
ELSEVIER
Volume 72, Issue 3, June 2011
ISSN 0169-5002
lungcancer
An international journal
for lung cancer and other
thoracic malignancies
AIOT
International Lung Cancer Consortium
etop

Lung Cancer 72 (2011) 384–390

Contents lists available at ScienceDirect

Lung Cancer

journal homepage: www.elsevier.com/locate/lungcan

Illness perceptions and quality of life in Japanese and Dutch patients with non-small-cell lung cancer

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ARTICLE INFO

Article history:
Received 22 June 2010
Received in revised form 31 August 2010
Accepted 14 September 2010

Keywords:
Non-small-cell lung cancer
Psychosocial research
Quality of life
Illness perceptions
Cross-cultural comparison

ABSTRACT

This study examined quality of life (QOL) and illness perceptions in Dutch and Japanese patients with non-small-cell lung cancer, thereby extending the body of knowledge on cultural differences and psychosocial aspects of this illness.

24 Dutch and 22 Japanese patients with non-small-cell lung cancer filled out questionnaires on three occasions: immediately before chemotherapy, 1 week later, and 8 weeks after the initial chemotherapy. The European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30) assessed QOL, and the Brief Illness Perception Questionnaire (B-IPQ) illness perceptions.

Scores on several QOL measures indicated (a) major impact of first chemotherapy sessions, and (b) some tendency to returning to baseline measures at 8 weeks. Differences between Japanese and Dutch samples were found on five EORTC QLQ-C30 dimensions: global health status, emotional functioning, social functioning, constipation, and financial difficulties, with the Dutch patients reporting more favorable scores. Regarding illness perceptions, Japanese patients had higher means on perceived treatment control and personal control, expressing a higher sense of belief in the success of medical treatment than Dutch patients.

In both Japanese and Dutch patients, impact of chemotherapy on QOL was evident. Some differences in illness perceptions and QOL between the two samples were observed, with implications for integral medical management. Both samples reported illness perceptions that reflect the major consequences of non-small-cell lung cancer. Incorporating symptom reports, illness perceptions, and QOL into medical management may have positive consequences for patients with non-small-cell lung cancer.

1. Introduction

Behavioural aspects of lung cancer are increasingly being studied. In this journal, psychosocial aspects of lung cancer have been reviewed by Carlsen et al. [1], where the authors concluded that major psychosocial problems are highly prevalent, and that these

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doi:10.1016/j.lungcan.2010.09.010

problems can be reduced to some degree by psychosocial interventions. Graves et al. [2] reported very high levels of distress in a large sample of patients with lung cancer, as well as a fairly large interest among those patients in receiving help with the distress and/or symptoms. Recently, papers have been published on psychometrics of measures of quality of life, pain, and denial in the area of lung cancer [3–6].

Quality of life is a concept that traditionally has been used in oncology to cover the functional effects of cancer and its treatment, as perceived by the patient. The number of publications on "quality of life AND lung cancer" (i.e., 3375 on 28 August 2010) reflects the quite impressive body of knowledge that is available. More recent studies on behavioural aspects of lung cancer, however, tend to go beyond the concept of quality of life. Modern theory and their clinical applications in psychology as applied to medicine focus on self-management and self-regulation. The Self-Regulation Model (SRM), developed by Leventhal et al. [7] encompasses illness perceptions and coping as determinants of quality of life. In essence, the SRM maintains that persons/patients respond to a threat or an illness by forming perceptions about that threat or illness, as well as a coping plan to deal with the consequences of the threat or illness. Illness perceptions can be categorized into empirically supported dimensions: *identity* (i.e., the complaints a patient attributes to his/her illness, such as fatigue, shortness of breath), *consequences* (i.e., consequences on the patient's life; the way others see the patient; difficulties for those close to the patient), *causes* (i.e., stress; weather; air pollution), *cure/control* (separated into personal control, and treatment control, i.e., chemotherapy; surgery; complementary medication; prayer), *timeline* (i.e., acute versus chronic illness versus cyclical illness; curable versus incurable, etc.) [8]. Recently, *coherence* (i.e., the degree to which the patient feels she/he can make sense of the threat or illness) and *emotional consequences* (i.e., distress; anxiety; depression) have been added as additional dimensions [9].

