REVIEW

HEALTH SYSTEM REFORM FROM THE PEOPLE'S POINT OF VIEW: DEVELOPMENT OF RELIABLE AND VALID QUESTIONNAIRE

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ABSTRACT

Health system reform has been a major concern for different countries. The aim of this research was to develop a reliable and valid questionnaire suitable to assess the consequences of health reform process from people's perspective. An extensive literature review used to extract a set of statements as possible indicators for health system reform. Expert panel used to determine the content validity rate (CVR) and the content validity index (CVI). The first version produced in Turkish language and pre-piloted with 20 heads of household. Qualified committee used to translate the Turkish version to English version. Group of eighteen academics and graduate students recruited to tests both versions for parallel test validity. The construct validity of the questionnaire was determined using principal components analysis with Varimax rotation method (PCA). Internal consistency and questionnaire's reliability were calculated by Cronbach's alpha and the test-retest reliability test. A 17- items questionnaire was developed through the qualitative phase. The Bartlett's test was significant ($p < 0.001$), and the KMO value (0.842) showed that using principal component analysis (PCA) was suitable. Eigenvalues equal or higher than 1 were considered significant and chosen for interpretation. By PCA, 4 factors were extracted (accessibility, attitude and preference, quality of care and availability of resources) that jointly accounted for 85.2% of observed variance. The Cronbach's alpha coefficient showed excellent internal consistency (alpha=0.97), and test-retest of the scale with 2-weeks intervals indicated an appropriate stability for the scale (Intra-class coefficient = 0.96). The findings showed that the designed questionnaire was valid and reliable and can be used easily to assess the consequences of health reform process by comparing the situation before and after the reform from people's perspective.

Keywords: Health Reform, Validity, Reliability, Turkey

Introduction

During the past few decades, many of the developed and developing countries have undergone health reform program[1]. Some are still in the process of Health Systems in Transition (HiT)[1-3]. Healthcare systems in North American and most of the Western European states have been gradually reformed using the local market frameworks[4]. However, in the Central and Eastern Europe part, the case is different. The centralized healthcare system (Semashko model) was dominant[5]. This rigid system failed to respond flexibly to the new health problems that emerged from accelerating changes in lifestyle and environmental factors[6]. Therefore, radical change toward market-oriented system was inevitable[7,8].

Although health reform processes are observed in different countries, moving at different speeds, using somewhat different means and different routes, the real motives behind such reforms may not differ greatly between states[9]. The administrative practices and organizational structures of the hospitals became noncompatible with steady growth of population and the need for more healthcare services at a reasonable cost and quality. More specifically, the indicators of the necessity for health system reform were the economic inefficiency of the health system, the growing doubts about the efficiency of diagnostic procedures and treatments prescribed by doctors, the inequities in terms of human resources and the costs for similar medical treatments across the hospital system, and the geographical distribution associated with poor access (i.e. long waiting time)[10].

In general, lack of resources and the demand to develop healthcare systems that are not state-financed, reduction in the value of the currency, pressures from international donors, national government

policies, and the need for new constitutional arrangements have been considered responsible for introducing the process of reform in the health system[11,12].

Health reform process has been noted to head toward the initiation of health policy with new laws and regulations that facilitate introduction of several structural and financial changes aiming to address the growing financial gap between the demand for healthcare services and available public resources[13,14]. New funding approaches: including case-mix system and purchaser-provider split, Payment for performance (P4P), in addition to incentives for effectiveness and efficiency to improve quality of care have been adopted[2]. Alongside the improved accessibility to healthcare, the reform most often entailed introduction of comprehensive primary healthcare, information technology (IT) system[2,13], advanced regulation of the pharmaceutical market and decentralization of the healthcare system, and introduction of voluntary and compulsory health insurance. Indeed, the major challenges faced by the governments are to make reasonable efforts and concurrent planning for the development of healthcare facilities for general population[15].

For optimal use of resources and improvement in the health status of the community, the political objectives of the reform have been focused on ensuring solidarity in funding health services and the adequacy of healthcare delivery to healthcare needs, in addition to better patient-physician relationship and increasing the level of satisfaction of both the population and healthcare providers[16,17].

