital and Department of Circulation and Medical Imaging, Medical Faculty, Norwegian University of Science and Technology, Trondheim, Norway, [4]Rikshospitalet University Hospital, Oslo, Norway, [5]Department of Physiological Nursing, University of California, San Francisco, CA and [6]Department of Behavioural Sciences in Medicine, Medical Faculty, University of Oslo, Oslo, Norway

Scand J Caring Sci; 2008

Cancer patients' barriers to pain management and psychometric properties of the Norwegian version of the Barriers Questionnaire II

The Barriers Questionnaire II (BQ-II) was developed to assess barriers to effective pain management. The purpose of this study was to evaluate the psychometric properties of the BQ-II in a sample of Norwegian cancer patients. The BQ-II was translated into Norwegian and pilot tested with eight oncology outpatients. Then, a convenience sample of 321 cancer patients from two different sites was recruited to maximize the number of questionnaires available for the psychometric analyses. Patients were included if they: were >18 years of age; had a diagnosis of cancer; and self-reported pain and/or use of analgesics. Construct validity of the Norwegian version of the BQ II (NBQ-II) was evaluated using an exploratory factor analysis. A seven-factor solution was found that was more consistent with the original version of the BQ. Construct validity of the NBQ-II was demonstrated through positive correlations between most of the subscale and total scores on the NBQ-II and pain intensity and pain interference scores. Finally, Cronbach's α coefficients of ≥ 0.7 for six of the seven subscales and 0.89 for the total scale demonstrated acceptable levels of internal consistency. In conclusion, the NBQ-II demonstrated adequate psychometric properties. However, further revision and testing of the questionnaire should be performed to confirm the factor structure that was identified in this study.

Keywords: attitudinal barriers, Barriers Questionnaire, cancer pain' psychometric properties.

Submitted 15 August 2007, Accepted 15 May 2008

Introduction

Numerous professional, patient and system barriers contribute to the undertreatment of pain (1). Patient barriers to pain management are described as erroneous beliefs and misconceptions that may lead to a reluctance to report pain and to use available analgesics (2, 3). These erroneous beliefs or misconceptions about pain and pain medication include fears of addiction and tolerance, desire to be good patients, reluctance to distract the doctor from curing the disease, fear of side effects and a belief that pain is an inevitable component of the disease process (4–11). Additional reasons for nonadherence with an analgesic regimen include the desire to be able to monitor symptoms or to test whether the treatment has relieved pain (12, 13).

To systematically evaluate patient-related barriers to effective cancer pain management, Ward et al. (8) developed the Barriers Questionnaire (BQ). The BQ has been used in several studies and was found to be a reliable and valid instrument (8, 9, 14, 15).

However, the BQ was revised in 2002 (13) based on the responses of patients in multiple studies and changes in analgesic prescription practices (16–18). The current version is called the BQ-II and evidence exists that it is a valid and reliable measure of patient barriers (13, 19).

While several studies from different parts of the world used the original BQ (8–10, 14, 15, 20–22), no data were available on European patients' barriers to cancer pain

Correspondence to:
BT Valeberg, Department of Public Health and Primary Health Care, University of Bergen, Bergen, Norway.
E-mail: berit.valeberg@su.hio.no

management. Of note, cancer patients from Taiwan, China and South America reported slightly higher barriers to pain management than North American patients which suggests that cultural differences might exist. Differences might also be due to variations in the healthcare system and to the use of opioids for the treatment of cancer pain (23). The translation and testing of the BQ-II in Norway provides an opportunity to monitor patient-related barriers to cancer pain management in a northern European cancer population, as well as the opportunity to compare results from Norway with those from other countries.

Therefore, the purpose of this study was to evaluate the psychometric properties of the Norwegian version of BQ-II (NBQ-II) in patients with cancer pain in terms of completeness of the data, construct validity and internal consistency.

Methods

Sample and data collection

A convenience sample of 321 cancer patients from two different studies was included to maximize the number of questionnaires available for testing the psychometric properties of the NBQ-II. Inclusion criteria for both patient groups were: >18 years of age; a diagnosis of cancer; self-reported pain and/or use of analgesics; and able, to read, write and understand Norwegian. All patients provided written informed consent.

The first sample (n = 217) was recruited from several outpatients clinics at the Radiumhospitalet Comprehensive Cancer centre in Oslo. Patients completed the NBQ-II either in the clinic or at home and returned it in a prepaid envelope. The recruitment procedure is described elsewhere (24). While 270 patients consented to participate, 53 (19.6%) did not return the questionnaire which resulted in 217 evaluable patients (80.4%). In the second sample, hospitalized patients were recruited from St. Olav's Hospital in Trondheim. A total of 104 (53%) patients completed the NBQ-II. All of these patients were taking opioid analgesics. Some of the patients were unable to complete the NBQ-II (i.e. supine position, limited movements of hands because of infusions) and were interviewed by a research assistant to obtain their responses. Data from these two samples were merged to evaluate the psychometric properties of the NBQ-II.

Instruments

Demographic and disease specific characteristics. Demographic data included gender and age**.** Patients' functional status was measured using the Karnofsky Performance Status (KPS) Scale (25, 26). For inpatients, KPS with scores that ranged from zero (dead) to 100 (adequate health status with no complaints and no evidence of disease) was used and the patient's status was rated by a research assistant. The outpatients self-reported their functional status using KPS. The lowest score were taken out because scores below 40 are not appropriate for outpatients and the scores ranged from 40 (disabled, need special help and care) to 100 (adequate health status with no complaints and no evidence of disease). Validity and reliability of the KPS have been established and it is considered to be a global indicator of the functional status of patients with cancer (25). To obtain data on cancer diagnosis, the patients' medical records were reviewed by a physician or a research assistant.