Illness perceptions can be assessed with standardized questionnaires (e.g., IPQ [8], IPQ-R [9], and B-IPQ [10]) and/or drawings [11]). In a recent meta-analysis of research on illness perceptions it was shown how illness perceptions predict outcomes in various categories of chronic physical disorders [12]. The first intervention studies applied cognitive-behavioural methods to elicit and change illness perceptions, and demonstrated the effectiveness of this approach in producing positive behavioural and psychological outcomes in patients with a myocardial infarction [13], pain [14] or SLE [15].

In lung cancer, illness perceptions have been examined only recently. A 26 August 2010 literature search in PubMed on "illness perceptions AND lung cancer" identified 38 references, 15 of which represent empirical studies on illness perceptions proper [3,16–29]). Excluded were papers that did not report empirical data on the topic or that reported on views of health care providers about living with lung cancer. Papers not in English were also excluded. A summary of the15 studies on illness perceptions in patients with non-small-cell lung cancer is presented in Table 1.

Sample sizes vary between 9 and 170 patients, with eight studies combining patients with small-cell lung cancer and non-small-cell lung cancer. About half of the studies have a cross-sectional design, the others have a prospective design. Qualitative methods (i.e., interviews) were the dominant method with which data were collected. Findings show a wide range of emotional and cognitive consequences in the patients. Over time, patients tend to report less perceived control and more emotional worries. Finding meaning in the illness, its treatment, its outcome, and relationships between the patient and loved ones and health care providers were other themes.

There is evidence that illness perceptions and quality of life are influenced by cultural background, and Dein, among others, highlighted the cultural determinants of symptom perception and symptom attributions [30,31]. However, in an earlier study we found that Japanese and Dutch patients with various types of cancer (breast, colon, lung, and prostate) responded in a quite similar way to a fairly large set of quality of life questionnaires; differences were found mainly on the social dimension of quality of life [32].

The primary aim of our paper, therefore, was to explore illness perceptions in Dutch and Japanese patients with non-small-cell lung cancer (NSCLC), and to examine differences in illness perceptions between Japanese and Dutch patients. Secondly, we examined potential differences between Japanese and Dutch non-small-cell cancer patients in their self-reported quality of life scores. These two aims follow from our earlier collaborative research project on QOL in Japanese and Dutch patients [32], and include the subject of illness perceptions in the current study. The longitudinal design in the current study allowed the examination of changes in QOL over time in both patient groups.

2. Patients and methods

This prospective study was performed in 22 Japanese and 24 Dutch patients, whose medical data are reported in Results. Patients provided informed consent, after having been identified during clinical meetings of the treating physicians, and having received a pathologically confirmed diagnosis of non-small-cell lung carcinoma. Clinical data were collected by nurse-practitioners and research associates. Patients were informed that the purpose of the study was to explore reactions of patients with non-small-cell lung cancer to their illness and its treatment. Patients in both the Netherlands and in Japan were informed about their diagnosis by their physician. Patients with evident psychiatric illness, according to the physicians treating the patient, and patients unable to fill out the questionnaires due to low health literacy were excluded. Their NSCLC was in stage 3 or 4.

Patients filled out a questionnaire booklet before their first chemotherapy cycle, 1 week after their first chemotherapy cycle, and 8 weeks after the start of chemotherapy. The booklets contained several questionnaires, including the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30; [33]) and the Brief Illness Perception Questionnaire (B-IPQ [10]). In addition, several clinical data were collected.

The EORTC QLQ-C30 is a quality of life questionnaire containing 30 questions organized into a number of scales, including a global health status scale, 5 functional scales, and 9 symptom scales. The scores are expressed on a 0–100 scale. For the general health and functional scales, higher scores indicate better general health and functioning. For the symptom scales, higher scores indicate worse symptoms. The Japanese version of the EORTC QLQ-C30 was developed following rigorous EORTC translation procedures and has been validated [32–37].

The B-IPQ consists of 8 questions that measure 8 dimensions of illness perception (see Introduction) on a scale of 1–10. The Japanese version was adapted from www.uib.no/ipq, Japanese B-IPQ.

Physicians rated the Karnofsky scores of the patients before the first chemotherapy cycle.

