

ORIGINAL ARTICLE

RELIABILITY AND VALIDITY TESTING OF THE HEALTHCARE PROVIDER-PATIENT COMMUNICATION INSTRUMENT: A PILOT STUDY IN A MALAYSIAN PRIMARY CARE SETTING

Nor Azmaniza A¹, Shamsuddin K², Aazami S²

¹ Faculty of Business Management, Universiti Teknologi MARA

² Department of Community Health, Faculty of Medicine Universiti Kebangsaan Malaysia Medical Centre

ABSTRACT

There is a growing interest in research on satisfaction with healthcare provider (HCP) and HCP- patient communication as a measure of healthcare quality of HCP's communication competency. However, many communication assessments were not comprehensive measures and are not entirely accurate in measuring what is supposed to be measured. This study aimed at assessing the validity and reliability of a newly developed HCP-PC instrument in a Malaysian primary care setting. The HCP-PC instrument was developed using items adapted from existing instruments as well as self-developed items. A pilot study involving 277 clients of an outpatient clinic was conducted in HKL using the proposed instrument which was distributed immediately after face to face consultation. The content validity and Cronbach alpha reliability were assessed. Factor analysis constructed 3 components, exchanging information (EI), socioemotional behaviour (SB) and communication style (CS). All items loaded on the corresponding component with factor loading ≥ 0.6 , suggesting that all items in the respective component are measuring the same direction. PCA of the final 30 items explain 61.98% of the total variance with 6.66%, 47.18% and 8.13% explained by EI, SB and CS respectively. Component-based reliability show strong internal consistency with Cronbach alpha, $\alpha_{EI} = 0.92$, $\alpha_{SB} = 0.96$ and $\alpha_{CS} = 0.70$. The pilot study supported the instrument validity and reliability after initial tests. However, further study needs to be done to confirm its construct validity to help establish a valid and reliable HCP-PC instrument for measuring patient satisfaction with HCP-PC that can be used in primary care setting.

Keywords: reliability, communication, Malaysia, primary health care

INTRODUCTION

Satisfaction with healthcare provider-patient communication (HCP-PC) is increasingly assessed as a part of evaluation of healthcare quality. Miscommunication and misunderstanding in clinical practice widened the communication gap between patient and healthcare providers (HCPs). Obtaining patient's perspective of HCP's communication after consultation is essential to establish more patient-centred communication in healthcare delivery setting. Evaluating the extent of patient satisfaction with HCP-PC is clinically relevant, as satisfied patients are more likely to comply with treatments¹. Previous studies have reported that many communication satisfaction assessments were not grounded into comprehensive measures and many instruments were not entirely accurate in measuring what is supposed to be measured². The tools created to measure patient satisfaction with health

services are also criticized for the lack of clear definition and face methodological problems related to validity and reliability testing³ and because of that, many surveys which were supposedly done to measure patients' satisfaction, were actually measuring something different⁴.

If the development of strategies for effective HCP-PC depends on the communication assessment, then the reliability and validity of the measuring instrument should be assured⁵. Reliability is the degree to which a test consistently measures whatever it measures and must produce consistent result regardless of time administration⁶. Validity was defined as the extent of test ability to measure what it is intended to measure in which the degree of a study accurately reflects or assesses the specific concept that the researcher is attempting to measure⁷. Previous study has suggested that patient satisfaction scale must fulfil the

following requirements: a) it must be (reliable) regardless of administration time b) measure what it is designed to test (construct validity) and c) measure patients group (transferability)⁶. Another literature suggested that the validated questionnaire fulfilled two basic elements. Firstly, all items in the instruments were important to the trait under study. Secondly, the test must produce what reflects the true values⁸. This study aim was to assess validity and reliability of a newly proposed instrument for measuring HCP-PC which could be used in evaluating patient satisfaction during outpatient consultation in primary care setting.

MATERIAL AND METHOD

Study design and setting

The instrument was specifically developed to measure patient satisfaction with the health provider's communication during an outpatient visit which was administered immediately after a face to face consultation. We conducted the validity and reliability study of an instrument for measuring HCP-PC involving a cross sectional survey of patients attending outpatient clinic, Hospital Kuala Lumpur (HKL). An outpatient setting was selected based on recent encounter and consultation.