Barriers questionnaire. The BQ-II is a 27-item self-report instrument that measures patients' beliefs about cancer pain and the use of analgesics. Participants rate the extent to which they agree with each statement on a Likert scale that ranges from zero (do not agree) to five (agree very much). A total score and subscales scores are calculated with higher score indicating stronger barriers.

The development of the original BQ was based on prior research that identified eight different barriers to pain management, as well as the notion that patients' beliefs or concerns could prevent optimal pain management (1, 4, 27–32). These barriers were named: addiction, tolerance, side effects, fatalism, be good (good patients do not complain about pain), distracting the medical doctor, disease progression and the fear of injections. Two experts in pain management developed items to assess each of the eight barriers and three other pain experts together with four investigators examined the items for clarity and categorized the items into the various subscales. Only the items categorized by all seven experts/investigators were retained in the BQ. The questionnaire was then pilot tested and items which lowered the alpha for individual subscales were deleted and the new items were added. This work resulted in the original 27-item BQ (8). However, the original BQ never underwent exploratory factor analysis.

Based on the feedback from patients and changes in pain medication practices, the BQ was revised in 2002 (13). In the BQ-II, the items about fear of injections and the notion that pain indicates disease progression were deleted. New questions about pain medications ability to impair immune function, and the notion that analgesics may block or mask one's ability to monitor symptoms were included in the scale. Earlier factor analyses of the BQ-II supported three- and four-factor solutions with subscales respectively called 'Fear of consequences of analgesic use', 'Fatalism' and 'Communication' (19), and 'Fatalism', 'Communication', 'Physiological effects' and 'Harmful effects' (13).

The BQ-II was translated into Norwegian by the primary investigator (BTV) and the researcher (PK) at St. Olav Hospital. Then it was back translated by a bilingual person and a professional translation company. The back and forth translation procedures were repeated until the

translated version was found to be congruent with the original (33). A pilot test of the NBQ-II was conducted with eight patients in the outpatient clinic. The patients were interviewed about any ambiguities or difficulties with any of the items on the NBQ-II. Two patients reported difficulties because of lack of knowledge about the content of the questions. When it was explained that answers should reflect their beliefs and not their knowledge they were able to answer the questions. The research assistant in Trondheim experienced the same difficulty when inpatients were interviewed. As a result, the statement 'Do you believe' was placed on the top of each page of the questionnaire to emphasize that patients were to respond in terms of their beliefs not their knowledge. Two patients did not know what the immune system was, so an explanation of the term was put in brackets. An additional two patients had difficulty answering the question 'It is important to be strong by not talking about pain'. They answered the opposite of what they meant. Half of the patients commented that many questions were alike and could not see the point in answering the 'same' question several times.

Cronbach's alphas for the original version of the BQ ranged from 0.78 to 0.90 (8–10, 14, 15). In addition, it demonstrated good test–retest reliability (10). Internal consistency reliability for the BQ-II total score was excellent, with Cronbach's alphas between 0.89 and 0.90 in two studies (13, 19).

The Brief Pain Inventory. The validated Norwegian version of the Brief Pain Inventory (34, 35) was used to evaluate pain. Pain intensity scores (i.e. pain now, average pain, worst pain, least pain in the last 24 hours) were measured using numeric rating scales (NRSs) that ranged from zero (no pain) to 10 (pain as bad as I can imagine). Pain interference with function was measured using NRSs that ranged from zero (does not interfere) to 10 (completely interferes). Pain relief was measured using an NRS that ranged from zero (no relief) to 100 (complete pain relief).

The Pain Management Index. The Pain Management Index (PMI) is based on the categorization of analgesics by the World Health Organisation and compares the most potent analgesic patients' use to their worst pain intensity level. The types of analgesics used were classified by the researcher as no analgesic (zero), nonopioid (one), weak opioid (two) and strong opioid (three). The levels of worst pain were grouped as no pain (zero), a pain rating of 1–4 (one), a pain rating of 5–6 (two) or a pain rating of 7–10 (three). The PMI was scored using the procedures described by Gunnarsdottir et al. (13). The PMI is a crude measure of the adequacy of the analgesic prescription in relationship to pain intensity. Despite this limitation, ample evidence exists that the PMI is a valid and useful measure to evaluate the adequacy of pain medication (8) and it is a commonly used measure in cancer pain studies (8, 14, 15, 36).

Analytic methods

Data were analysed using SPSS Version 14.0 (SPSS, Inc., Chicago, IL, USA). For all tests, a $p < 0.05$ was considered statistically significant.

Descriptive statistics were used to present demographic and clinical characteristics of the sample and to assess the completeness of the NBQ-II. The mean (SD), floor and ceiling scores, together with skewness and kurtosis were calculated for each item, subscale scores and total NBQ-II score. Differences in these scores between the two samples (i.e. inpatients and outpatients) were evaluated using independent sample *t*-tests and chi-square analyses.

Construct validity. As a part of the development of the NBQ-II, construct validity was examined through an exploratory factor analysis. An exploratory analysis was chosen for several reasons. First, the revised BQ-II was found to have four factors as opposed to an expected eight factors based on the original BQ (13). Second, the Icelandic version of the BQ-II had only three factors (19). Finally, this study was the first to use the Norwegian version of the BQ.

To explore the factor solution of the BQ-II, the correlation matrix of the 27 items with estimated communalities as diagonal elements was factorized by the principal axis method with oblique rotation. Correlations between subscales and the total scale were computed using Pearson Product Moment Correlation coefficients.

Construct validity was explored further by examining the relationships between barrier scores and several outcome measures (37). In accordance with prior studies, it was hypothesized that patients with higher barriers to pain management would have higher pain intensity scores, higher pain interference scores and lower PMI (8, 13–15). Because previous studies demonstrated a relationship between barrier scores and age (13, 14, 19), it was hypothesized that higher barrier scores would be positively correlated with age.