Health reform has attracted attention of a broad spectrum of researchers and academics in this field over the last years[11,16]. Enormous amount of studies have been published to evaluate health reform process in various countries, such as health in transition versions issued periodically[1]. Although public support was among the necessary conditions for the success of reforms[18], it has been noted that these versions are meant mainly to assess the reform's results from the planners and reformers' or providers' perspective. Although many researchers have emphasized on patients' satisfaction toward healthcare

services, the direct public opinion in health system reform is rarely studied independently[19,20].

In recent years, a number of approaches have been developed to engage public in the planning and delivery of healthcare services, with each having its own advantages and disadvantages[21]. The frequent usage of survey polling by modern media contributed significantly to make it widely known among the users[22]. The opinion poll or survey research has appealed several researchers due to the flexibility of data collection and analysis[2]. Survey research data have been used for different purposes: the public opinion on decentralization in Poland[23]; the priority setting and rationing from people perceptive in UK[24]; comparison of the perceptions and realities with respect to accessibility to healthcare in Canada[25]; the quality, accessibility, and healthcare cost from people's point of view in the United States[26]; and the public preference and responsiveness measurement[27].

Survey studies have a prominent role as a source of information[28], because they provide a wide scope of data collected in a reasonably cheap and more accessible way to larger samples for data analysis. Although the public opinion poll suffered from some limitations regarding the evaluation and interpretation of the results as well as respondents' misinterpretation or misunderstanding of survey questions[29], many of the potential disadvantages of survey research can be minimized by establishing valid and reliable instruments. A great challenge in assessing public opinion is the lack of valid and reliable research instrument, which might be used by different researchers in different countries and in different languages[30].

This study aimed to develop a reliable and valid model survey questionnaire suitable to assess the aspects and consequences of health reform processes that are occurring in many countries from people's point of view. Aspects of health reform, such as introduction of universal health insurance and its effect on accessibility of health services, geographical equity, overall quality of service, continuity of care, availability of resources, cost of medication, attention to psychological problems, and media and

politicians' attitude toward health system reform were defined and determined.

MATERIAL AND METHODS

Literature Review and Statement Development

The first part of research was an extensive review of the available scientific literature through an electronic search of Medline (PubMed and OVID), EBSCO, and Sage. In addition, World Bank, OECD, WHO, and European Observatory websites were also searched over the last three decades. Literatures such as health in transition versions, national health reform process evaluation, and public engagement in health reform or planning were included. While the studies that did not deal with health reform process, or those dealing with the evaluation of health reform from the viewpoint of healthcare providers or stakeholders only were excluded. Several key words were used during the search, such as health reform process, health reform in OECD region, public opinion, patients' perspective, public preferences, survey research, and attitude of politician, role of media in health reform, universal health insurance, health policy, and patients' satisfaction. Thirty-seven statements of care aspects, as possible indicators for health system reform from people's point of view, were drawn from literature review.

Item Development

The selected statements were discussed in depth with a team of seven academics familiar with the topic. The statements were re-reviewed; the number was reduced, and restructured. The initial questionnaire included 17 items that were designed based on five-point Likert scale. These items referred to different topics such as accessibility, availability of resources, quality of care, attitude, and preference. The items in this version ranged from two to five for each topic, according to the type and degree of complexity of the relevant topic

Content Validity

First, nine experts in the field were recruited to determine the content validity rate (CVR). They were asked to answer the question "is the item essential to the aspect?. Their answers were designed based on three-point Likert scale comprising "essential, useful but not essential, or not necessary". According to the Lawshe table, the minimum CVR for each item to be considered as acceptable was 0.78[31]. On the other hand, the content validity index (CVI) used four-point Likert scale "not relevant, somewhat relevant, quite relevant, or highly relevant"[32,33]. An acceptable CVI in this study was determined to be 0.80 (i.e. 80%) or above because there were nine judges in this study[34].

First pilot study

The first version was pre-piloted with a randomly selected sample of 20 heads of household. They were asked to comment and give their suggestions on items.

Translation to English language

The Turkish version was forward-backward translated into English by two Turkish academics working in community health science, in addition to three linguistic experts. Both the versions were reassessed by a commission of six academics in related research field with the required competence in English language and familiarity with the topic. After the evaluation, the commission decided that there were no discrepancies between the content and meaning of both (Turkish and translated English) versions[35,36].

