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Developing a Service Quality Measurement Model of Public Health Center in Indonesia

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Abstract

Many researches were conducted in order to develop service quality measurement model for health service. However, the majority of the researches were conducted in hospital service context and only small numbers of the researches were done in developing countries. Furthermore, the previous researches also have not tested the stability of service quality measurement model because of the differences in socio-demographic profiles (sex, age, and income) of the users. Therefore, this research tried to develop a new service quality measurement model for public health center (PHC) in Indonesia, a developing country.

In order to build the model, research data were gathered from 800 PHC users using survey method. The authors applied some statistical analysis, such as: exploratory factor analysis to identify the dimensions of service quality; confirmatory factor analysis to test the goodness of fit, discriminant validity, and convergent validity; Cronbach Alpha analysis to ensure the reliability, and stability analysis based on socio-demographic profiles of the respondents.

The result shows that service quality measurement model of PHC in Indonesia consists of 24 indicators which are divided into four dimensions, namely the quality of healthcare delivery, the quality of healthcare personnel, the adequacy of healthcare resources, and the quality of administration process. This service quality measurement model has not only met the criteria of goodness of fit, discriminant validity, convergent validity, and reliability but also proved to be stable tested against respondents' sexes, ages, and incomes.

Key words: Service quality; Public Health Center; Measurement instrument; Developing countries

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1. INTRODUCTION

1.1 Background

In service sectors, quality is already identified as a variable with important roles (Yusoff and Ismail, 2008). Many researches proved that service quality is an antecedent factor of satisfaction (Lai and Chen, 2011; Olorunnivo et al., 2006; Ojo, 2010; Ravinchandran et al, 2010; Salazar et al, 2004; Hasan et al, 2008; Ishaq, 2011; Sumaedi et al., 2011) and customer loyalty (Bunthuwun et al., 2010; Kheng et al., 2010; Al-Rousan et al., 2010; Bloomer et al., 1999). Furthermore, service quality also determines the value of products/ services in the eyes of customers (Omar et al., 2010; Ismail et al., 2009; Wen et al., 2005; Kuo et al., 2009; Jen and Hu, 2003; Zeithaml, 1998).

In the context of health service, customer perception on service quality is also believed to be a success factor for healthcare organizations. For example, Donabedian (2005) stated that hospital profitability and user satisfaction is affected by users' perceptions on service quality. Furthermore, perceived service quality is also said to have an impact on customer loyalty and word-of-mouth (Andaleeb, 2001). Therefore, user perception on service quality must always be considered and improved in health service context.

Health is an important aspect of national development since it influences the quality of human resources (Act No. 36 of 2009 concerning Health). In this particular context, healthcare service in Indonesia is a part of public services

that must be provided by the Government. In Indonesia, Government develops public health centers (PHC) to ensure the availability of healthcare service for its citizens (The Decree of Indonesian Minister of Health No.279/MENKES/SK/IV/2006 concerning the Guideline for Implementing Public Healthcare Effort in Public Health Center). Unfortunately, until now, harsh complaints and criticisms towards PHC in Indonesia are still vibrantly heard. Given this, PHC service quality improvement must be a mandatory agenda. With that in mind, user perception of public health center in Indonesia, especially the way they measure service quality, is essential, urgent and interesting to be studied. This because the knowledge on quality measures (quality dimensions) will help practitioners and policy makers in public health center clearly assess what needs to be monitored, analyzed, maintained, and fixed regarding to service quality.

1.2 Literature Review and Research Gaps

Service quality is one of the most discussed topics among practitioners and scholars in the field of service management (Yusoff and Ismail, 2010). Many researchers try to define service quality. Although different, generally, researchers agree that service quality must be seen from the view of users/customers (Clemes et al., 2008). Zeithaml (1988) defined it as “the consumer’s judgment about a [service]’s overall excellence or superiority”. Hence, we can conclude that healthcare service quality is referred as consumer overall evaluation on healthcare service performance given by health care service provider.

Quality is an abstract concept, making it hard to be measured and it is currently seen using various points of view (Lee et al., 2000). It is more complex in service context because of the unique characteristics of service quality, which are intangibility, inseparability, variability, and perishability (Kotler and Keller, 2012). Hence, many researchers have tried to develop ways to measure service quality including in the context of healthcare service. Surprisingly, until now, there is no agreement on how to measure service quality (Jain and Gupta, 2004; Parasuraman, 1985; 1988; 1994; Cronin and Taylor, 1992; Clewes, 2003), including in the context of healthcare service (Pai and Chary, 2012).