Participants and sampling

Participants were recruited using convenience sampling. This method was used in several studies on patient satisfaction^{7 8 9}. The ability to use random sampling was reduced as the majority of the patients refused to participate due to time constraint. Such sampling will give low response rate. The inclusion criteria include, age 18 and above, Malaysian citizenship, ability to read and understand the Malay language and agreement to participate in the study.

Data collection

Data was collected using self-administered questionnaires. The questionnaires were distributed to 283

able to produce consistent result the same constructs when applied to different

respondents who visited the OPD, HKL immediately after consultation with the HCP. Data were collected by the researcher and co researcher for 10 days consecutively in July 2012. After the detailed study brief which include selection criteria and need for consent were given, the questionnaires were distributed to the respondents. All returned questionnaires were transferred to the analysis software.

Instrument development phase

To produce a valid and reliable instrument, two steps were involved: a) Phase I: Drafting the domain of the instrument and b) Phase II: Testing of the validity and reliability of the instrument

Phase I: Drafting the instrument

The first stage of producing a valid and reliable instrument measuring HCP-PC is the development of the communication domain. The drafting of the content was based on extensive literature review conducted by researcher and co researcher. This was carried out to obtain a preliminary list of ideas about communication aspects or domain that were likely to predict satisfaction. Three domains were identified: a) exchanging information² b) socio emotional behaviour² and c) nonverbal communication¹⁰. The domains consist of self-developed items and items adapted from existing validated instruments with major modifications. Therefore, we considered this instrument to be a new self-developed instrument and back to back translation was not done since no one instrument was taken in total. The description of the domains constructed in this instrument is as follows:

A. Exchanging information

Some items modified from the Patient Enablement Instrument (PEI)¹¹ were used to measure exchanging information (EI)

in Section A. The original version comprised of 6 items¹¹ and the patients were asked to circle the answer which corresponded most closely to their response of each statement as a result of their most recent visit to a HCP. The questions focused on whether patients felt they are able to understand and cope with life and with their illness, maintain health as well as help themselves to be confident about it. In this study, we made modifications in three aspects: 1) based on the group discussion and expert panel comments, we had chosen only 4 items from the original PEI (A1, A2, A4 and A14) with improved structuring and wording for better understanding by the local respondents 2) the original frequency measure in PEI was modified to a scale measure ranging from “Strongly disagree” to “Strongly agree”. The responses were coded 1-5 (strongly disagree = 1, disagree = 2, uncertain= 3, 4= agree 5 = strongly agree). Negative items were reverse scored (so that 1=5, etc) and 3) an additional 14 items were included making a total of 18 items in this section.

B. Socio emotional behavior

Some items modified from the Patient Satisfaction Questionnaire (PSQ)-III were used to measure socio emotional domain (SB) in section B. The original version of PSQ-III instrument is a 50-item survey that taps global satisfaction with medical care as well as satisfaction with six (6) aspects of care: technical quality, interpersonal manner, communication, financial aspects of care, time spent with doctor, and accessibility of care¹². However, based on the group and panel discussion and face validity, only seven (7) of the 50 items were chosen considering those items fit into the socio emotional behaviour domain. Ten (10) additional items were self-developed and added making a total of 17 items in this section. The responses were similar with the original version of PSQ-III and were coded 1-5 (strongly disagree = 1, disagree = 2, uncertain= 3, 4= agree 5 =

strongly agree). Negative items were also reverse scored (so that 1=5, etc).

C. Communication style

In section C, some items modified from the Non-Verbal Immediacy Scale (NIS) were used to measure communication style (CS) domain. The original version of NIS comprises 26 items (13 positive worded and 13 negative worded). The items were presented with a 5 Likert response format measuring frequency (ranging from 1-5, 1= never 2= rarely 3= occasionally 4= often 5= very often)¹³. In this study, several modifications were made. These modifications were: 1) based on the group and panel discussion and face validity, only 6 of the 26 original NIS items were chosen to be included in this instrument considering those items measure the trait under communication style domain 2) the original frequency measure in NIS was modified to a scale ranging from “strongly disagree” to “strongly agree”. The responses were coded 1-5, (strongly disagree = 1, disagree = 2, uncertain= 3, 4= agree 5 = strongly agree). Negative items were reverse scored (so that 1=5, etc) and 3) an additional 11 items were added making a total of 17 items in this section. These led to a 52 items instrument, each item measured with Likert scale (range 1-5, strongly disagree to strongly agree) and the negative items were reverse scored (so that 1=5, etc).

