

RESEARCH ARTICLE

Psychometric Properties of the Persian Version of Satisfaction with Care EORTC-in-patsat32 Questionnaire among Iranian Cancer Patients

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Abstract

Background: Cancers impose an increasing burden on health of the populations and individuals, but little is known about cancer patient satisfaction with care. The aim of this study was to assess the psychometric properties of the Persian version of European Organisation for Research and Treatment of Cancer (EORTC) In-Patsat32, as a recently developed questionnaire to assess cancer patient satisfaction with care and information provided during hospital admission. **Materials and Methods:** Complying with EORTC protocols, the Persian version of Inpatsat32 was translated and piloted in a small group of patients, then applied to 380 cancer patients admitted to different oncology wards in Tehran. Validity (convergent, discriminant, and divergent) and reliability of the tool was assessed through using multitrait analysis, factor analysis, intraclass correlations, Chronbach's alpha and test-retest (on a sample of 70 patients). **Results:** Good acceptance and high sensitivity of the questionnaire with low floor and ceiling effects were recognized, indicating power of the instrument to detect differences between groups with heterogeneous levels of satisfaction. Multitrait scaling analyses supported the convergent validity of the majority of scales (correlation coefficient >0.4) and favorable discriminant validity (item own scale correlation >0.8). There was no correlation between In-patsat32 scales and the EORTC-C30, which measures different concepts, confirming divergent validity of the tool. Internal consistency for all domains was high ($\alpha > 0.70$) except for the hospital access score and the test-retest reliability was excellent ($r = 0.86-0.96$). There was a weak responsiveness to change except for nurses technical skills. Principle component analysis confirmed five domains with much improved internal consistency ($\alpha > 0.9$). **Conclusions:** The Persian version of the EORTC-in-patsat32 module is a reliable and valid instrument to measure cancer patient satisfaction with care received during their hospitalization period and can be utilized in clinical cancer research.

Keywords: EORTC-in-patsat32 - psychometric properties - cancer - patient satisfaction - validation

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Introduction

During the past decades, cancer incidence and mortality rates had an increasing trend especially in less developed and economically transitioning countries (Jemal et al., 2010), which indicate 8 million death from cancer in 2010, 38% more than the past two decades (Lozano et al., 2013). Due to the severity of illness and sophisticated treatments and complications, the quality of health services should be more considered and regularly measured. Good quality of health services influence patients satisfaction and their positive perception may lead to better adherence to care plans and satisfied patients are more likely to comply with treatment, which in turn affect treatment process (Asadi-Lari et al., 2004). This is why a more patient-centered approach health care has adopted

during past decades (Bredart et al., 1998).

Patient satisfaction can be defined as the result of an interaction between provider power, health care standards and patient expectations (Shiva et al., 2009), and it can be interpreted as the extent of an individual's experience compared with his or her expectations (Asadi-Lari et al., 2004). Patients' satisfaction is related to the extent to which general health care needs and condition-specific needs are met (Asadi-Lari et al., 2003). Satisfaction is an abstract and multidimensional concept, which is hard to be directly observed or measured, therefore should be evaluated using a variety of multi-item scales (Labarere et al., 2001). There is no consensus over a standard tool to measure satisfaction, thus the significance of results is often dubious (Asadi-Lari et al., 2003).

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Treatment of Cancer (EORTC) has developed a 30-item quality of life questionnaire (QLQ-C30) which is used as a core questionnaire, designed to evaluate health related quality of life in cancer patients, which is highly effective in outcome assessment in different designs including clinical trials and even in routine clinical practice (McLachlan et al., 1998; Asadi-Lari et al., 2004; Esmaili-Hesari et al., 2012). EORTC has also developed a range of supplementary modules to assess specific issues according to the type of treatment or disease site or even specific to dimensions such as fatigue (Arraras et al., 2009). EORTC has recently developed and validated cross-culturally a specific questionnaire to assess cancer in-patients' satisfaction of the quality of hospital-based cancer care (the EORTC-in-patsat32), which contains 32 items organized in eleven multi-item scales and three single items. There is also another tool to measure the satisfaction of cancer outpatients.

This study sought to assess the psychometric properties of the Persian version of EORTC-in-patsat32 questionnaire which was applied to a sample of Iranian cancer patients admitted to different oncology wards in Tehran and to compare the results with those of the previous validation studies conducted elsewhere.