Second pilot study

Both the versions in the two languages were applied to 18 academics and graduate students in public health science to test for parallel test validity[36].

Construct Validity

The construct validity of the questionnaire was determined using principal components analysis with Varimax rotation method (PCA)[37]. For this purpose, an empirical study was carried out in Turkey. The sampling method was a self administered survey of heads of household by using a multi stage sampling technique[38]. We divided Turkey into seven geographical regions (Aegean, Black Sea, Central Anatolia, Eastern Anatolia, Marmara, Mediterranean, and South-eastern Anatolia); then, we selected one province from each geographical region, two districts from each selected province, two municipalities from each selected district, two quarters from each selected municipality, two blocks from each selected quarter, and three household's heads from each selected block[20].

Internal Consistency and Reliability

The questionnaire's internal consistency was calculated by Cronbach's α coefficient. The widely accepted social cutoff is that Cronbach's α coefficient should be 0.70 or higher for a set of items to be considered as a reliable scale[39]. The questionnaire's reliability was assessed by calculating Intra-class Correlation Coefficient (ICC), where ICC of 0.4 or above was considered acceptable[40,41]. A sub-sample of 70 heads of household from different regions completed the questionnaire twice with an interval of 15 days in order to examine the stability of the scale[32].

Statistical Analysis

The One-sample Kolmogorov-Smirnov test represented a normal distribution of the obtained scores; therefore, Pearson's correlation coefficient was assessed between the two completed questionnaires. The CVR and CVI for each individual item were calculated. The construct validity was determined using PCA. Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity were used to study the adequacy of the data for factor analysis. Eigenvalue ≥1 and screen plot have been used to determine the number of factors to be extracted. Split-half validation has been performed to test for generalizability of the data to the population from which the sample was collected. Statistical Package for Social Science (SPSS) program (version 16; SPSS Inc., Chicago, IL, USA) was used for data analyses[42].

Ethical Approval

Ethical approval (FF-175-2011) for the study was obtained from the National University of Malaysia Medical Center (UKMMC). Moreover, written informed consent was obtained from each participant after explanation of the study objectives and guarantee of secrecy.

Results

Participants' Characteristics

Out of the 336 distributed questionnaires in the empirical study were completed by 325 heads of household (response rate 96.7%). More than half of the respondents were female (169; 52.0%) with an average age of 44.07 years, SD = 13.94 and age range 20–74 years. The median (interquartile range) completion rate for questions was 95.1% (94.1–95.5%). The scale scores were calculated for a median (interquartile range) of 96.6% (93.4–97.0%) of responses.

Content Validity Ratio

The questionnaire's CVR was assessed. All the items had scored more than 0.78 by the nine experts and entered the second stage for the measurement of the questionnaire's CVI.

Content Validity Index

There was no eliminated question in the CVI assessment, and all the questions had a score above 0.80.

First Pilot Study

First pilot study was performed with a sample of randomly selected twenty heads of household (with an average age of 38.55 years, SD = 12.12 and age range 21–56 years. Completion rate for questions was excellent. Participants agreed on all items and the related domains. The pilot questionnaire had 17 attitudinal questions dealing with the following aspects: accessibility (five questions), availability of resources (three questions), quality of care (four questions), attitude (three questions), and preference (two questions).

Parallel Test Validity

Eighteen academics and graduate students (with mean age of 39.44 years, SD = 12.27 and age range 22–58 years) participated in the scoring of the Turkish version and English version for parallel test validity. The correlation between the overall scores obtained from the two forms were significant (r = 0.95, p >0.05), table 1.

Table 1 Parallel Test Validity between Turkish and Translated English versions

Version	Mean	Std. Deviation	N	Pearson's r	P- value
Turkish	80.06	4.87	18	0.950	<0.001
English	80.17	4.52	18	0.950	<0.001

Construct Validity

Factors analysis was conducted to identify the nature of the factors underlying the set of measures in the questionnaire. The sample adequacy for extraction of the factors was confirmed. Bartlett's test result was (p < 0.001), and the KMO value (0.842). In this analysis, the factors with eigenvalues equal to or higher than 1 were considered significant and chosen for interpretation. Through PCA, four factors were extracted,

explaining 85.2% of the total variance. All factor loadings were higher than 0.4, indicating that they were statistically significant and higher than the recommended level. The factor loading of each item is listed in table 2.