Statistical analyses pertain to comparing the two samples within and between three assessment times. Student *t*-tests and repeated measures analysis of variance (ANOVAs) were applied.

The research project was approved by the Medical Ethical Committee of the Leiden University Medical Centre, and by the Internal Review Board of the Saitama International Medical Centre, Hidaka City, Japan. The study protocol was used in both locations in an identical fashion.

Table 1
Summary of 15 studies on illness perceptions in patients with non-small-cell lung cancer and small cell lung cancer.

First author Year of publication Country of origin Reference	Number of patients; Type of cancer[a]	Study design	Major results
Browning 2009 USA [3]	52 Mixed	Prospective 1-group descriptive longitudinal; IPQ-R at baseline, 2–4 weeks, 6 months	'Identity' and 'timeline' increased over time; 'personal control' and 'treatment control' decreased over time
Buchanan 2010 UK [16]	170 Mixed	Prospective observational	Increased worry in patients is associated with patient perceptions of increased anxiety in their social network
Chapple 2004 UK [17]	45 Mixed	Qualitative: narrative interviews	Patients experienced high levels of stigma because of the association of lung cancer with smoking. Concealing the illness was a coping strategy that patients used
Dias 2006 Brazil [18]	11 Mixed	Qualitative: exploratory interviews	Patients resented the glorious image of smoking cigarettes. Cancer outcome was attributed to other respiratory illnesses, and to mystical, religious factors
Downe-Wamboldt 2006 Canada [19]	85 NSCLC	Cross-sectional; interview data from patients and family members	Perception of illness manageability determines quality of life mainly. Considerable concordance in illness meaning in patients and their family members
Hay 2007 USA [20]	122 NSCLC	Prospective observational	Cancer related risk perception predicted post-cancer diagnosis smoking patterns
Lai 2007 Hong Kong [21]	11 NSCLC	Qualitative: in-depth interviews	Characteristics of dyspnea, dyspnea impact, dyspnea managing strategies, and the nurses' role in dyspnea management were the major themes in the patients. Patients reported dissatisfaction with health care practitioners' role in assisting with dyspnea
Leveälahti 2007 Sweden [22]	37 Mixed	Narrative analysis of qualitative interviews	Symptoms leading to diagnosis varied widely. Biographical disruption quite often associated with allowing for integration of past and present aspects of patients' lives (biographical continuity)
Lobchuk 2008 Canada [23]	100 Mixed	Cross-sectional study on attributions for lung cancer in patients and their partners	Patients and support persons ascribed more negative attributions toward oneself, and more positive attributions towards their partner
Porter 2002 USA [24]	30 Mixed	Interviews on concordance between patients and primary family care givers regarding their perceptions of patients' self efficacy for managing pain and other symptoms	Considerable variability in degree of concordance. A poorer quality of relationship between caregiver and patient, high levels of patient-rated symptoms, and high levels of caregiver strain were associated with caregivers overestimating patient self-efficacy
Salander 2007 Sweden [25]	23	Repeated interviews throughout the course of the disease	Smoking was not seen as the prime cause of cancer in the patients
Sanders 2010 USA [26]	109 Mixed	Cross-sectional study on prevalence and correlates of intensity of supportive care needs	High prevalence of unmet needs in the physical, daily living and psychological domain. Higher levels of supportive care needs are associated with more difficulties regarding the illness
Sarna 2005 USA [27]	217 NSCLC	Qualitative: in-person interviews	Serious disruptions in psychological and social aspects of quality of life. Negative meaning of illness, depressed mood, distress, family distress, sexual problems were highly prevalent
Sharf 2005 USA [28]	9 NSCLC	Qualitative: in-depth interviews	Patients refusing physicians' recommendations emphasized self-efficacy, minimizing threat, distrust of medical authority
Yardley UK 2001 [29]	13 Mixed	Qualitative: semi-structured interviews	Communication, family/community issues, reaction to diagnosis, views on treatment and prognosis, and suggested improvements were the five themes identified

[a] Non-small-cell lung cancer (NSCLC) and small cell lung cancer = mixed.