Materials and Methods

A cross-sectional study was designed to assess satisfaction of cancer patients admitted to oncology wards in three public hospitals in Tehran (Haft-e-tir, Firuzgar and cancer institute) over a period of three months starting in February 2013 to validate the Persian version of the EORTC-in-patsat32 questionnaire. We administered the pack of questionnaires (including the core QLQ-C30, IN-PATSAT32 and a demographic tool) to adult hospitalized cancer patients if they had an expected survival of at least 3 months, were hospitalized for at least 3 days to the same ward, had no serious psychiatric disorders (psychosis, untreated major depression, severe personality disorder) and if they signed a formal consent form. Patients were required to understand Persian language sufficiently to self-complete the questionnaires, while surveyors helped the illiterates and patients who sought assistance.

Questionnaires

i) The EORTC-in-patsat32 is a 32-item questionnaire organized into eleven multi-item scales and three single items. Included are measures of: doctors' and nurses' technical skills (e.g. knowledge, experience, assessment of physical symptoms), interpersonal skills (e.g. interest, willingness to listen) information provision (about the disease, medical tests and treatment), and availability (e.g. time devoted to the patient); satisfaction with other hospital staff (receptionists, laboratory assistants, technicians); interpersonal skills and information provision; exchange of information within the care team; waiting-time; hospital access; hospital comfort; and overall satisfaction with care. This questionnaire was developed according to the guidelines and procedures recommended by the EORTC QL Group. It is based on interviews with patients for assessing their experience,

including current health and health-related quality of life and more specific issues related to expectations, perceptions, satisfaction with treatment and associated factors, as well as, interviews with oncology specialists and existing patient satisfaction questionnaires (Bredart et al., 2007). This questionnaire was developed and validated in a multicenter study across countries and cultures and translated into many languages (Arraras et al., 2012). The performance of validation studies for this instrument in each country individually is widely recommended by the EORTC Quality-of-Life Group. These studies help professionals to explore whether the questionnaires have a good psychometric functioning for different groups of patients in each country and to compare the expected values in different cultures (Fayers and Bottomley, 2002; Kavadas et al., 2004; Arora et al., 2010; Arraras et al., 2010; Obtel et al., 2012). A Likert scale of "poor", "fair", "good", "very good" or "excellent" response options is used to rate each aspect of care. This type of response scale has been shown to have methodological advantages over other types of response scales. All scores are linearly transformed to a 0-100 scale, where a higher score reflects a higher level of satisfaction (Bredart et al., 2005a).

Forward-backward translation was conducted complying the tough standards of the EORTC which was reported to the headquarter regularly to seek their advice on translation process. After obtaining a formal permission, a pilot study was performed on 12 cancer patients through deep interviews to investigate the understandability, readability and whether the questions are upsetting and unacceptable. In the pilot study patients were requested to advise on any further amendments, addition or deletion of the questions.

ii) The EORTC QLQ-C30, as the core of all EORTC quality of life tools contains subscales and single items addressing functional aspects of HRQL and symptoms that commonly occur in patients suffering from cancer. The EORTC QLQ-C30 is a 30-item questionnaire composed of five multi-item functional subscales: physical, role, emotional, social and cognitive functioning; three multi-item symptom scales, which measure fatigue, pain and emesis; global health/quality of life subscale; and six single items to assess financial impact and symptoms such as dyspnoea, sleep disturbance, appetite, diarrhea and constipation. Higher scores represent better function or higher levels of symptoms. The psychosocial subscales of the QLQ-C30 are defined as those measuring role function, social function, cognitive function, emotional function and global/overall quality of life (Osoba et al., 1997).

iii) Demographic questionnaire, which was developed specifically for the purpose of this study, to record patients' demographic, socio-economic, and clinical data.