Service quality measurement model, which consists of dimensions and indicators of the dimensions, illustrates how service quality is evaluated by service consumers. Service quality dimension is aspects that are deemed as relevant by consumers in evaluating service performance (Clemes et al., 2008). Literatures show that service quality has been agreed as a multidimensional concept (Berry et al., 1985 and Parasuraman et al., 1985), but there is no consensus on what are the dimensions of the construct (Brady and Cronin, 2001).

Many researchers have proposed service quality measurement model that is specific to the context of healthcare service. For examples, Lim and Tang (2002) suggested seven service dimensions of healthcare service

quality, namely reliability, assurance, tangible, empathy, responsiveness, accessibility and affordability. Other researchers, Reidenbach and Sadifer-Smallwood (1990), argued that service quality should be consisted of seven dimensions, which are patient confidence, empathy, quality of treatment, waiting time, physical appearance, support services, and business aspects. Haddad et al. (1998) saw that service quality dimension only has three dimensions, namely delivery, personnel, and facilities. Van Duong et al. (2004) mentioned that service quality has four dimensions (healthcare delivery, health facility, interpersonal aspects of care, and access to services). More completely, Table 1 summarizes studies that proposed service quality dimensions that are specific to the context of healthcare service.

Referring to previous explanation, the majority of the researches on health care service quality measurement model was in the context of developed countries, while researches in developing countries are fairly limited (van Duong et al., 2004). To our knowledge, there was no empirical study in Indonesia that specifically conducted to develop healthcare service quality measurement model. Meanwhile, it is generally known that culture in a country can influence service quality dimensions that are appropriate for service context in that country (van Duong et al., 2004; Herbig and Genestre, 1996; Witkowski and Wolfinger, 2002). Thus, service quality measurement model generated from studies on certain countries needs to be tested and adjusted for others (Malhotra et al., 1994; Cui et al., 2003).

Previous researches that developed healthcare service quality measurement model were also mostly carried out for hospital service while similar researches for PHC are small in numbers. That was indicated by the difficulty in looking for PHC service quality measurement model in some large data bases and publisher (Emeraldinsight, Science Direct, JSTOR, Taylor & Francis Online). Service characteristics in PHC are different with the ones in hospitals. In Indonesia, public health center focuses on basic health treatments. Besides, public health center is the responsibility of Indonesian Government so that it is more social-oriented than profit-oriented (Deber, 2002). These characteristics create implication that service mix, marketing programs, and even resources managed by PHC are different with hospital. This condition will differentiate the user perceptions of roles and functions between PHC and hospitals. Therefore, it becomes important to build an appropriate model for the context of healthcare service in PHC in Indonesia.

Besides above gaps, from the methodology aspect, the previous researches utilized the method proposed by Parasuraman et al. (1988; 1991) in developing healthcare service quality measurement models. Researchers generally did some explorations to identify the dimensions of service quality using factor analysis. After that, every

dimension was tested for its validity and reliability (for examples, see Reidenbach and Sandifer-Smallwood, 1990; Haddad et al., 1998; Baltussen et al., 2002; Van Duong et al., 2004; Narang, 2011).

Related to the use of factor analysis, Hair et al. (2006) pointed out some important points for considerations as follows:

“[t]he researcher must ...ensure that the sample is homogeneous with respect to the underlying factor structure. It is inappropriate to apply factor analysis to a sample of males and females for a set of items known to differ because of gender. When the two subsamples (males and females) are combined, the resulting correlation and factor structure will be a poor representation of the unique structure of each group. Thus, whenever differing groups are expected in the sample, separate factor analyses should be performed, and the results should be compared to identify differences not reflected in the results of the combined sample.” (Hair et al., 2006)

Unfortunately, the previous researches have not tested whether service quality dimensions used in the model were stable across various socio-demographic profiles, such as sex, age, and income. Meanwhile, literature on consumer behavior discusses that socio-demographic characteristics of consumers can affect their attitude and purchasing behavior (Al-Khayri and Hassan, 2012; Farah et al., 2011; Akman and Rehan, 2010; Abreu and Lins, 2010). For example, women tend to consider hedonic service elements as more important than functional utilitarian elements and men tend to think the other way around (Jen-Hung and Yi-Chun, 2010; Alreck and Settle, 2002). More specifically, in the context of service quality, Zeithaml (1993) and Joseph et al (2005) argued that consumer evaluation on service quality will be affected by their socio-demographic profile. Thus, the results of previous researches are questionable since they have not considered the possibility of different service quality dimensions among respondents with different socio-demographic profiles.