3. Results

Respondents consisted of 22 Japanese patients (17 males, 5 females; mean age and standard deviation (SD): 63.0 ± 6.64 years) and 24 Dutch patients (16 males, 8 females; mean age and SD: 63.3 ± 9.69 years). Table 2 summarizes clinical data for both samples, including type of cancer, TNM stage of cancer, and Karnofsky ratings by physicians. The preponderance of male patients is worth noting, and is common in lung cancer studies. As the distribution of males/females is virtually identical ($\chi^2 = 0.637$; $p = 0.425$), differences observed between the two samples in the outcomes being assessed cannot be attributed to gender differences. Differences

Table 2
Summary of clinical data of Japanese ($n = 22$) and Dutch ($n = 24$) patients.

Variable	Categories	Japan	The Netherlands
Type of cancer	Adeno	17 (77.3%)	11 (45.8%)
	Squamous	5 (22.7%)	13 (54.2%)
TNM stage of cancer	IIIA	5 (22.6)	7 (29.2)
	IIIB	7 (31.8)	7 (29.2)
	IV	10 (45.5)	10 (41.6)
Karnofsky score by doctor (mean ± SD)	0 = deceased 100 = no complaints	87.37 ± 12.40	91.43 ± 8.54

for age and Karnofsky score were tested by means of *t*-tests. The resulting *p*-values were 0.907 and 0.241, respectively, indicating no significant differences. Type of cancer differed for Japanese and Dutch patients ($\chi^2 = 4.697$; $p = 0.030$), with relatively more adeno cancer among the Japanese patients, and more squamous cell cancer among the Dutch patients. For stage of cancer no differences were found ($\chi^2 = 0.708$; $p = 0.40$).

Chemotherapy protocols were identical in both countries and followed international guidelines [38]. All Japanese patients underwent platinum based therapy except 1 patient who had a platinum allergy reaction and 2 patients who received newer biological agents. In the Dutch sample it is unknown how many patients received other treatments than platinum base therapy.

Table 3 reports the means and standard deviations (SDs) of the Japanese and Dutch patients on the subscales of the EORTC QLQ-C30 for the three assessment points. This table also displays the means and SDs of a reference group of non-small-cell lung cancer patients, reported in the 2008 reference value manual of the EORTC QLQ-C30 with the lists and the scale and item value for a great variety of cancer types, among which NSCLC [34]. As can be seen, for most of the subscales the means of the Japanese and Dutch patients are relatively close to those of the reference group. However, in the Dutch patients 12 of the 18 means on the general health and functional scales are more favorable than those of the reference group, compared to 3 out of 18 in the Japanese patients. A similar result was obtained for the symptom scales: 17 out of 27 means of the Dutch patients indicated less severe symptoms than the reference group, compared to 12 out of 27 in the Japanese patients. This difference is statistically significant ($\chi^2 = 4.455$; df = 1, $p < 0.05$).

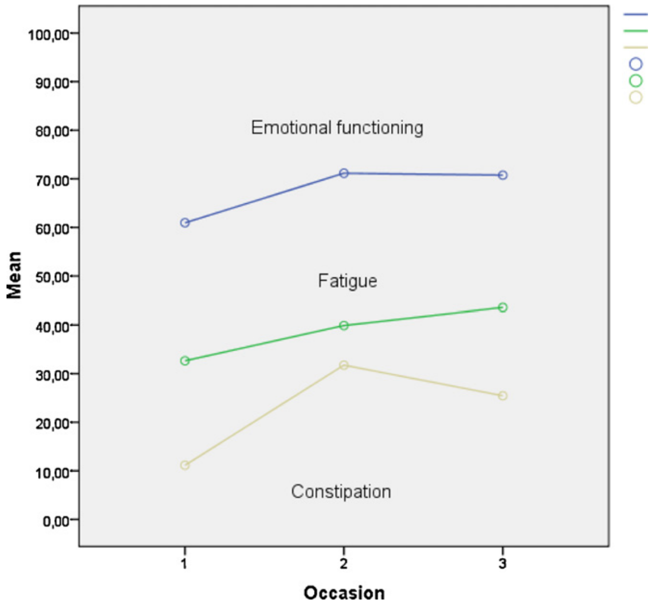

Fig. 1. Mean values of emotional functioning, fatigue, and constipation for the Japanese and Dutch patients combined, on three measurement occasions.