Patients sample

Our study data collection was performed during three months, using a pack of questionnaires, comprising care satisfaction items and questions on patients' quality of life, which were distributed among cancer patients who had been hospitalized either for surgery or chemotherapy in Tehran educational hospitals for at least 3 days. The sample size was calculated according to the number of

items of the main questionnaire (in-patsat), which made the total sample to 380 patients, who were approached consecutively during February to May 2013. The logistics of data collection were ensured by a team (comprised of 4 senior nurses) specifically dedicated to the project who explained the survey to the consented participants. All patients provided written informed consent before participating in the study. Patients were asked to complete the questionnaire anonymously and to return it to the study colleagues. And they were being assured that their reporting about weak levels of satisfaction would not negatively affect the ongoing care provision to them. Four hundred patients meeting the eligibility criteria were recruited from collaborating hospitals in Tehran. Of these, 380 (95%) patients completed and returned the questionnaires. Respondents and non-respondents did not differ significantly in terms of age, gender, education level or time since diagnosis. However patients in advanced stages of disease and with severe pain were not usually willing to attend the study. Responses provided to the questionnaires were analysed using the SPSS programme, version 18.0 (Windows).

Statistical analysis

To test of the sensitivity of the questionnaire, we determined the distribution of the patients' answers. According to the scoring protocol of EORTC scores were transformed from 0 to 100 (Scott et al., 2008), where 0 indicates low satisfaction and 100 stands for the highest satisfaction. Floor and ceiling effects for each dimension were calculated according to the percentage of subjects presenting the maximum and minimum scores respectively in that dimension. The low measure of floor effect represents the instrument's capacity to evaluate and to discriminate patients with higher level of expectations from those with lower levels of satisfaction. The frequency of ceiling effect found in each scale represents the possibility of the instrument sensitivity to verify differences among the patients with higher level of reported satisfaction.

A number of analyses were used to evaluate the validity of the subscales of the EORTC in-patsat32. In the first step, we used multitrait scaling (a correlation matrix of the eleven scales of the EORTC in-patsat32 and its items) to appraise item convergent and discriminant

validity. Convergent validity is confirmed if the correlation between each item and its own scale are more than 0.4, which indicates that the item and the whole subscale contribute to the same concept. Discriminant validity can be considered favorably if the correlation of each item and its own scale are higher than its correlation with other scales (comprising different concepts).

In the second approach, divergent validity was checked by assessing the relationship between the IN-PATSAT32 and the core QLQ-C30 scales, where patient satisfaction and quality of life are supposed to assess distinct concepts; therefore their scales and items should evidence lower correlation (Pearson's $r < 0.30$).

Construct validity, as the third step, was evaluated by using confirmatory factor analysis (CFA) with varimax rotation method to investigate the structure underlying the relationships among the items of the questionnaire. We entered 32 items of the questionnaire into principal component analysis (PCA) and then verified factors with eigenvalues greater than or equal to 1.

To estimate the reliability of the under study instrument scales and items, we examined data set internal consistency reliability and test-retest reliability. Cronbach's alpha coefficient was used to assess the internal consistency of the scales, an alpha coefficient greater than 0.70 was considered satisfactory. To assess the test-retest reliability of the EORTC In-Patsat32, a consecutive sample of 70 patients was recruited from one centre (Cancer Institute), who were approached two weeks after the first assessment, to complete the questionnaire for the second time.

For the purpose of measuring responsiveness, effect size was calculated through standardized response mean (SRM), to determine the clinical importance of changes over time, by calculating the changes of mean scores divided by standard deviation (SD), where 0.2-0.5 is called a weak change, 0.5-0.8 a moderate change and changes over 0.8 are strong (Ribera et al., 2006). Compliance with data collection was also monitored according to standard EORTC procedures. The statistical software used for all analyses was SPSS version 18.0

Results

The study population included 380 patients with a diverse age span ranging from 18 to 92 years old (mean:

Table 1. Quality of Life Scores According to EORTC-in-patsat32

In-patsat32 Scales:	Scale name	Mean	S.D.	Floor effect: n (%)	Ceiling effect: n (%)
Doctors':	1 technical skills	67.17	27.51	9 (2.4%)	92 (24.2%)
	2 interpersonal skills	58.61	30	22 (5.8%)	70 (18.3%)
	3 information provision	54.17	28.23	18 (4.7%)	39 (10.2%)
	4 availability	58.11	29.19	26 (6.8%)	69 (18.1%)
Nurses':	5 technical skills	65.85	26.27	2 (0.5%)	90 (23.6%)
	6 interpersonal skills	61.62	26.41	4 (1%)	63 (16.5%)
	7 information provision	49.27	30.25	44 (11.5%)	39 (10.2%)
	8 availability	58.12	29.56	19 (5%)	72 (18.8%)
Other areas:	9 Other hospital staff interpersonal skills and information provision	59.03	25.7	4 (1%)	53 (13.9%)
	10 Waiting time	57.75	28.57	22 (5.8%)	57 (14.9%)
	11 Hospital access	52.44	28.34	17 (4.5%)	54 (14.1%)
	Q23 Exchange of information	58.97	28.08	23 (6%)	74 (19.4%)
	Q31 Comfort	54.02	30.78	39 (10.2%)	74 (19.4%)
	Q32 General satisfaction	59.43	28.66	25 (6.5%)	78 (20.4%)