1.3 Research Objective

In order to fill the gaps in the literature, this research aims to build service quality measurement model that is both stable and appropriate for PHC in Indonesia, a developing country. More specifically, this research tries to answer the question of what are the appropriate dimensions and indicators to measure service quality of PHC in Indonesia.

After the introduction, this paper is organized as follows. First section is a literature review related to service quality and service quality measurement model in healthcare service. Second part will confer about research methodology and the third will present research results and the implications. The last section of this paper will discuss the conclusion, limitations, and next research agenda.

2. RESEARCH METHODOLOGY

2.1 Research Design

This research was designed as exploratory study using quantitative approach. Following the footsteps of previous researchers (e.g. van Duong, 2004; Vandamme and Leunis, 1993; Narang 2011; Haddad et al., 1998; Ygge and Arnetz, 2001), research was begun with identifying service quality indicators believed to be relevant with the characteristics of PHC. After that, data of consumer perceptions were gathered in a survey using questionnaire as research instrument. Exploratory and confirmatory factor analyses were applied to form service quality dimensions and ensure the validity. Cronbach alpha analysis conducted to test the reliability of the dimensions. Unlike previous researches, service quality dimensions formed were tested for their stability against socio-demographic profiles (sex, age, and income). Research design can be seen in Figure 1.

2.2 Service Quality Indicators

PHC service quality indicators used in this study were gathered from review on scientific literature, government regulations, and documents currently used by PHC to measure user perception towards PHC performance and the performance of healthcare service in general. Indicators were chosen based on several considerations, which are (1) their appropriateness to be used as evaluation indicators for healthcare service providers that only offer basic medical treatment; (2) their compatibility with social oriented healthcare organizations; (3) their suitability with service providers that serve citizens with lower-middle income. Based on above method, authors chose 29 indicators suspected as PHC service quality indicators. For more details, those indicators can be seen in Table 2.

2.3 Data Collection

The respondents of this study were 800 PHC users. The number of sample was bigger than previous researches, such as van Duong et al. (2004) with sample size 396, Narang (2011) with sample size 396, Haddad et al. (1998) with sample size 241, and Ygge and Arnetz (2001) with sample size 624. This sample size also exceeds the requirements of factors analysis and Structural Equation Modelling (Hair et al., 2010). Demographic profiles of respondents will be discussed in the result and discussion section.

Data collection was done by using survey method with questionnaire as the instrument. The questionnaire consists of two parts, respondent demographic profile and PHC service quality measurement. In the second part, PHC service quality measurement, respondents were asked to express their perception on 29 positive statements regarding the indicators of service quality (see Table 3). The questionnaire used 7-points Likert where 1 represents “totally disagree” and 7 represents “totally agree”.