Internal consistency was measured by Cronbach's alpha reliability coefficient for each of the subscales and the total NBQ-II.

Results

Patient characteristics

The total sample consisted of 321 cancer patients with pain (i.e. 217 outpatients and 104 inpatients). As shown in Table 1, the patients were approximately 60 years of age (range: 24–86 years), were 61% female, and had an average KPS score of 70.4 (SD = 14.3). The outpatients had significantly higher KPS, they were younger, were more

Table 1 Demographic and clinical characteristics of the total sample and differences between outpatients and inpatients

Characteristic	*Total sample (n = 321)* Mean ± SD	*Outpatients (n = 217)* Mean ± SD	*Hospitalized patients (n = 104)* Mean ± SD	Statistics
Age (years)	60.4 ± 11.8	58.1 ± 11.1	65.1 ± 12.0	$t = 5.18$, $p < 0.001$
KPS score	70.4 ± 14.3	74.8 ± 12.8	61.7 ± 13.0	$t = -8.39$, $p < 0.001$
	%	%	%	
Gender				
Males	38.6	25.3	66.3	$\chi^2 = 49.6$, $p < 0.001$
Females	61.4	74.7	33.7	
Diagnosis				
Breast	30.2	38.7	12.5	$\chi^2 = 80.7$, $p < 0.001$
Prostate	15.6	7.4	32.7	
Gynaecologic	6.9	10.1	0.0	
Colorectal	8.4	6.5	12.5	
Head and neck	6.2	8.3	1.9	
Sarcoma	5.3	7.8	0.0	
Other	27.4	21.2	40.4	

KPS, Karnofsky Performance Status; SD, standard deviation.

likely to be female than the inpatients, and the two groups differed in cancer diagnosis as well.

Psychometric Properties of the NBQ-II.

Completeness of the data: As shown in Table 2, the items from the NBQ-II with the most missing data were those that concerned the immune system (i.e. items 4, 13 and 19). The inpatients had a higher percentage of missing items (i.e. 6.2% overall missing) compared with the outpatients (i.e. 2.0% overall missing).

The mean (SD) of the individual items, the floor and ceiling scores, and the measures of skewness and kurtosis for each of the items in the total sample are listed in Table 2. Based on the measures of skewness and kurtosis, most of the items did not deviate markedly from a normal distribution. However, kurtosis was high for two of the three items in the fatalism subscale, which suggests that many of the patients chose the middle response. The distribution of these scores was also skewed to the right which suggests that many patients did not have fatalistic thoughts about pain management.

Construct validity: The results of the principal axis factor analysis are outlined in Table 3. A cut-off criterion of Eigen-values above unity resulted in a seven-factor solution that explained 63% of the total variance.

Factor 1 consists of the three tolerance items. Two items loaded highest on this factor. However, one of the tolerance items loaded on all of the other factors and loaded highest on factor four. Considering the theoretical underpinnings of the original BQ and the item loading across all factors, the three tolerance items were considered to be a part of the same factor. This factor was named 'Tolerance'.

Factor 2 consists of all three of the fatalism items and was named 'Fatalism'.

Factor 3 consists of three 'be good' items and a fourth item about 'distracting the medical doctor'. This item addresses talking to the doctor about pain. One of the 'be good' items loaded slightly higher on the seventh factor. However, despite this loading, it was considered to be part of the third factor, because all of these items relate to communication about pain. Factor three was labelled 'Communication of pain'.

Factor 4 was labelled 'Psychological or cognitive effect'. This factor consists of the three addiction items and three of the side effects items. Two out of the three addiction items loaded highest on factor four together with two of the side effect items that evaluated concerns about being drowsy and confused. The third addiction item loaded slightly higher on factor one. However, theoretically it fits better with the other addiction items. While the side effect item that stated that pain medicine makes you say or do embarrassing things loaded on three factors (i.e. four, six and seven), it loaded second highest with the other psychological items on factor four.

Factor 5 consists of the three immune system items that loaded highest on this factor. Factor 5 was labelled 'Immune system'.

Factor 6 was called 'Monitor'. Two of three items loaded highest on factor six, while the second monitor item loaded highest on the tolerance factor. To be consistent with the theoretical underpinnings of the original BQ, the second monitor item was retained in factor 6.

Factor 7 was called 'Side effects and distracting the Medical Doctor (MD)'. This factor is a mix of three side effect items (i.e. nausea, constipation and a general side effect item) and two of the three questions about

Table 2 Mean, standard deviations, percentage of patient scoring the lowest or the highest, skewness and kurtosis for the total sample (n = 321) on each item