Table 2. Factor Pattern and Eigenvalues of Persian Version of EORTC-Inpatsat32 Module by Varimax Rotation

Questions:	Scale1	Scale2	Scale3	Scale4	Scale5	Scale6	Scale7	Scale8	Scale9	Scale10	Scale11
1	0.889	0.611	0.45	0.646	0.565	0.377	0.193	0.381	0.505	0.435	0.374
2	0.922	0.695	0.515	0.685	0.546	0.39	0.271	0.461	0.588	0.535	0.379
3	0.91	0.734	0.531	0.703	0.492	0.354	0.27	0.367	0.571	0.461	0.402
4	0.739	0.902	0.576	0.657	0.562	0.48	0.287	0.474	0.612	0.494	0.421
5	0.734	0.933	0.637	0.691	0.568	0.52	0.342	0.543	0.619	0.502	0.367
6	0.632	0.922	0.715	0.684	0.52	0.526	0.316	0.461	0.584	0.409	0.362
7	0.567	0.616	0.846	0.594	0.344	0.337	0.345	0.281	0.43	0.326	0.293
8	0.459	0.612	0.922	0.548	0.263	0.336	0.46	0.285	0.413	0.277	0.173
9	0.491	0.662	0.91	0.585	0.329	0.395	0.38	0.3	0.474	0.299	0.239
10	0.634	0.621	0.607	0.869	0.431	0.4	0.409	0.342	0.466	0.464	0.333
11	0.718	0.711	0.566	0.920	0.488	0.424	0.256	0.434	0.597	0.544	0.493
12	0.518	0.55	0.296	0.460	0.878	0.616	0.324	0.582	0.499	0.381	0.334
13	0.555	0.523	0.296	0.497	0.926	0.693	0.387	0.669	0.582	0.452	0.446
14	0.535	0.57	0.324	0.477	0.917	0.78	0.464	0.685	0.583	0.460	0.421
15	0.45	0.607	0.382	0.446	0.79	0.88	0.51	0.707	0.548	0.418	0.372
16	0.21	0.41	0.329	0.292	0.522	0.869	0.59	0.602	0.336	0.301	0.061
17	0.448	0.446	0.315	0.439	0.695	852	0.481	0.723	0.505	0.379	0.327
18	0.186	0.24	0.381	0.272	0.304	0.493	0.895	0.404	0.17	0.251	0.120
19	0.216	0.296	0.381	0.289	0.426	0.575	0.948	0.508	0.267	0.347	0.146
20	0.304	0.389	0.453	0.369	0.437	0.518	0.942	0.525	0.313	0.387	0.171
21	0.368	0.448	0.27	0.347	0.578	0.688	0.496	0.933	0.48	0.478	0.275
22	0.468	0.536	0.308	0.455	0.726	0.743	0.476	0.918	0.619	0.529	0.392
23	0.545	0.542	0.406	0.555	0.531	0.481	0.326	0.489	0.478	0.651	0.55
24	0.53	0.535	0.361	0.549	0.568	0.535	0.307	0.577	0.849	0.594	0.45
25	0.569	0.6	0.458	0.562	0.515	0.446	0.196	0.487	0.889	0.621	0.535
26	0.564	0.599	0.472	0.503	0.533	0.426	0.227	0.509	0.865	0.646	0.578
27	0.537	0.539	0.363	0.53	0.482	0.415	0.305	0.535	0.595	0.931	0.572
28	0.479	0.431	0.283	0.529	0.404	0.37	0.173	0.484	0.507	0.951	0.531
29	0.306	0.303	0.175	0.347	0.302	0.173	0.138	0.266	0.44	0.426	0.871
30	0.465	0.436	0.318	0.474	0.48	0.334	0.134	0.348	0.579	0.491	0.842
31	0.288	0.266	0.129	0.385	0.378	0.322	0.195	0.351	0.427	0.491	0.432
32	0.531	0.51	0.26	0.49	0.591	0.483	0.266	0.573	0.574	0.44	0.61