Phase II: Analysis of validity and reliability

Face validity and content validity

Face validity was ascertained by ensuring that the items which made up each subscale appear to be reasonable measures of patient satisfaction with HCP-patient communication. Expert panels reviewed and verified the dimension developed with the aim to investigate coverage of patient satisfaction content, detect ambiguity, offensiveness, suggestiveness as well as scientific items^{14,15} to assure easy understanding among the local patients.

Factor analysis

Principle component analysis (PCA) was performed on the 52 items: a) 18 items from EI, b) 17 items from SB and c) 17 items from CS. The next PCA analysis was done on the final items after the deletion of items which were not loaded on the corresponding component. Scree plot, a statistical test alternative to eigenvalue for identifying the right number of component which should be extracted was also obtained¹⁶. The number can be identified by looking at the elbow of the plot where vertical line (on the left side of the plot) transit to a horizontal shape line (on the right side of the plot). Items were rotated using direct Oblimin rotation. KMO greater than 0.6 and Bartlett's test of sphericity with $p < 0.05$ was considered satisfactory for performing the factor analysis¹⁷. Items that have factor loading of more than 0.6 were considered acceptable and allowed to load on the corresponding items. To the best of our knowledge, there was no existing instrument measuring patient satisfaction with healthcare provider communication, therefore, criterion validity was not done because of the lack of a gold standard that can be need for comparison.

Reliability

Reliability, a measure of internal consistency was assessed using Cronbach's alpha which indicates the internal correlation of all items on a scale. A high coefficient (range 0-1) suggests a more consistent scale, pointing to a more precise evaluation of a defined parameter through the question. A Cronbach's alpha of 0.7 or higher indicates relevant internal consistency¹⁸.

RESULTS

Table 1 describes the respondent's profile. Out of 277 respondents, 60.6% of the respondents were females and 39.4% were males. A total of 20(73.3%)

respondents were young (18-32 years old) while 74(26.7%) were older (33 years and above)¹⁹. Based on ethnicity of those who sought treatments at OPD, HKL, 191(69%) were Malays, while the other 86(31%) were non Malays. A total of 146(52.7%) respondents had low educational background (secondary school and below) and the other 131(47.3%) had high educational background (diploma and above). A total of 198(71.5%) respondents had low income (RM1500 and less) while the other 79(28.5%) were in the higher income group (more than RM1500). The respondent's health status was measured by their self-perceived current health status. Most, 266(96%) of the respondents rated their health status as good and only 11(4%) reported poor health.

Factor analysis

Using the finalised 30 items, the median score and IQR for EI, SB and CS was 39.0(40.0), 63.0(64.0) and 14.0(16.0) respectively (Table 2).

Factor structure of the proposed instrument measuring patient satisfaction with HCP-PC was examined through principle component analysis (PCA) with direct Oblimin rotation. The exact number of 3 was specified to extract the dimensions. This is to ensure the 3 dimensionality of the proposed instrument. KMO test was 0.95 which indicated the adequacy of our sample size to conduct PCA²¹. The three extracted dimensions with PCA of the original 52 items explain 52.08% in total variance with 40.32%, 7.00% and 4.76% explained by SB, CS and EI respectively. PCA of the finalised 30 items explained increment of the variance which was 61.98% in total, with 47.18%, 8.13% and 6.66% explained by SB, CS and EI respectively (Table 3).

Table 1: Description of patient profile (n=277)

Characteristic	f	%
Gender		
Male	109	39.5
Female	168	60.6
Age (Years)		
18-32	203	73.3
33 and older	74	26.7
Ethnicity		
Malays	191	69.0
Non Malays	86	31.0
Educational level		
Low (primary, secondary school)	146	52.7
High (diploma, degree and above)	131	47.3
Income		
Low (RM1500 and less)	198	71.5
High (more than RM1500)	79	28.5
Self-perceived health status		
Good	266	96.0
Poor	11	4.0

PCA of initial 52 items

Only the items that have factor loading of more than 0.6 were allowed to load on the corresponding items²³. For EI component, items A4, A5, A6, A7, A8, A10, A14, A15, A17 and A18 were loaded correspondingly. However, two items (A7 and A18) loaded on both EI and SB

components. These items were retained in EI component considering their factor loadings were higher in this component. Eight items, A1, A2, A3, A9, A11, A12, A13 and A16, did not load on any components, either in EI, SB or CS. These items were deleted in the next PCA analysis.