Items	*Mean (SD)*	*% Floor*[a]	*% Ceiling*[b]	*Skewness*	*Kurtosis*	*% Missing in total sample*	*% Missing in outpatients*	*% Missing in inpatients*
1. Cancer pain can be relieved	0.8 (1.1)	1.3	48.1	1.52	2.56	1.6	2.3	0.0
2. There is a danger of becoming addicted to pain medicine	3.6 (1.5)	5.3	39.9	−0.94	−0.15	0.9	1.4	0.0
3. Drowsiness from pain medicine is difficult to control	3.1 (1.5)	5.8	23.1	−0.43	−0.79	2.8	2.8	2.9
4. Pain medicine weakens the immune system	2.6 (1.7)	14.1	17.4	−0.04	−1.15	7.2	2.3	17.3
5. Confusion from pain medicine cannot be controlled	2.4 (1.5)	13.5	11.5	0.07	−0.88	5.3	1.8	12.5
6. When you use pain medicine your body becomes used to its effects and pretty soon it will not work any more	3.2 (1.5)	6.3	20.6	−0.60	−0.48	1.6	1.8	1.0
7. Using pain medicine blocks your ability to know if you have any new pain	3.1 (1.6)	8.1	21.9	−0.53	−0.76	3.4	3.2	3.8
8. Pain medicine can effectively control cancer pain	1.3 (1.2)	1.6	29.2	0.81	0.33	4.0	5.1	1.9
9. Many people with cancer get addicted to pain medicine	3.4 (1.5)	6.1	29	−0.70	−0.46	3.4	3.7	2.9
10. Nausea from pain medicine cannot be relieved	1.7 (1.6)	28.7	7.2	0.58	−0.77	4.4	3.7	5.8
11. It is important to be strong by not talking about pain	1.4 (1.7)	49.0	7.4	0.89	−0.55	2.8	2.8	2.9
12. It is important for the doctor to focus on curing illness, and not waste time controlling pain	1.8 (1.9)	41.5	15.1	0.51	−1.29	3.1	2.3	4.8
13. Using pain medicine can harm your immune system	2.4 (1.6)	15.7	13.4	0.03	−1.05	6.9	2.8	15.4
14. Pain medicine makes you say or do embarrassing things	1.1 (1.4)	49.2	3.5	1.16	0.42	3.1	1.8	5.8
15. If you take pain medicine when you have some pain, then it might not work as well if the pain becomes worse	2.8 (1.7)	17.5	18.1	−0.33	−1.21	1.9	0.9	3.8
16. Pain medicine can keep you from knowing what is going on in your body	3.0 (1.7)	12.5	24.4	−0.43	−1.00	2.8	0.9	6.7
17. Constipation from pain medicine cannot be relieved	1.34 (1.5)	42.2	5.8	1.01	−0.18	2.5	0.9	5.8
18. If doctors have to deal with pain they will not concentrate on curing the disease	1.1 (1.6)	55.3	6.1	1.33	0.53	3.1	0.9	7.7
19. Pain medicine can hurt your immune system	2.3 (1.6)	18.1	12.8	0.09	−1.04	7.2	2.3	17.3
20. It is easier to put up with pain than with the side effects that come from pain medicine	2.2 (1.6)	20.5	11.0	0.12	−1.12	4.0	0.9	10.6
21. If you use pain medicine now, it will not work as well if you need it later	2.4 (1.8)	23.0	12.8	−0.01	−1.40	2.5	1.4	4.8

Table 2 (Continued)

Items	Mean (SD)	% Floor[a]	% Ceiling[b]	Skewness	Kurtosis	% Missing in total sample	% Missing in outpatients	% Missing in inpatients
22. Pain medicine can mask changes in your health	3.1 (1.6)	11.0	22.9	−0.56	−0.75	3.4	1.8	6.7
23. Pain medicine is very addictive	3.2 (1.5)	7.7	24.0	−0.57	−0.69	2.5	0.9	5.8
24. Medicine can relieve cancer pain	0.8 (1.1)	2.3	50.8	1.66	3.08	3.1	2.3	4.8
25. Doctors might find it annoying to be told about pain	1.3 (1.6)	47.4	5.8	1.01	−0.24	2.8	0.9	6.7
26. Reports of pain could distract a doctor from curing the cancer	1.0 (1.4)	55.0	4.2	1.38	0.92	2.5	1.4	4.8
27. If I talk about pain, people will think I am a complainer	2.1 (1.8)	30.3	12.1	0.25	−1.33	2.2	0.9	4.8

[a]Percentage of patients with lowest possible score.

[b]Percentage of patients with the highest possible score.

distraction of the medical doctor. All three of the side effect items loaded on other factors. Nausea and constipation loaded with the same pattern, loading the least on factors one and three. The more general side effect item loaded differently, loading the least on factors one, two and four.

As shown in Table 4, significant correlations were found between the subscale scores and total NBQ-II scores. The total NBQ-II score was weakly but positively correlated with least pain, average pain and pain now, but not with worst pain. Many of the subscale scores from the NBQ-II were positively correlated with the pain intensity scores. In addition, the total NBQ-II score was positively correlated with most of the pain interference items (Table 5).

A significant but weak negative correlation was found between the total NBQ-II score and the PMI score which suggests that patients with an adequate analgesic prescription had lower barriers. This same pattern was found for all the NBQ-II subscale scores, except for 'Monitor'. Pain relief was not correlated with total NBQ-II scores, but was inversely correlated with the subscale scores for 'Tolerance' and 'Immune system'. These findings suggest that patients with less pain relief were more concerned about tolerance and about the effects of pain on the immune system. Communication about pain was positively correlated with pain relief which suggests that patients with higher concerns about pain communication had higher pain relief scores.

An examination of the relationship between demographic and clinical characteristics and NBQ-II total scores indicates that elderly patients reported higher barrier scores. Of note, no differences in NBQ-II scores were found based on gender. In terms of KPS scores, only one weak positive correlation was found with the subscale 'Monitor' which suggests that patients with higher functional status were less afraid of taking pain medication to mask symptoms.

Internal consistency: Table 4 presents the mean (SD) for the subscale and total NBQ-II scores, as well as their Cronbach's alphas. Patients scored highest on the 'Monitor' subscale and lowest on the 'Fatalism' subscale. The Cronbach's alphas were ≥0.70 for six of the seven subscales and 0.89 for the total NBQ-II. The Cronbach's alpha for the 'Fatalism' subscale was 0.69. These alpha levels demonstrate good internal consistency. All of the correlations between the subscales and the total NBQ-II scores were significant and the majority was positive. The exception was the fatalism subscale which did not correlate with psychological/cognitive effect and the monitor subscales.