*Multitrait scaling analysis was used to examine item convergent validity (item scale correlation >0.80) and item discriminant validity (item own scale correlation higher than the correlation with the other scales)

Table 3. Divergent Validity; Assessing the Relationship between the EORTC-in-patsat32 and the EORTC QLQ-C30 Scales by Correlation Coefficient

EORTC- C30 scales:	DTS	DIS	DIP	DAV	NTS	NIS	NIP	NAV	OTH	WAI	ACC
C30-physical functioning scale:	-0.03	-0.13*	-0.12*	-0.05	-0.02	-0.09*	-0.14*	-0.10*	0.07	0.05	0.03
C30-role functioning scale:	0	-0.06	-0.02	0.009	0.03	-0.03	-0.06	-0.06	0.06	-0.008	0.003
C30-emotional functioning scale:	-0.08	-0.16*	-0.12*	-0.16*	-0.10*	-0.09	-0.05	-0.11*	-0.11*	-0.10*	-0.12*
C30-cognitive functioning scale:	0.01	-0.06	-0.07	-0.04	0.03	-0.01	-0.04	-0.04	-0.03	-0.02	-0.08
C30-social functioning scale:	-0.01	-0.07	-0.03	-0.09	-0.04	-0.11*	0.03	-0.10*	-0.08	-0.09	-0.08
C30-measuring fatigue scale:	0.25*	0.31*	0.18*	0.23*	0.25*	0.24*	0.09	0.23*	0.21*	0.29*	0.17*
C30-measuring vomiting scale:	-0.06	-0.09	-0.06	0.05	-0.001	0.03	-0.05	-0.03	-0.006	-0.06	-0.004
C30-measuring pain scale:	0.09	-0.09	0.05	0.07	0.06	0.03	0.05	0.05	0.01	0.05	-0.03
C30-global health/QL scale:	-0.04	-0.03	0.03	0.02	0.06	0.04	0.06	0.08	0.12	0.01	-0.004

*Spearman Rho<0.30 shows each instrument evaluates distinct ideas. EORTC-in-patsat32 scales: DTS=doctors technical skills, DIS=doctors interpersonal skills, DIP=doctors information provision, DAV=doctors availability, NTS=nurses technical skills, NIS=nurses interpersonal skills, NIP=nurses information provision, NAV=nurses availability, OTH=other personal interpersonal skills and information provision, WAI=waiting time, ACC=access. All meaningful correlations (p-value<0.05) are flagged by an **

51.4, SD 16.4), of whom 52.9% were males and 80% were married. More than one third (37.2%) had diploma or university degree while 51% were illiterate or had only elementary school degree.

Of returned forms, all patients had completed the questionnaires with almost no missing data, which reveals the understandability of Persian version of the questionnaire. The distribution of scores indicated medium satisfactions in nearly all scales with a fairly large variability (standard deviation) in scores, which indicates high sensitivity of the questionnaire. There

was a low percentage of floor effect, which represents the percentage of patients reported lower score, and high percentage of ceiling effect in all dimensions (Table 1). Floor effect for all scales and single items was lower than 10% except for nursing information provision (11.5%) and comfort (10.2%), which indicates the capability of the questionnaire to discriminate the satisfaction of patients.