Table 2: Respondent's score on three HCP-PC domain

Domains	No. of items (Score range)	Median score (IQR)
Exchanging information (EI)	10 (10-50)	39(40)
Socio emotional behavior (SB)	16 (16-80)	63(64)
Communication style (CS)	4 (4-20)	14(16)

IQR: Interquartile range

Table 3: Variance explained by components in the initial 52 items and final 30 items instrument

Component	Extraction sums of squared loadings		
	Total	% of variance	Cumulative %
52 items instrument			
1	20.97	40.32	40.32
2	3.64	7.00	47.32
3	2.48	4.76	52.08^d
30 items instrument			
1	14.15	47.18	47.18
2	2.44	8.13	55.31
3	1.99	6.66	61.98^d

1=socio emotional behavior, 2=communication style, 3=exchanging information,

^d Total variance of 3 extracted components

Meanwhile, all items in SB component loaded correspondingly except for one item, B1, which did not load on any components either in EI, SB or CS. Therefore, B1 was deleted and the rest of the items were retained for the next analysis (Table 3). Five items (B2, B3, B12, B16 and B17) show two dimensionality as they loaded on both EI and SB components. However, these items were retained in SB component since their factor loadings were higher in this component.

For CS component, only four items, C11, C13, C14 and C16, loaded correspondingly while items C1, C2, C3, C5, C6, C7, C10, C12, C15 and C17, did not load on this component (they were loaded either on EI or SB component). Three items, C4, C8 and C9, did not load on any components either in EI, SB or CS. Thus, for CS, only four items, C9, C11, C13 and C14, were retained for the next analysis.

Based on the initial PCA of 52 items result, 22 items were deleted (8 from EI, 1 from SB and 13 from CS) leaving only 30 items for the next PCA analysis.

PCA of remaining 30 items

In this PCA analysis, only the items that have factor loading of more than 0.6 were allowed to load on the

corresponding component. All items in EI loaded correspondingly. Two items; A7 and A18 were found to load on both EI and SB. However, these items were retained in EI as their factor loadings were higher in this component.

For SB, all items loaded correspondingly with four items, B2, B3, B5 and B16, found to load on both EI and SB. These items were retained in SB component since their factor loadings were higher than in EI. All items in the CS component were found to load on CS with factor loading of more than 0.6 and without sharing items with other components (EI and SB) (Table 4).

Reliability

Cronbach's alpha revealed that the items in the three (3) components were internally reliable ($\alpha_{EI}=0.92$, $\alpha_{SB}=0.97$ and $\alpha_{CS}=0.70$) indicating that items within components were highly inter-related. The Cronbach alpha for the total 30-items instrument is 0.94.

DISCUSSION

The outcome of this pilot study is to establish a valid and reliable instrument specifically for measuring patient satisfaction with HCP-PC among users of outpatient services. A validated and reliable HCP-PC communication instrument is important to measure

accurate levels of patients' perception and satisfaction with HCP communication during consultation in primary care setting. The instrument did not take much patient's time to complete the instrument and among those who agreed to participate, over 98% successfully completed the instrument. Validity and reliability testing of the newly developed

instrument provided support that the instrument is comprehensible and its domain specific and overall internal consistency was adequate. High internal consistency which was above 0.7 for each component suggests that the items are related and measuring the same direction and correlated with one another⁶.

Table 4: The component loading (rotated) for items defining each component (30 items)