Discussion

This exploratory factor analysis provides evidence for a seven-factor solution for the NBQ-II which is more consistent with the original BQ even though neither exploratory nor confirmatory factor analyses were performed with the original BQ. While several factor analyses were conducted in the present study to explore some of the inconsistencies in the item loadings, and the factor solution was unclear, the seven-factor solution was selected as the 'best' for several reasons. First, the seven-factor solution was based on Eigen-values above unity. In addition, this factor solution demonstrated face validity and fit fairly well with the theoretical underpinnings of the original BQ (8). In addition, the seven-factor solution appeared sufficiently fine-grained to capture a comprehensive and clinically meaningful variety of barriers to pain management.

The main difference between the factors in the original BQ and the NBQ-II are the items that measured side effects. While the six side effect items (Table 2 – items 3, 5, 10, 14, 17 and 20) were grouped as a single factor on the original BQ, in this study three side effect items (i.e. 10, 17 and 20) loaded together with distracting the medical doctor. The other three side effect items (i.e., drowsiness, confusion, saying embarrassing things) loaded together

Table 3 Pattern matrix of the NBQ-II (n = 321)

	Factor						
Tolerance	1	2	3	4	5	6	7
6. When you use pain medicine your body becomes used to its effects and pretty soon it will not work any more	0.151	0.114	−0.206	**0.274**	−0.208	0.250	−0.135
15. If you take pain medicine when you have some pain, then it might not work as well if the pain becomes worse	**0.615**	0.074	0.005	0.085	−0.098	−0.052	0.154
21. If you use pain medicine now, it will not work as well if you need it later	**0.478**	0.245	−0.186	0.091	−0.132	−0.063	0.012
Fatalism							
1. Cancer pain cannot be relieved	0.051	**0.689**	−0.005	0.078	0.064	0.097	−0.045
8. Pain medicine cannot effectively control cancer pain	−0.046	**0.652**	−0.091	−0.074	0.007	0.004	−0.023
24. Medicine cannot relieve cancer pain	0.043	**0.609**	0.076	−0.065	−0.043	−0.117	0.070
Communication of pain							
11. It is important to be strong by not talking about pain	0.087	0.011	0.229	−0.085	0.031	0.138	**0.350**
25. Doctors might find it annoying to be told about pain	−0.003	0.068	**0.768**	0.077	0.013	−0.075	−0.027
26. Reports of pain could distract a doctor from curing the cancer	0.034	−0.011	**0.665**	−0.038	−0.161	−0.205	0.172
27. If I talk about pain, people will think I am a complainer	0.001	−0.022	**0.556**	0.023	0.018	0.312	0.035
Psychological or cognitive effects							
2. There is a danger of becoming addicted to pain medicine	0.102	−0.017	−.046	**0.816**	0.029	−0.155	−0.045
3. Drowsiness from pain medicine is difficult to control	−0.087	−0.008	0.003	**0.518**	−0.064	0.103	0.132
9. Many people with cancer get addicted to pain medicine	0.213	−0.097	0.033	**0.453**	−0.116	0.072	0.036
5. Confusion from pain medicine cannot be controlled	−0.030	0.080	−0.117	**0.263**	−0.071	0.260	0.056
14. Pain medicine makes you say or do embarrassing things	0.021	−0.063	0.034	0.216	−0.049	0.142	**0.322**
23. Pain medicine is very addictive	**0.421**	−0.014	−0.105	0.379	−0.106	0.099	−0.147
Immune system							
4. Pain medicine weakens the immune system	−0.114	0.061	0.026	0.131	**0.849**	−0.055	−0.015
13. Using pain medicine can harm your immune system	0.062	−0.022	0.009	−0.059	**0.897**	0.016	0.016
19. Pain medicine can hurt your immune system	0.127	−0.079	−0.066	−0.101	**0.891**	0.041	−0.004
Monitor							
7. Using pain medicine blocks your ability to know if you have any new pain	0.083	0.003	0.052	0.038	−0.101	**0.628**	0.021
16. Pain medicine can keep you from knowing what is going on in your body	**0.497**	−0.021	0.059	0.071	−0.048	0.192	0.242
22. Pain medicine can mask changes in your health	0.414	−0.077	−0.002	−0.041	−0.165	**0.431**	0.082
Side effects and distract MD							
10. Nausea from pain medicine cannot be relieved	−0.041	0.226	0.054	0.047	−0.167	0.239	**0.270**
12. It is important for the doctor to focus on curing illness, and not waste time controlling pain	0.153	0.023	0.024	0.003	−0.006	−0.153	**0.752**

Table 3 (Continued)

	Factor						
17. Constipation from pain medicine cannot be relieved	−0.037	0.199	0.064	0.117	−0.087	0.110	**0.467**
18. If doctors have to deal with pain they will not concentrate on curing the disease	0.114	0.000	−0.236	0.007	−0.070	−0.024	**0.597**
20. It is easier to put up with pain than with the side effects that come from pain medicine	−0.023	−0.021	−0.140	0.007	−0.118	0.038	**0.370**

Extraction method: principal axis factoring. Rotation method: Oblimin with Kaiser normalization. A rotation converged in 15 iterations.
NBQ-II, Norwegian version of the Barriers Questionnaire II; MD, Medical Doctor.
Values in bold have the highest loading.