Multitrait scaling analysis (Table 2) shows a strong support for the convergent validity of majority of scales. To measure similar attributes, the correlation coefficient for all items with their own scales exceeded 0.8, which

Table 4. Factor Pattern and Eigenvalues of Persian Version of EORTC-inpatsat32 Module by Varimax Rotation

factor name	Items loaded in the factor	Factor loading	Eigenvalue	% variance
Satisfaction with nurses			14.55	45.4
	During your hospital stay, how would you rate nurses?			
	12 The way they carried out your physical examination (took your temperature, felt your pulse...)?	0.7		
	13 The way they handled your care (gave your medicines, performed injections...)?	0.74		
	14 The attention they paid to your physical comfort?	0.78		
	15 The interest they showed in you personally?	0.78		
	16 The comfort and support they gave you?	0.63		
	17 Their human qualities (politeness, respect, sensitivity, kindness, patience...)?	0.73		
	21 The time they devoted to you?	0.63		
	22 The time they devoted to you?	0.71		
Satisfaction with services & care organization			3.5	9.5
	During your hospital stay, how would you rate services & care organization?			
	23 The exchange of information between caregivers?	0.52		
	24 The kindness and helpfulness of the technical, reception, laboratory personnel?	0.62		
	25 The information provided on your admission to the hospital?	0.65		
	26 The information provided on your discharge from the hospital?	0.64		
	27 The waiting time for obtaining results of medical tests?	0.74		
	28 The speed of implementing medical tests and/or treatments?	0.71		
	29 The ease of access (parking, means of transport...)?	0.67		
	30 The ease of finding one's way to the different departments?	0.66		
	31 The environment of the building	0.6		
	32 How would you rate the care received	0.68		
Satisfaction with doctors			2.6	8.1
	During your hospital stay, how would you rate doctors?			
	1 Their knowledge and experience of your illness?	0.81		
	2 The treatment and medical follow-up they provided?	0.75		
	3 The attention they paid to your physical problems?	0.77		
	4 Their willingness to listen to all of your concerns?	0.6		
	5 The interest they showed in you personally?	0.6		
	6 The comfort and support they gave you?	0.51		
	10 The frequency of their visits/consultations?	0.64		
	11 The time they devoted to you during visits/consultations?	0.61		
Satisfaction with doctors' information provision			1.51	4.7
	During your hospital stay, how would you rate information provided by doctors?			
	7 The information they gave you about your illness?	0.51		
	8 The information they gave you about your medical tests?	0.75		
	9 The information they gave you about your treatment?	0.81		
Satisfaction with nurses' information provision			1.04	3.2
	During your hospital stay, how would you rate information provided by nurses?			
	18 The information they gave you about your medical tests?	0.85		
	19 The information they gave you about your care?	0.85		
	20 The information they gave you about your treatment?	0.83		

indicates strong convergent validity. In contrast, the intra-class correlation of each dimension was higher than all other items which represents discriminant property of the questionnaire.

The divergent validity was satisfactory because there was no correlation between EORTC In-Patsat32 module scales and the EORTC-C30 scales, which comprises items measuring different concepts (satisfaction and HRQL); all scales had weak correlation (Spearman rho<0.30) (Table 3).

Principle Component Analysis (PCA) resulted in five dimensions with an Eigenvalue of more than 1 (Table 4) which explained 71.1% of variance. The first dimension contains items 12-17 and 21-22 named satisfaction of nurses. Second dimension, includes questions 23-32 named satisfaction of services and care organization. The third dimension relates to satisfaction of doctors (questions 1-6, 10 and 11). The fourth component comprises questions 7 to 9, measuring satisfaction of information provided by doctors and the last, items 18 to 20, represents satisfaction of information provided by nurses.

Table 5. Reliability: Internal Consistency Reliability

	EORTC-in-patsat32 dimensions:	Questions: No. of items	Cronbach's alpha coefficient	
Doctors	1 Doctors' technical skills	3-Jan	3	0.897
	2 Interpersonal skills	6-Apr	3	0.915
	3 Information provision	9-Jul	3	0.873
	4 Availability	10,11	2	0.789
Nurses	5 Nurses' technical skills	14-Dec	3	0.884
	6 Interpersonal skills	15-17	3	0.835
	7 Information provision	18-20	3	0.921
	8 Availability	21,22	2	0.833
	9 Other hospital staff interpersonal skills and information provision	24-26	3	0.871
	10 Waiting time	27-28	3	0.84
	11 Hospital access	29,30	2	0.668
WHOLE scales		Jan-32	32	0.959
α for five dimension Computed for Persian version by explanatory factor analysis:				
	1	12-17 & 21,22	8	0.944
	2	23-32	10	0.929
	3	1-6 & 10,11	8	0.953
	4	9-Jul	3	0.937
	5	18-20	3	0.961

*hospital access internal consistency is below criteria ($\alpha \geq 0.7$).