Table 2 Health system reform assessment from people's perspective scale and its factors loading (n=325)

Questionnaire's Items	Factor 1	Factor 2	Factor 3	Factor 4
1. Health care is easier to get as compared to before health reform process.	**0.925**	0.013	-0.043	0.221
2. Medicines and treatment are easier to obtain as compared to before health reform process.	**0.942**	-0.024	-0.005	0.194
3. Patients have to pay more for medical treatment as compared to before health reform process.	**0.950**	-0.015	-0.018	0.228
4. Medical treatment is more accessible now for everybody as compared to before health reform process.	**0.821**	-0.039	-0.042	0.221
5. Patients have to wait longer for medical treatment now as compared to before health reform process.	**0.891**	-0.004	-0.009	0.247
6. The media and Politicians gave more attention to health care as compare to before the health reform process.	-0.029	**0.889**	0.274	-0.005
7. People feel more responsible for their own health as compare to before the health reform process.	0.017	**0.942**	0.163	-0.016
8. The population is more informed about health risk and healthy behavior as compare to before the health reform process.	-0.006	**0.950**	0.129	0.019
9. I would like it when we could go back to the healthcare system as it was before the health reform process.	-0.011	**0.837**	0.278	0.037
10. I prefer health insurance services now than as it was before the health reform process.	-0.026	**0.916**	0.111	0.004
11. In general, the quality of care improved as compare to before the health reform process.	-0.002	0.246	**0.737**	-0.013
12. Doctors are much more friendly as compare to before the health reform process	-0.036	0.127	**0.934**	0.025
13. Doctors Provide their patients with more explanations and information as compare to before the health reform process.	-0.021	0.128	**0.920**	0.051
14. Doctors' offices now have all the necessary things to provide full care as compare to before the health reform process.	-0.029	0.346	**0.755**	-0.038
15. There are enough doctors now as compared to before health reform process.	0.327	0.004	0.020	**0.817**
16 There are enough doctors who specialize now as compared to before health reform process.	0.214	0.036	0.015	**0.758**
17. There are enough hospitals now as compared to before health reform process.	0.041	0.005	0.012	**0.810**
Eigenvalue	4.952	3.337	3.077	2.155
Explained Variance (%)	29.127	25.515	17.906	12.675
Cumulative Variance (%)	29.127	54.642	72.548	85.223

* Factor 1: accessibility, factor 2: attitude & preferences, Factor 3: quality of care, Factor 4: availability of resources

• Factor 1 included five accessibility items that explained 29.1% of the total variance and was labelled as "accessibility."
• Factor 2 included three attitude items and two preference items, which explained 25.5% of the total variance and was labelled as "attitude and preference."
• Factor 3 included four quality items, which explained 17.9% of the total variance and was labelled as "quality."

• Factor 4 included three availability items, which explained 12.7% of the total variance and was labelled as "availability of resources."

The outcomes of PCA have been tested for generalizability using a split-half validation analysis on two randomly split samples. The results in table 3 showed that each half have almost the same factor structure, factor loading and factor communalities and for the full data.

Table 3 Split-half validation of the health system reform assessment from people's perspective scale (n=325)