Table 4 Means (SD) and Cronbach's alphas for the seven subscales and total score, correlations between subscales and total scores for the NBQ-II (n = 321)

	Tolerance	*Psychological or cognitive effect*	*Immune system*	*Monitor*	*Side effects and distracting MD*	*Fatalism*	*Communication*	*Total NBQ-II*
Mean (SD)	2.8 (1.3)	2.8 (1.0)	2.4 (1.5)	3.1 (1.3)	1.7 (1.2)	1.0 (0.9)	1.4 (1.2)	2.2 (0.8)
Cronbach's alpha	0.71	0.74	0.92	0.75	0.73	0.69	0.70	0.89
Tolerance		0.59[a]	0.60[a]	0.55[a]	0.45[a]	0.24[a]	0.40[a]	0.79[a]
Psychological or cognitive effect	0.59[a]		0.52[a]	0.56[a]	0.35[a]	0.03	0.31[a]	0.75[a]
Immune system	0.60[a]	0.52[a]		0.57[a]	0.49[a]	0.12[b]	0.34[a]	0.76[a]
Monitor	0.55[a]	0.56[a]	0.57[a]		0.46[a]	0.04	0.30[a]	0.72[a]
Side effects and distracting MD	0.45[a]	0.35[a]	0.49[a]	0.46[a]		0.20[a]	0.47[a]	0.76[a]
Fatalism	0.24[a]	0.03	0.12[b]	0.04	0.20[a]		0.12[b]	0.29[a]
Communication	0.40[a]	0.31[a]	0.34[a]	0.30[a]	0.47[a]	0.12[b]		0.64[a]

[a]Correlation is significant at the 0.01 level (two-tailed).
[b]Correlation is significant at the 0.05 level (two-tailed).
NBQ-II, Norwegian version of the Barriers Questionnaire II; MD, Medical Doctor.

with the more psychological items. The validity of the factor structure of the NBQ-II will need to be confirmed in future studies because several of the items had weak loadings (i.e. under 0.30) and they loaded on more than one factor. The specific reasons for the weak loadings and the fact that several of the items loaded on more than one factor are not apparent.

One of the reasons to perform an exploratory factor analysis, rather than a confirmatory factor analysis, was to validate the translation of the questionnaire. While the translation process followed recommended procedures and the pilot testing of the questionnaire did not reveal major ambiguities or difficulties answering the questions, additional research is needed to evaluate whether the various concepts evaluated on the NBQ-II are relevant to Norwegian patients or other groups of Northern European patients.

The most apparent problem with weak loadings in the factor analysis was with some of the side effects items. Gunnarsdottir et al. (13, 19) reported some of the same problems with nausea, constipation and the general side effect item. This consistent finding across two studies suggests potential problems with the original items and not with the translation of the items. Perhaps, because nausea and constipation were common side effects of analgesic medications, they need to be evaluated as a single item on the questionnaire.

Some of the problems with the factor analysis could be due to the heterogeneity of the sample (i.e. outpatients and hospitalized) and associated differences in demographic and clinical characteristics. However, multiple regressions using total barrier as the dependent variable revealed that the effects of sociodemographic variables (age, gender), diagnosis and the KPS were approximately the same among outpatients and hospitalized patients (i.e. no significant interactions between the said predictors and the patient group variable).

As suggested by Ward et al. (38) and hypothesized in this study, the construct validity of the BQ was suggested through positive correlations between the various barrier subscale scores and pain intensity and interference scores.

Table 5 Correlations between subscale and total NBQ-II scores and pain intensity, pain interference with function and Pain Management Index scores, and demographic variables

Measures	*Tolerance*	*Psychological or cognitive effect*	*Immune system*	*Monitor*	*Side effects/distracting MD*	*Fatalism*	*Communication*	*Total NBQ-II*
Pain intensity scores								
Worst pain	0.04	0.04	−0.02	−0.09	0.07	0.12[a]	0.11	0.06
Least pain	0.19[b]	0.19[b]	0.11	0.04	0.16[b]	0.17[b]	0.22[b]	0.21[b]
Average pain	0.09	0.14[a]	0.04	0.01	0.19[b]	0.17[b]	0.24[b]	0.21[b]
Pain now	0.10	0.10	0.07	0.05	0.20[b]	0.20[b]	0.18[b]	0.10[b]
Pain relief from treatment	−0.18[b]	−0.03	−0.15[a]	−0.02	−0.03	−0.05	0.14[a]	−0.06
Pain interference with function								
Pain interference daily activity	0.11[a]	0.10	0.10	0.09	0.14[a]	0.09	0.05	0.14[a]
Pain interference mood	0.07	0.17[b]	0.02	0.09	0.08	0.13[a]	0.03	0.12[a]
Pain interference ability walk	0.11[a]	0.09	0.10	0.04	0.09	0.00	0.09	0.13[a]
Pain interference work	0.00	0.02	0.04	0.03	0.09	0.14[a]	0.02	0.06
Pain interference relations to other	0.09	0.16[b]	0.05	0.10	0.12[a]	0.17[b]	0.09	0.16[b]
Pain interference sleep	0.15[b]	0.15[b]	0.09	0.04	0.14[a]	0.17[b]	0.21[b]	0.20[b]
Pain interference joy of life	0.11	0.21[b]	0.06	0.15[b]	0.19[b]	0.01[a]	0.18[b]	0.24[b]
Pain interference	0.12[a]	0.17[b]	0.08	0.10	0.16[b]	0.16[b]	0.12[a]	0.20[b]
Age	0.26[b]	−0.01	0.25[b]	0.20[b]	0.26[b]	−0.02	0.08	0.21[b]
Karnofsky Performance Status score	−0.02	0.01	−0.00	−0.14[a]	−0.04	0.01	0.02	−0.02
Adequacy of analgesic used (PMI)	−0.13[a]	−0.14[a]	−0.11[a]	−0.07	−0.12[a]	−0.15[b]	−0.15[b]	−0.19[b]
Gender	−0.09	0.02	−0.14[a]	−0.06	−0.06	0.07	0.09	−0.04

[a]Correlations are significant at the 0.05 level (two-tailed).

[b]Correlations are significant at the 0.01 level (two-tailed).