Table 6. Reliability: Test-Retest Reliability, Paired T-test Value, Standardized Response Mean

In-patsat32 scales:	Name of the scale	Original test Mean(S.D)	Retest Mean(S.D)	Correlation coefficient	t (p-value)	SRM
	Doctors:					
1	Doctor's technical skills	75.0(25.6)	72.3(21.5)	0.877	1.86(0.06)	0.22
2	interpersonal skills	63.7(30.7)	65.8(23.3)	0.87	-1.08(0.28)	0.15
3	information provision	58.5(27.2)	59(23.5)	0.916	-0.38(0.70)	0.04
4	Availability	65(28.1)	66.7(23.2)	0.87	-1.13(0.26)	0.12
	Nurses:					
5	Nurses' technical skills	74.9(26.7)	69.1(21)	0.91	2.24(0.02)	0.56
6	interpersonal skills	63.4(26.2)	62.3(23.8)	0.936	1(0.32)	0.12
7	information provision	48.3(32.5)	49.2(30.3)	0.958	-0.87(0.38)	0.09
8	Availability	63.2(26.9)	60.1(25.5)	0.913	2.20(0.03)	0.26
	Other areas:					
9	Other hospital staff interpersonal skills and information provision	63.9(26.9)	62.1(23.5)	0.926	1.53(0.12)	0.18
10	Waiting time	61.4(28.2)	60.5(24.8)	0.903	0.63(0.52)	0.07
11	Hospital access	60.5(27.9)	61.2(23.0)	0.859	0.43(0.66)	0.05
Test-retest results for five dimensions computed for Persian version:						
1	Satisfaction with nurses	66.5(25.3)	64.3(20.6)	0.973	2.59(0.01)	0.31
2	Satisfaction with services & care organization	61.7(23)	61.5(17.8)	0.97	0.25(0.80)	0.02
3	Satisfaction with doctors	68.2(25.9)	68.5(19.6)	0.956	-0.33(0.73)	0.03
4	Satisfaction with doctors' information provision	58.5(27.2)	59(23.5)	0.927	-0.38(0.70)	0.04
5	Satisfaction with nurses' information provision	48.3(32.5)	49.2(30.3)	0.96	-0.87(0.38)	0.09

Internal consistency was high (all Cronbach's alpha coefficients > 0.70) except for the hospital access score (Table 5). After PCA Cronbach's alpha coefficients were remarkably improved to higher than 0.90 in all five components.

To examine test-retest reliability the second round of questioning was conducted two weeks after original test, which indicates strong correlations in all scales ranging from 0.86-0.95. Paired t-test showed no significant change in patients' satisfaction scoring in different components of the tool within their hospital stay, except for their satisfaction with nurses' technical skills and availability of nurses, which both were decreased over time. Table 6 also represents the test-retest results for the new five-scale version, where only the mean of satisfaction reported for the nurses' information provision was low, and also satisfaction with nurses had significantly decreased after two weeks of hospital stay. All calculated SMR values were lower than 0.26 which represents questionnaire's week responsiveness except for the nurses' technical skills scale which shows moderate change.

Discussion

This is the first report of validation study of a specific tool to measure satisfaction of cancer patients with physicians' and nurses' care and overall care organizations and services received in the hospital, who were admitted to various oncologic wards in Tehran, the capital of Iran. This study reports the results of the translation and validation of the Persian version of the EORTC In-Patsat32 questionnaire, which has been originally developed by the European Cancer Organization (Bredart et al., 2005b); to be administered among Iranian hospitalized cancer patients. Results indicate that the instrument has high satisfactory psychometric properties, which was well accepted among cancer in-patients.

Mean age of participants in this study was 51 years and more than a half were illiterate or with the lowest

educational degree, however, the questionnaire was understandable for all of the patients and nobody reported items as upsetting that lead to a high level of compliance, which resulted in a quite few missing data. During the pilot study, patients confirmed the understandability and readability of the questionnaire (In-Patsat32), though some suggestions were raised by a few patients regarding their satisfaction with food, or provision of comfort for family caregivers and even treatment expenditures, which were not included in the main questionnaire as there was no consensus on all of the suggestions and also to prevent any major change in the psychometric features of the tool. To our knowledge, performing a pilot study was helpful to understand patients' perceptions culturally or conceptually, unlike other reports that no pilot study had been before the main test (Hjorleifsdottir et al., 2010).