Repeated measures ANOVAs using lower-bound sphericity estimates were run on the Country by Occasion data of the 15 EORTC scales. As 8 Japanese patients had missing data on one or two occasions, the results are based on 14 Japanese and 24 Dutch patients. Significant differences between the Japanese and the Dutch patients were found on global health status ($p = 0.008$), emotional functioning ($p = 0.005$), social functioning ($p = 0.001$), constipation ($p = 0.012$), and financial difficulties ($p < 0.001$), with the Dutch patients having significantly more favorable average scores on all five variables (Fig. 1).

Differences over time were observed for physical functioning, ($p = 0.027$), emotional functioning ($p = 0.030$), fatigue ($p = 0.038$), constipation ($p = 0.007$), and financial difficulties ($p = 0.017$). For physical functioning, and financial difficulties, the time effect reflected an interaction between country and time (see Fig. 2 and below). For emotional functioning, fatigue, and constipation, the average scores on the first measurements were significantly different from the means on the following two occasions. This shows that symptoms of fatigue and constipation increase after chemotherapy. At the same time, emotional functioning improved

Table 3
Means and SDs of reference standard, and Japanese and Dutch patients on the EORTC-QLQ-C30 subscales, at three occasions.

EORTC QLQ C30 subscale	Reference standard[a]	Japan Occasion			The Netherlands Occasion		
		1 $n = 22$	2	3	1 $n = 24$	2	3
Global health status[b]	58.8 (22.5)	50.8 (22.4)	50.0 (18.4)	51.8 (30.7)	71.2 (24.2)	66.3 (20.7)	61.6 (23.8)
Physical functioning[b]	78.4 (19.3)	78.0 (16.2)	77.0 (17.9)	76.9 (17.6)	86.9 (14.1)	80.0 (17.9)	71.4 (17.5)
Role functioning[b]	60.7 (33.1)	62.9 (32.9)	57.9 (24.5)	60.0 (28.0)	76.4 (25.5)	68.8 (25.2)	56.3 (27.3)
Emotional functioning[b]	68.1 (24.2)	61.1 (25.7)	69.0 (17.5)	70.0 (11.9)	60.8 (28.3)	73.3 (27.3)	71.5 (25.3)
Cognitive functioning[b]	84.0 (21.1)	71.2 (27.3)	77.0 (16.2)	76.7 (21.6)	81.9 (21.4)	83.3 (20.9)	83.3 (23.1)
Social functioning[b]	73.6 (28.9)	47.7 (40.6)	59.5 (31.0)	54.8 (31.6)	86.1 (21.8)	83.3 (24.6)	75.7 (28.2)
Fatigue[c]	40.4 (27.0)	38.4 (25.6)	38.1 (22.4)	42.2 (20.7)	26.9 (23.4)	41.7 (21.8)	44.9 (27.3)
Nausea and vomiting[c]	9.7 (18.3)	4.5 (10.5)	18.3 (28.3)	8.9 (13.9)	4.9 (12.5)	15.3 (26.4)	20.1 (27.4)
Pain[c]	29.7 (30.3)	33.3 (29.5)	30.2 (25.1)	17.8 (20.4)	17.4 (24.3)	18.1 (25.0)	15.3 (25.0)
Dyspnea[c]	38.5 (31.7)	24.2 (23.4)	14.3 (16.9)	24.4 (19.8)	30.6 (32.5)	29.2 (26.6)	36.1 (32.5)
Insomnia[c]	32.4 (32.7)	37.6 (34.6)	42.9 (31.9)	22.2 (20.6)	26.1 (31.7)	27.8 (32.1)	29.2 (31.6)
Appetite loss[c]	27.9 (33.5)	22.7 (31.5)	46.0 (37.2)	33.3 (41.8)	23.6 (37.4)	27.8 (36.3)	29.2 (33.1)
Constipation[c]	17.4 (27.9)	16.7 (24.7)	41.3 (33.2)	35.6 (29.5)	5.6 (16.1)	22.2 (27.2)	15.3 (26.0)
Diarrhoea[c]	6.8 (17.4)	15.2 (24.6)	3.2 (10.0)	8.9 (15.3)	9.7 (18.3)	6.9 (13.8)	13.9 (25.9)
Financial difficulties[c]	12.8 (25.8)	54.5 (31.8)	36.5 (34.8)	33.3 (29.2)	6.9 (17.0)	8.3 (22.5)	5.6 (16.1)

[a] From the EORTC QLQ-C30 reference value manual [34, p. 203].