Items	First half (n=165)		Second half (n=160)	
	Communality	Loading	Communality	Loading
Factor 1: Accessibility				
1. Health care is easier to get as compared to before health reform process.	0.807	0.894	0.732	0.835
2. Medicines and treatment are easier to obtain as compared to before health reform process.	0.810	0.895	0.738	0.842
3. Patients have to pay more for medical treatment as compared to before health reform process.	0.888	0.940	0.857	0.925
4. Medical treatment is more accessible now for everybody as compared to before health reform process.	0.605	0.776	0.551	0.670
5. Patients have to wait longer for medical treatment now as compared to before health reform process.	0.782	0.883	0.722	0.838
Factor 2: Attitude and Preference				
6. The media and Politicians gave more attention to health care as compare to before the health reform process.	0.777	0.855	0.699	0.790
7. People feel more responsible for their own health as compare to before the health reform process.	0.888	0.933	0.798	0.876
8. The population is more informed about health risk and healthy behavior as compare to before the health reform process.	0.905	0.946	0.856	0.927
9. I would like it when we could go back to the healthcare system as it was before the health reform process.	0.613	0.761	0.565	0.745
10. I prefer health insurance services now than as it was before the health reform process.	0.847	0.912	0.810	0.895
Factor 3: Quality of care				
11. In general, the quality of care improved as compare to before the health reform process.	0.913	0.968	0.845	0.925
12. Doctors are much more friendly as compare to before the health reform process	0.959	0.964	0.890	0.934
13. Doctors Provide their patients with more explanations and information as compare to before the health reform process.	0.952	0.956	0.896	0.939
14. Doctors' offices now have all the necessary things to provide full care as compare to before the health reform process.	0.651	0.676	0.580	0.646
Factor 4: Availability of resources				
15. There are enough doctors now as compared to before health reform process.	0.633	0.726	0.510	0.673
16 There are enough doctors who specialize now as compared to before health reform process.	0.620	0.720	0.570	0.677
17. There are enough hospitals now as compared to before health reform process.	0.678	0.751	0.653	0.730
Total Explained Variance (%)	81.069		77.061	
KMO for MSA	0.781		0.778	

Reliability
The data of 70 heads of household (with mean age of 42.74 years, SD = 12.73 and age range 24–68 years) was used for test–retest reliability. The questionnaire's internal consistency (Cronbach's α coefficient 0.97) and the Intra-class Correlation Coefficient (0.87) were excellent indicating an appropriate stability of the questionnaire and sufficient reliability. The results are shown in Table 4.

Table 4 Cronbach's α coefficient and ICC for health system reform assessment scale and its subscales (n =325)

Subscales	Number of items	Mean (SD)	Cronbach's α Coefficient	ICC (n=70)
Accessibility	5	23.23 (2.67)	0.99	0.98
Attitude and preference	5	22.24 (2.92)	0.88	0.86
Quality of care	4	18.56 (2.17)	0.93	0.92
Availability	3	13.81 (1.73)	0.85	0.82
Total scale (n=325)	17	78.33 (7.50)	0.97	0.96

Discussion

The questionnaire was developed systematically and was confirmed to be a satisfactorily valid and reliable instrument. It was found to have the ability to evaluate the consequences of health reform process from people's perspective. The acceptability of the questionnaire to respondents is shown by the high response rates for each question (median 95.1%) and the high proportion of responses for which we could calculate the scale scores. This shows that the instrument can successfully be a self-administered questionnaire or administered at interview to a broad range of urban and rural heads of households[43].

Content validity was first ensured during the qualitative phase by including all the important issues to participants and all elements identified from other studies[44-48], and then through the quantitative measurement of the CVR and CVI[33]. Based on Lawsche table[31], the scores of all the items evaluated by the nine experts were more than 0.78, and thus all the items entered the second stage for the questionnaire measurement (CVI). According to Waltz and Bausell[49] suggestion, the same panel group was used to evaluate the items for CVI.

Polit et al. (2007) indicated that the item CVI values should be 0.78 for expert panels of more than five. In the CVI assessment, there was no eliminated question because all the questions had a score above 0.80 by the nine judges recruited in this study[34,50]. The original Turkish and translated English version had positive and significant correlation (r =0.95, p >0.05), which indicated that the two forms have validity of parallel test[36]. In the present study, Bartlett's test result and the KMO value were highly significant showed that use of factor analysis (PCA with Varimax rotation) to test the construct validity was suitable[32,40,44,51].

The assumptions of factor analysis were fulfilled, and in the application of factor analysis with 17 items, four factors with eigenvalues of more than 1 were obtained. The overall explained variance of scale was 85.2% of the total variance. Each factor more likely seemed to be coherent and represent a separate scale related to health reform assessment from people's point of view and providing good evidence for the construct validity of the instrument. This result is consistent with the similar studies conducted elsewhere[37,43,51,52].