Responses indicated a moderate satisfaction in all scales, ranging from 49.2 (information provided by nurses) to 67.1 (doctors' technical skills), with a fairly large variability in the distribution of the scores, which indicates high sensitivity of the questionnaire. (Arraras et al., 2009) Our results were much less than the European counterparts and Taiwan, (Bredart et al., 2007) and fairly higher than Morocco as a similar economic level. (Obtel et al., 2012)

The lower frequency of ceiling effect in this study (ranging 10-24%) compared to the Spanish version (ranging 6-46%) in one hand, and zero percent of floor effect in the Spanish version compared to higher ones (ranging 0.5-11%) on the other hand indicates better discrimination property of Persian version of the instrument in detecting differences between groups of cancer patients. Moreover, high floor and ceiling effect in HRQL tools represent highly skewed distribution of the scores, which warrants cautious interpretation of the results (Hirsch et al., 2011; Inrig et al., 2012). These differences in floor and ceiling effects might arise from the fact that fairly high quality of care is provided for the Spanish cancer patients, compared to the care provided

to our patients. The floor effect in the scale of satisfaction with information provided by nurses is higher than other dimensions. Also the ceiling effect is lower in the same scale and also in the scale of satisfaction with doctors' information provision; these figures could be attributable to unmet information needs of patients and even cautious approach in honestly notifying patients about their disease or the stage of the disease because of iatrogenic cultural barriers.

Analyses of validation studies of the questionnaire for Spanish, (Arraras et al., 2010) Iceland, (Hjorleifsdottir et al., 2010) different European countries, (Bredart et al., 2005b) Morocco, (Obtel et al., 2012) Sri-Lanka (Jayasekara et al., 2008) and Taiwanese (Bredart et al., 2005b) cancer patients indicated high convergent validity for all scales except for the access scale (i.e. ease of access by means of transport and parking and easy finding one's way inside the hospital), which might best be handled separately (Bredart et al., 2005b; Arraras et al., 2009). Likewise, our results endue strong support to the convergent, discriminant and divergent validity of the questionnaire.

Principle component analysis helped us identifying five factors: satisfaction with nurses (8 items), satisfaction with services and care organization (10 items), satisfaction with doctors (8 items), satisfaction with doctors' information provision (3 items), and satisfaction with nurses' information provision (3 items); these augmented components may help further researches in the era of satisfaction with care in cancer patients.

Results indicate appropriate reliability for all domains of the questionnaire, either in terms of internal consistency or test-retest. Internal consistency for all but one of the scales (scale-10, α : 0.67), was fairly high, which is consistent with other validation studies, and better than the Spanish version, where Cronbach's alpha for hospital access was weak (α =0.36). (Arraras et al., 2009) The Cronbach's alpha coefficient was lower than 0.7 in only one domain (hospital access) that is probably conceptual difference of the two questions (29-30), though these two items seem relevant. (Arraras et al., 2009) The first question in access domain refers to external access (the ease of access to hospital), while the second question is about internal access (the ease of finding one's way to the different departments); therefore almost 20% of our patients scored 'poor' to the external access, while only 8% did the same for internal access. This might be due to the referral nature of our wards, where patients from different parts of the city or even the country, seek their medical care in these wards, while as a result of 'quality management' protocols, all internal pathways are marked to help patients and their carers find the paths easily.

Likewise other satisfaction studies, this survey suffers from various limitations. Satisfaction with care is a totally subjective issue, (Asadi-Lari et al., 2004) which is more hard to measure in cancer patients even with valid and reliable tools such as Inpatsat-32. Patients' perception may vary from time to time during their hospital stay, thus continuous assessments of satisfaction are routinely required to ensure the best available quality of care, particularly in referral hospitals. Moreover,

satisfaction with care may be affected by different medical interventions and clinical care.

In conclusion, the persian version of EORTC In-Patsat32 module demonstrated satisfactory psychometric properties, with acceptable validity, reliability and understandability. Availability of this questionnaire in Iran will facilitate the assessment of cancer patients' satisfaction with care provided during hospital stay to identify the points where improvements can be implemented and integrated into the organization of cancer care and also to ensure more compliance.

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