[b] Higher scores indicate better health and functioning.

[c] Higher scores denote more pain and symptoms.

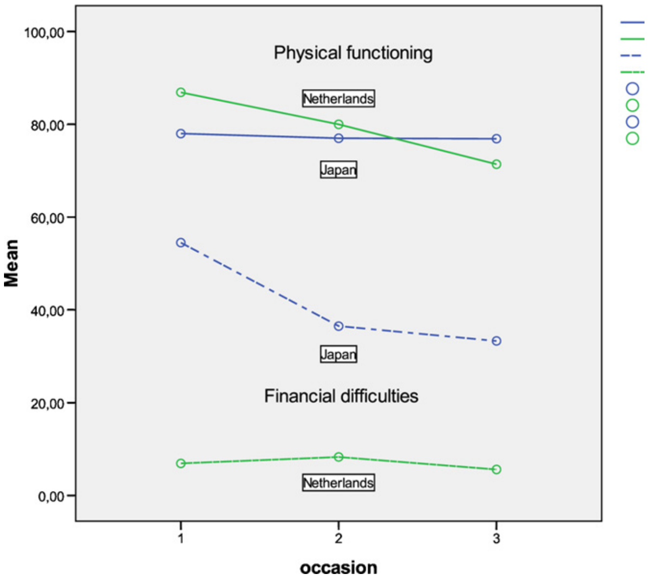

Fig. 2. Interaction of country and occasion for physical functioning and financial difficulties.

as well. It appears that, after chemotherapy, the patients adjusted somewhat to the emotional upset related to the diagnosis of lung cancer.

Interactions between country and time were found for physical functioning ($p = 0.034$) and financial difficulties ($p = 0.026$). These interactions are shown in Fig. 2. The significant interaction effect for physical functioning is probably due to the decrease of the Dutch patients on Occasion 3 ($p = 0.010$), which breaks the parallel time pattern of the two groups. The interaction on financial difficulties is reflects the lower means on Occasions 2 and 3 for the Japanese patients, while the Dutch patients had continuously low mean scores on all measurements.

Table 4 displays the means, SDs and standard errors of the means (SE) of the Japanese and the Dutch patients on the 8 dimensions of the B-IPQ. High means on consequences, timeline, and concern indicate that the patients were fully aware of the seriousness of their illness. *t*-Tests showed that Japanese patients perceived more personal control and more treatment control than did their Dutch counterparts ($p = 0.047$ in both cases). Dutch patients showed more variability on Personal control and coherence ($p = 0.022$ and $p = 0.003$, respectively). For the other IPQ-B dimensions the scores of both groups are remarkably similar.

4. Discussion

A major finding of this theory-driven, empirical study on 'illness perceptions' is the greater sense of psychological and medical control and impact that Japanese patients report compared to Dutch patients. On all B-IPQ subscales, the Japanese patients had higher means (although not significantly so, except in two cases). The significantly higher mean on treatment control of the Japanese patients seems to reflect the greater sense of trust in (bio)medical care for lung cancer, and possibly, in health care in general in Japan compared to the Netherlands [30]. Scores on the EORTC QLQ-C30 questionnaire showed a more or less similar pattern of impact of chemotherapy on QOL in both samples. Over the course of the chemotherapy sessions, scores on EORTC QLQ-C30 indicated significant impairment on most subscales immediately after the first course of chemotherapy, followed by a minor improvement on some subscales. Overall, the QOL impact was similar between the two samples.

The observation of some of the improvements in QOL-scores was confirmed during the (telephone) contacts the first, third and fifth author had with most patients to remind them to complete the questionnaires. Patients appeared relieved and almost happy that medical treatment had been initiated, and reported having high expectations of its effects. We would note that this expressed optimism sometimes appeared to reflect some degree of denial as well [6]. Our observations are consistent with those of Murray et al. where the different trajectories of (psychological) symptoms are described in patients with advanced lung cancer [39].