NBQ-II, Norwegian version of the Barriers Questionnaire II; MD, Medical Doctor; PMI, Pain Management Index.

Of note, most of the results in the present study were in concert with the stated hypotheses even though the correlations were relatively small. Of note, a prior validation of the BQ-II reported even smaller correlations or lack of correlations (i.e. no correlation between pain now and worst pain) (13). These findings suggest that the NBQ-II discriminates to a certain degree between levels of pain intensity and interference and is in agreement with previous reports (8, 10, 13, 15, 18, 19, 38–40).

The hypothesis that an adequate analgesic prescription would be associated with lower barrier scores was also confirmed and is consistent with previous reports (8, 13–15). However, the weak correlations between some of the pain intensity scores and the subscale and total NBQ-II scores underscore the fact that many different factors influence patients' pain and pain treatment and these results should be interpreted with caution.

In this study, older patients tended to report higher total NBQ-II scores. This finding is consistent with two previous studies (13, 38). However, in other studies of cancer patients (8, 10, 14, 15, 41) and their family caregivers (40), as well as with Icelandic adults (19) and AIDS patients (18), no correlations were found between age and barrier scores. It should be noted that the correlation coefficients between age and barrier scores in this study were small and should be interpreted with caution.

A limitation of the NBQ-II is that most of the items are formulated in such a way that patients who agree with most of the statements are categorized as having a high level of barriers. However, this scoring scheme may result in response bias because some patients may have a tendency to answer on the positive side of a rating scale (42). This hypothesis is underscored by the responses to the three questions labelled fatalism, where patients seemed to report lower barrier scores. These items were the only ones that were formulated in such a way that patients who agreed with these statements were actually reporting low barrier scores.

Because the factor analysis of the NBQ-II did not produce the same factor structure as the previous reports of the BQ-II (13, 19), it is not possible to do a detailed comparison of all of the BQ-II scores with the data from the Norwegian sample. However, an evaluation of the total scores on the BQ-II found that the Norwegian patients reported higher total BQ-II scores (i.e. 2.2 ± 0.8) than cancer patients in the USA (i.e. 1.5 ± 0.73) (13) but about the same scores as a sample of Icelandic adults from the general population (i.e. 2.3 ± 0.78) (19). The reasons for these differences are not readily apparent and require evaluation in future research.

Overall, the factor solution selected as the 'best' showed that the NBQ-II has weaknesses that warrant further

validation. Except for the fatalism and immune system subscales, the variations in the magnitude of the item loadings together with some cross-loadings within the factors, suggests possible threats to the validity of the NBQ-II. Additional studies are needed to refine the items and to confirm the underlying factor structure of the questionnaire.

In conclusion, the NBQ-II demonstrated adequate psychometric properties and may be used to assess barriers to pain management. However, the instrument requires additional refinements. The results of the factor analysis suggest somewhat different dimensions than previous psychometric studies of the BQ-II. However, the dimensions identified in this study seem to be more in accord with those in the original BQ. The increased number of subscales in the NBQ-II, compared with the revised BQ-II, may increase the sensitivity of the instrument to identify specific barriers that affect pain management. In addition, it may be useful to shorten the questionnaire by removing the duplicate items. A shorter instrument could be used more easily in clinical practice to assess patient barriers. This assessment could be used to guide interventions studies, as well as patient education initiatives to improve the management of cancer pain.

Acknowledgement

The authors would like to thank Anne-Marie Skogli, RN at the Norwegian Radium Hospital, Department of Radiation Oncology, Rikshospitalet Medical Center, Norway for her assistance with recruitment of patients.

Author contributions

BT Valeberg planned the project, assessed the data and wrote all the drafts and primary investigator. BR Hanestad read all the drafts and included in the writing process. P Klepstad contributed with the data assessment and was consultant in the writing process. C Miaskowski read all the drafts and included in the writing process. T Moum was mainly responsible for the quality of the statistics and read all the drafts. T Rustøen included in the planning of the project, read all the drafts and involved in the writing process.

Funding/Sponsorship

This study was supported by Oslo University College.