Statement/ Pernyataan	Component*		
	1	2	3
A4- After talking to the healthcare provider, I felt much better about my problem ^a			0.785
A5- Healthcare provider provided information about treatment procedures			0.778
A6- I will follow the healthcare provider's advice because I think he/she is absolutely right			0.679
A7- The healthcare provider's explained things in a way I could fully understand	0.629		0.811
A8- Healthcare provider explained everything about name and cause of my illness			0.772
A10-I will comply to the instruction and medication given by the healthcare provider			0.605
A14- I have more confidence in my future health status after consultation ^a			0.677
A15- Healthcare provider checked my understanding at the end of the consultation			0.778
A17- I am completely understand healthcare provider's explanation about my illness			0.851
A18- I am satisfied with information sharing during consultation	0.665		0.827
H2- Healthcare provider's manner made me feel completely at ease	0.771		0.621
H3- Healthcare providers were attentive	0.762		0.666
H4- Healthcare provider listened to everything that I had to say with his/her full attention ^b	0.726		
H5- The healthcare provider took my problem seriously	0.682		0.618
H6- I feel the healthcare provider really respects me as a person ^b	0.866		
H7- Healthcare provider was very sympathetic about my problems	0.757		
H8- Healthcare provider always do their best to keep me from worrying ^b	0.794		
H9- I was treated with respect+	0.746		
H10- Healthcare provider treat me in a friendly manner ^b	0.822		
H11- Healthcare providers were very considerate	0.811		
H12- Healthcare provider showed concern for my privacy ^b	0.787		
H13- Healthcare provider understands my religious and cultural belief	0.786		
H14- Healthcare provider is compassionate towards my situation	0.77		
H15- Healthcare provider showed a caring attitude towards me as a person ^b	0.838		
H16- I am satisfied with the courtesy shown by the healthcare provider	0.88		0.604
H17- I am satisfied with the overall empathy shown by the healthcare provider	0.855		
I9- Healthcare provider did not use body gesture while talking to me ^c		0.669	
I11- The healthcare provider voice is monotonous or dull when talking to me ^c		0.835	
I13- Healthcare provider avoid eye contact when talking to me ^c		0.764	
I14- Healthcare provider is very rude when she/ he talks to me		0.769	

*Extraction method: Principal Component Analysis. Rotation method: Direct Oblimin. ^aOriginal items from PEI with improved structuring and wording. ^bOriginal items from PSQ-III with improved structuring and wording. ^cOriginal items from NIS

With reference to validity, the final 30 items have achieved content validity after improvement of wording of some of its items as suggested by the expert panels, and the panels decided that all three aspects of communication constructed, EI, SB and CS were adequately covered. We performed PCA to determine what relevant items to retain or remove from the instrument, and to examine the factor structure of items for grouping into components. In terms of factor structure, the scale performed as predicted. Factor structure

supports the existence of the three dimensionality of communication proposed by the instrument. Based on the initial PCA of 52 items, we excluded eight items from EI, one item from SB and thirteen items from CS leaving the final instrument with 10 items for EI, 16 items for SB and 4 items for CS. The HCP-PC instrument can be used to measure either the total or domain specific scale. However, the total scale is heavily weighted by the SB component which has the most number of items and

it explains 47.18% of the total variance which was 61.98%.

The development of this instrument is to accommodate the growing interest on patient satisfaction in evaluating health providers' competency in communication with their patients. In Malaysia, we have limited published information and lack research on evaluation of communication during clinical consultation. Hence, the availability of this instrument would be useful in determining whether medical education in this country is evolving towards producing more patient-centered HCPs that are competent in establishing and maintaining effective health provider-patient communication in their practice. The content of the HCP-PC instrument focused on three important aspects of communication which are essential component of comprehensive HCP-PC. It also included non-verbal communication which had received little attention in communication studies^{2 9 20}.

However, the limitation of the study was the test retest reliability was not done due to limited time. In addition the sample size was small and the fact that the study was conducted in a single setting, an outpatient clinic of a major hospital, may limit the generalizability of the study to clients of primary care services in Malaysia.

CONCLUSION

The instrument has adequate internal consistency and validity which makes it available to be used to measure patient satisfaction with HCP-PC during consultation in Malaysian primary care setting.

ACKNOWLEDGEMENTS

This study was funded under Universiti Kebangsaan Malaysia Medical Centre (UKMMC) Fundamental Research Fund (FF187-2012). The authors would like to express appreciation to the Head of Outpatient Department (OPD), Hospital

Kuala Lumpur and Ministry of Health (MOH) for granting permission to conduct this study and all the patients who participated in this study.