The Self Regulation Model provides the conceptual basis of our exploratory study [7,12]. Illness perceptions and outcomes such as quality of life figure prominently in that model. Together with the studies reviewed in Table 1, our work adds to the empirical tests of the model. The studies that are summarized in Table 1 illustrate that our study compares quite well with the extant literature: the number of patients, design and methods used to assess patient-reported outcomes are similar in a broad sense to the studies reviewed in Table 1.

Dutch patients reported a better quality of life than Japanese patients on the EORTC QLQ-C30 dimensions, and somewhat lower levels of symptomatology. This may reflect differences in response style in Dutch and Japanese culture. It may also reflect differences

Table 4
Means, standard deviations (SDs), and standard errors of the means (SE) of the scores of the Japanese and Dutch patients on the eight dimensions of the IPQ-B.

IPQ-B dimension	Japan		The Netherlands		*p*-Values	
	N	Mean ± SD SE	*N*	Mean ± SD SE	Differences between means*	Differences between SDs
Consequences	22	7.82 ± 2.938 0.626	24	7.50 ± 2.859 0.584	0.712	0.628
Time line	22	7.50 ± 2.304 0.491	23	6.13 ± 2.702 0.563	0.074	0.664
Personal control	20	5.75 ± 2.425 0.542	24	3.88 ± 3.603 0.736	0.047*	0.022*
Treatment control	20	8.30 ± 2.080 0.465	22	6.82 ± 2.594 0.553	0.047*	0.427
Identity	21	4.40 ± 3.113 0.679	23	3.70 ± 3.052 0.636	0.563	0.869
Concern	22	8.32 ± 2.147 0.458	24	7.83 ± 2.632 0.537	0.496	0.435
Coherence	22	6.77 ± 1.926 0.411	24	5.58 ± 3.450 0.704	0.153	0.003*
Emotional response	22	5.82 ± 3.065 0.653	24	5.21 ± 3.092 0.631	0.506	0.737

* $p < .05$.

in how health care providers and the health care system respond to patients' suffering.

The topic of cross-cultural comparisons, methodologies, patient response styles and physicians behaviour deserves a concise discussion. Culture determines how persons/patients respond to illness [31,40]. Gotay et al. reported on differences between Caucasian and Japanese respondents' attitudes to disclosing the diagnosis of 'cancer', and found that ". . . Japanese respondents expressing a personal preference to be told if they themselves were diagnosed with cancer, as did virtually all US respondents" (p. 665). The Japanese senior physicians involved in our study embraced western values regarding "telling the truth" to their patients about their diagnosis. In a previous paper they also demonstrated how socioeconomic factors impacted on cancer survivor's worries and QOL [41]. Further research into these issues clearly is warranted.

The two samples in our study were relatively small, and the follow-up period was relatively short. Future studies with larger sample sizes and longer follow-up periods are needed. Larger studies could also resolve the potential problem of limited statistical power in the current study.

Recent papers have discussed the effects of psychosocial interventions designed to improve the QOL of patients with non-small-cell lung cancer [26,42–44]. They have assessed supportive care needs [26,43], have used a rehabilitation format [42], or a group psychotherapy approach intended to give meaning to the illness [44]. Clearly, this type of research is in its infancy in patients with non-small-cell lung cancer. In other diagnostic cancer categories, researchers have addressed the issue of whether interventions aimed at influencing patient-reported outcomes translate into gains in longevity [45,46]. A recent paper demonstrated that patients who received early palliative care for metastatic non-small-cell lung cancer had less aggressive care at the end of life but longer survival [47]. Clearly these provocative findings require replication.

Recent research also points to the relevance and importance of the way in which health care services are organized in decisions that patients take regarding surgery for lung cancer [48], and in tracking the well-being and distress in family care givers of patients with lung cancer [49]. A biopsychosocial approach to patients with various types of lung cancer appears to hold promise for the future.

Conflict of interest

None declared.

Acknowledgements

The authors are very grateful to two anonymous reviewers for their constructive comments on an earlier version of the paper.

Supported by an unrestricted grant from Pfizer Japan Health Research Trust.

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