References

1 Cleeland CS. Barriers to the management of cancer pain. *Oncology* 1987; 1: 19–26.
2 Anderson KO, Richman HP, Hurley J. Cancer pain management among underserved minority outpatients. Perceived needs and barriers to optimal control. *Cancer* 2002; 94: 2295–304.
3 Wells N. Pain intensity and pain interference in hospitalized patients with cancer. *Oncol Nurs Forum* 2000; 27: 986.
4 Dar R, Beach CM, Barden PL, Cleeland CS. Cancer pain in the marital system: a study of patients and their spouses. *J Pain Symptom Manage* 1992; 7: 87–93.
5 Thomason TE, Cune JSM, Bernard SA, Winer EP, Tremont S, Lindley CM. Cancer pain survey: patient-centered issues in control. *J Pain Symptom Manage* 1998; 15: 275–84.
6 Riddell A, Fitch MI. Patients' knowledge of and attitudes toward the management of cancer pain. *Oncol Nurs Forum* 1997; 24: 1775–84.
7 Ersek M, Miller Kraybill B, Du Pen A. Factors hindering patients' use of medications for cancer pain. *Cancer Pract* 1999; 7: 226–32.
8 Ward SE, Goldberg N, Miller-McCauley V, Mueller C, Nolan A, Pawlik-Plank D, Robbins A, Stormoen D, Weissman DE. Patient-related barriers to management of cancer pain. *Pain* 1993; 52: 319–24.
9 Ward SE, Berry PE, Misiewicz H. Concerns about analgesics among patients and family caregivers in a hospice setting. *Res Nurs Health* 1996; 19: 205–11.
10 Ward S, Gatwood J. Concerns about reporting pain and using analgesics. A comparison of persons with and without cancer. *Cancer Nurs* 1994; 17: 200–6.
11 Paice JA, Toy C, Shott S. Barriers to cancer pain relief: fear of tolerance and addiction. *J Pain Symptom Manage* 1998; 16: 1259–65.
12 Coward DD, Wilkie DJ. Metastatic bone pain. Meanings associated with self-report and self-management decision making. *Cancer Nurs* 2000; 23: 101–8.
13 Gunnarsdottir S, Donovan HS, Serlin RC, Voge C, Ward S. Patient-related barriers to pain management: the Barriers Questionnaire II (BQ-II). *Pain* 2002; 99: 385–96.
14 Ward S, Hernandez L. Patient-related barriers to management of cancer pain in Purerto Rico. *Pain* 1994; 58: 233–8.
15 Lin CC, Ward SE. Patient-related barriers to cancer pain management in Taiwan. *Cancer Nurs* 1995; 18: 16–22.
16 Hawkins R. The role of the patients in the management of postsurgical pain. *Psychol Health* 1997; 12: 565–77.
17 Brescia FJ, Portenoy RK, Ryan M, Krasnoff L, Gray G. Pain, opioid use, and survival in hospitalized patients with advanced cancer. *J Clin Oncol* 1992; 10: 140–55.
18 Breitbart W, Passik S, McDonald MV, Rosenfeld B, Smith M, Kaim M, Funesti-Esch J. Patient-related barriers to pain management in ambulatory AIDS patients. *Pain* 1998; 76: 9–16.
19 Gunnarsdottir S, Serlin RC, Ward S. Patient-related barriers to pain management: the Icelandic Barriers Questionnaire II. *J Pain Symptom Manage* 2005; 29: 273–85.
20 Chung T, French P, Chan S. Patient-related barriers to cancer pain management in a palliative care setting in Hong Kong. *Cancer Nurs* 1999; 22: 196–203.
21 Wills BSH, Wotton YSY. Concerns and misconceptions abourt pain among Hong Kong Chinese patients with cancer. *Cancer Nurs* 1999; 22: 408–13.
22 Potter VT, Wiseman CE, Dunn SM, Boyle FM. Patients barriers to optimal cancer pain control. *Psychooncology* 2003; 12: 153–60.

23 Vainio A. Use of morphine and other opioids in the Nordic countries. *Acta Oncol* 1998; 37: 743–8.
24 Valeberg BT, Rustoen T, Bjordal K, Hanestad BR, Paul S, Miaskowski C. Self-reported prevalence, etiology, and characteristics of pain in oncology outpatients. *Eur J Pain* 2008; 12: 582–90.
25 Schag CC, Heinrich RL, Gannz PA. Karnofsky Performance Status revisited: reliability, validity, and guidelines. *J Clin Oncol* 1984; 2: 187–93.
26 Karnofsky D, Burchenal J. *The Clinical Evaluation of Chemotherapeutic Agents in Cancer*. 1949, Columbia University Press, New York.
27 Twycross R, Lack S. *Symptom Control in Advanced Cancer: Pain Relief*. 1984, Raven Pitman, London.
28 Diekmann JM, Engber D, Wasem R. Cancer pain control: one state's experience. *Nurs Forum* 1989; 16: 219–23.
29 Arathuzik D. Pain experience for metastatic breast cancer patients. Unravelling the mystery. *Cancer Nurs* 1991; 14: 41–8.
30 Jones WL, Rimer BK, Levy MH, Kinman JL. Cancer patients' knowledge, beliefs, and behavior regarding pain control regimens: implications for education programs. *Patient Educ Couns* 1984; 5: 159–64.
31 Levin D, Cleeland C, Dar R. Public attitudes towards cancer pain. *Cancer* 1985; 56: 2337–9.
32 McCaffery M, Beebe A. *Pain: Clinical Manual for Nursing Practice*. 1989, Mosby, St. Louis, MO.
33 Brislin RN. *The Wording and Translation of Research Instruments*. 1986, Sage Publications, Beverly Hills, CA.
34 Daut RL, Cleeland CS, Flanery RC. Development of the Wisconsin Brief Pain Questionnaire to assess pain in cancer and other diseases. *Pain* 1983; 17: 197–210.
35 Klepstad P, Loge JH, Borchgrevink PC, Mendoza TR, Cleeland CS, Kaasa S. The Norwegian Brief Pain Inventory Questionnaire: translation and validation in cancer pain patients. *J Pain Symptom Manage* 2002; 24: 517–25.
36 Larue F, Colleau SM, Brasseur L, Cleeland CS. Multicentre study of cancer pain and its treatment in France. *BMJ* 1995; 310: 1034–7.
37 Feyers P, Hays R. *Assessing Quality of Life in Clinical Trials*. 2005, 2nd edn. Oxford University Press Inc., New York.
38 Ward S, Carlson-Dakes K, Hughes S, Kwekkeboom K, Donovan H. The impact on quality of life of patient-related barriers to pain management. *Res Nurs Health* 1998; 21: 405–13.
39 Wang K, Ho S, Ger L, Wang J, Cherng C, Lin C. Patient barriers to cancer pain management: from the viewpoint of the cancer patients receiving analgesics in a teaching hospital of Taiwan. *Acta Anaesthesiol Sin* 1997; 35: 201–8.
40 Berry PE, Ward SE. Barriers to pain management in hospice: a study of family caregivers. *Hosp J* 1995; 10: 19–33.
41 Potter J, Higginson IJ. Pain experienced by lung cancer patients: a review of prevalence, causes and pathophysiology. *Lung Cancer* 2004; 43: 247–57.
42 van Herk H, Poortinga YH, Verhallen TMM. Response styles in rating scales: evidence of method bias in data from six EU countries. *J Cross Cult Psychol* 2004; 35: 346–60.