Factor one included the five items of accessibility and explained 29.1% of the

total variance. Different indicators were used to define accessibility from patient's perspective, such as healthcare accessibility in general, drugs, treatment, payment, and waiting time for medical treatment. It was noted that patients strongly agreed (mean 4.51, SD=0.59) that medical treatment is more accessible for everybody, when compared with that before health reform, and less agreed (mean 3.47, SD=0.95) on increased payment for medical treatment, when compared with that before health reform. The second factor included the three attitude items and the two preference items, which explained 25.5% of the total variance. In this factor, public considered themselves more informed (mean 4.67, SD = 0.49) about the risk and healthy behaviour, and felt more responsible for their own health, when compared with that before health reform (mean 4.46, SD = 0.51). They agreed that healthcare got more attention from politicians and media than that earlier. Public preferred current health insurance services (mean 4.61, SD = 0.50) and not to go back to the old healthcare system (mean 4.67, SD = 0.49). Factor 3 included four quality items, which explained 17.9% of the total variance. In general, the respondents indicated that the quality of care improved, when compared with that a decade ago (mean 4.72, SD = 0.46); the doctors are much more friendly, their office has everything needed to provide complete care (mean 4.83, SD = 0.38), and they give patients more information these days than a decade ago (mean 4.78, SD = 0.43). Factor 4 included three availability items, which explained 12.7% of the total variance. In this factor, public agreed that number of doctors, specialized doctors, and health institutions are enough, when compared with situation before the health reform process (mean 4.61, SD = 0.51).

DeVellis (2003) indicated that the strength of any study is directly proportional with the increase of instrument's reliability and thus its ability to detect the real significant correlations and differences in the study[53]. In this study two ways were used to test the questionnaire's reliability. First, Cronbach's alpha coefficient for homogeneity was 0.97 indicating high degree of internal consistency[39]. Burns and Grove (2001) reported that the fine discriminations in the levels of the construct would be more richly reflected by instrument with coefficient of slightly more than (0.8–0.9)[54]. Second, test-retest reliability was also examined for consistency of repeated measures. Intra-class Correlation Coefficient was 0.87 indicating an appropriate stability of the questionnaire. In real test of test–retest reliability, the variable and measurement technique should be the same in both situations[43]. Retest scores were lower than the test scores, which may reflect the effect of time interval and also the difference in the method of application. Nevertheless, these data indicated good stability of the questionnaire and sufficient reliability.

Strength and Limitations

This study characterized by its methodology and results. The survey do not question people's opinion about only the current healthcare system, but their opinion comparing the current system to the one before the health reform process. Thus, the results of the survey provide comparison of the view of the general public about the system before and after the reforms, and measure the success (or failure) of the reforms from people's perspective. The other features of this study was the fact it was developed to elicit public opinion and the data was collected using a multistage sampling methods which making it a nationwide study. In addition, the results of the split sample validation, the communalities, factor loadings, and factor structure were the same for each half and for the full data set which gave evidence that the new scale is generalizable and valid because, in effect, the two analyses represent a study and replication. Also it contains items cover important domains, such as the accessibility, quality of care, availability of resources , attitude of politician and media toward health reform process and public preferences. The statement in each item was prolonged and complete sentence in order to help respondent to understand the item and avoid confusion. However, the study had few limitations. For instance, the study missed some domains such as continuity of care. The statements were close ended, which might probably reduce the opportunity for the respondents to express their opinion in detail. In addition, we did not perform concurrent validity, because to date a 'gold standard' for assessing public

opinion toward health reform process is lacking.

Conclusions

In summary, the questionnaire was developed using item analysis and factor analysis on items with content face and validity. The construct validity was confirmed. The internal consistency reliability and test–retest reliability were acceptably high. The questionnaire can be used to assess the consequences of health reform process by comparing the situation before and after the reform from people's perspective. Future studies should be conducted for further validation and standardization of the scale in various settings with other populations and different languages.

List of abbreviations

Health system in Transition (HiT), Payment for performance (P4P), information technology (IT), The World Trade Organization (WTO), The Organization for Economic Co-operation and Development (OECD), Content Validity Ratio (CVR), Content Validity Index (CVI), principal component Analysis (PCA), Intra-class Correlation Coefficient (ICC).

Acknowledgments

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