REFERENCES

1. Guldvog B. Can patient satisfaction improve health among patients with angina pectoris?. *Int J Qual Health C* 1999; 11(3): 233-40.
2. McCormack LA, Treiman K, Rupert D, et al. Measuring patient-centered communication in cancer care: A literature review and the development of systematic approach. *Soc Sci Med* 2011; 72: 1085-1095.
3. Garrat AM, Danielsen K, Forland O, Hunskaar S. The patient experiences questionnaire (OEPEQ): Data quality, reliability and validity in patients attending 52 Norwegian Hospitals. *Scand J Prim Health Care* 2010; 28 (2): 433- 437.
4. Baker R, Whitfield M. Measuring patient satisfaction: A test of construct validity. *Qual Health Care* 1992; 1: 104-109.
5. Sitzia J. How valid and reliable are patient satisfaction data? An analysis of 195 studies. *Int J Qual Health C* 1999; 11: 4.
6. Gay L, Educational research: competencies for analysis and application. 1987 Merrill Pub. Co., Columbus.
7. Dyah Pitaloka S. and Rizal AM.. Patients' satisfaction in antenatal clinic hospital Universiti Kebangsaan Malaysia. Dissertation, Community Health Department. 2005. University Kebangsaan Malaysia.

8. Ismail S, Eng HS, Krishnan B, Siti Nooraini A, Noorfandi M, Pathnathan A. and Choy CY. A study of patient's satisfaction with the emergency department (ED) of hospital Universiti Kebangsaan Malaysia (HUKM). *Medicine and Health* 2008; 3(1): 7-13.
9. Noor Hazilah Abd Manaf. and Phang SN. Patient satisfaction as an indicator of service quality in Malaysian public hospitals. *The Asian Journal On Quality* 2009; 10(1): 77-87.
10. Takemura Y, Liu J, Atsumi R, Tsukasa T. Development of A Questionnaire To Evaluate Patient Satisfaction With Medical Encounters. *J Exp Med* 2006; 210: 373-38.
11. Baker R. Pragmatic model of patient satisfaction in general practice: progress towards a theory. *Qual Health Care* 1997; 6: 201-204.
12. Gorawara-Bhat R, Cook M, Sachs G. Non-verbal communication in doctor- elderly patient transactions (NDEPT): Development of a tool. *PATIENT EDUC COUNS* 2007; 66:223-34.
13. Howie JGR, Heaney DJ, Maxwell M, Walker JJ, Freeman GK, Rai H. Quality at general practice consultations: Cross sectional survey. *Brit Med J* 1999; 319(7212): 738-743.
14. Lam CLK, Yuen NYK, Mercer SW, Wong W. A pilot study on the validity and reliability of the Patient Enablement Instrument (PEI) in a Chinese population. *J Fam Practice* 2010; 27 (4): 395-403.
15. Ware J, Davies-Avery A, Stewart AL. The measurement and meaning of patient satisfaction. *Med Care Res Rev* 1978; 1 (1): 1-15.
16. Richmond V P, McCroskey J C, Johnson AD. Development of the nonverbal immediacy scale (NIS): Measures of self- and other-perceived nonverbal immediacy. *Comm Quart* 2003; 51: 502-515.
17. McBride A, Pates R, Ramadan R, McGowan C. Delphi survey of expert's opinions on strategies used by community pharmacists to reduce over- the counter drug misuse. *Addiction* 2003; 98: 487-497.
18. O'Hara, L, De Souza L, Ide L. A delphi study of self-care in a community population of people with multiple sclerosis. *Clin Rehabil* 2000; 14: 62-71.
19. Cattell RB. The scree test for the number of factors. *Multivar Behav Res* 1966; 1(2): 245-276.
20. Hovat N, Kos M. Development and initial validation of a patient satisfaction with pharmacy performance questionnaire (PSPP-Q). *Eval Health Prof* 2010; 33: 197.
21. Grogan S, Conner M, Norman P, et al. Validation of a Questionnaire Measuring Patient Satisfaction with General Practitioner. *Int J Qual Health C* 2000; 9: 210-215.
22. Sharifa Ezat, W.P., Jamsiah M., Malka S.A., Azimatun Noor A., Tuti Ningseh & Noor Izzah A. Customers' satisfaction among urban and rural public health clinics in state of Selangor, Malaysia. *Malaysian Journal of Public Health Medicine* 2010; 10 (2):52-67.

23. Verlinde E, De lander N, De Maesschalck S, Deveugele M, Willems S. The social gradient in doctor-patient communication. *Int J Equity Health* 2012; **11**: 12.