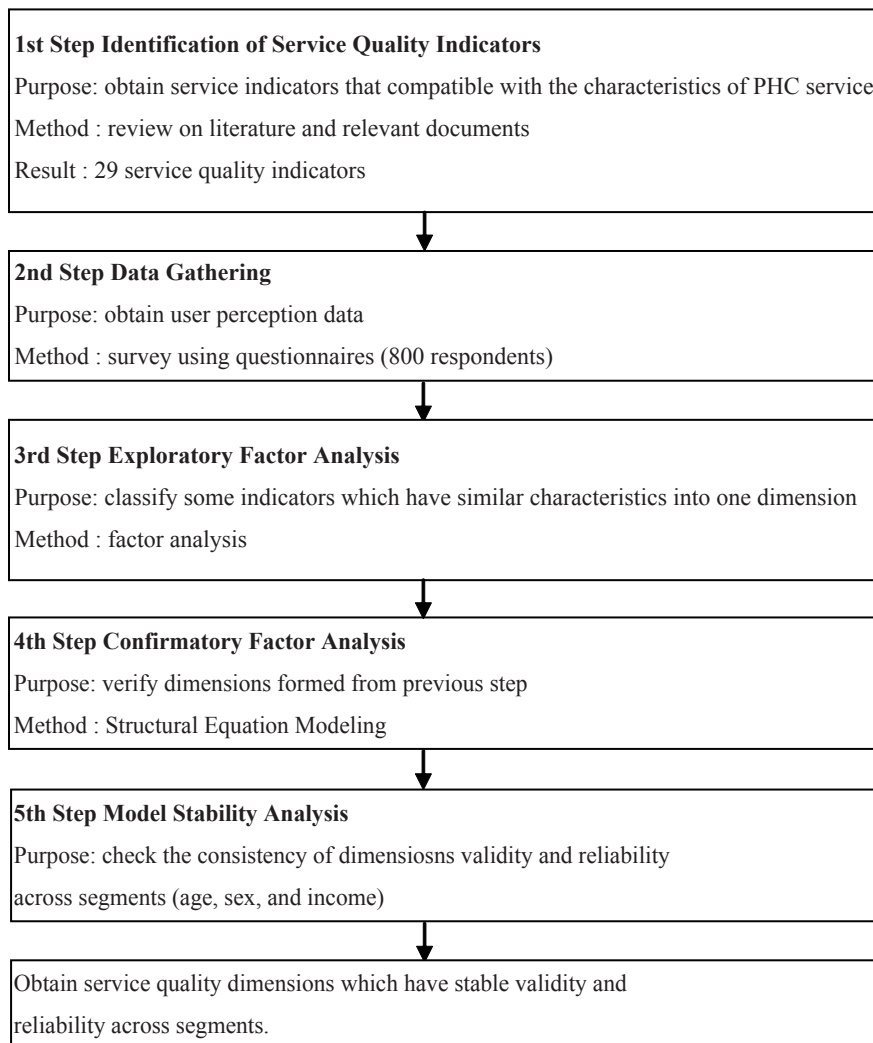


Figure 1
Research Design

To ensure that respondents were the users of PHC service, survey was carried out in the location of PHC. There were five PHC chosen in Jabodetabek. The sites were preferred because the area is located in Indonesia

central government area and considered as metropolitan area which has residents that are highly critical towards healthcare service.

Table 1
Service Quality Dimensions in Healthcare Service Context

Authors	Country	Object	Sample	Service quality dimensions
Lim and Tang (2000)	Singapore	Hospital	252 patients	<i>Tangibility, Reliability, Responsiveness, Assurance, Empathy, Accessibility and Affordability</i>
Reidenbach and Sandifer-Smallwood (1990)		Hospital	300 patients from three service area (ER, inpatients service, outpatients service)	<i>Patient confidence, empathy, quality of treatment, waiting time, physical appearance, support services and business aspects</i>
Jabnoun and Chaker (2003)	United Arab emirates	Hospital	205 inpatients	<i>empathy, tangibles, reliability, administrative responsiveness, and supporting skills"</i>
Maxwell (1984)	United Kingdom	Hospital	-	<i>Accessibility, relevance, effectiveness, equity, social acceptability and efficiency</i>

To be continued

Continued

Authors	Country	Object	Sample	Service quality dimensions
Tomes and Ng (1995)	England	Hospital	132 patients	Tangible (empathy, understanding of illness, relationship of mutual respect, dignity, religious needs) and Intangible (food and physical).
Haddad et al. (1998)	Upper Guinea	Hospital, Urban and Rural health centers	241 patients	health care delivery, personnel, and facilities
Baltussen et al (2002)	Burkina Faso	1 Urban Hospital and 10 rural health care centers	1081 visitors	health personnel and conduct; adequacy of resources and services; healthcare delivery, and financial; and physical accessibility
Van Duong, et al (2004)	Vietnam	Pregnant and postnatal care	196 pregnant women and 200 women in maternity care	healthcare delivery, health facility, interpersonal aspects of care, and access to services
Narang (2011)	India	Public Health Care Center	396 patients	health care delivery; interpersonal and diagnostic aspect of care; Facility; health personnel conduct and drug availability; Financial and physical access to care
Ygge and Arnetz (2001)	Sweden	The Pediatric Care	624 patients and parents	information-illness; information-routine; accessibility; medical treatment; caring process; staff attitude; participation; work environment
Zineldin (2006)	Egyptian & Jordanian	Medical Clinic	244 inpatients	Object, processes, infrastructure, interaction and atmosphere quality
Lynn (2007)	-	Nursing care	1.470 patients	Individualization, nurse characteristics, caring, Environment, Responsiveness
Badri, et al (2008)	UAE	Public Hospital	244 inpatients	quality of care, process and administration and information
Karassavidou (2009)	Greek	NHS Hospital	137 patients	Human Aspect; Access; Physical environment and infrastructure
Choi et al (2005)	South Korea	A general hospital in Sungnam, Seoul	557 outpatients	physician concern, staff concern, convenience of the care process, and tangible, reflecting aspects of technical, functional, environment and administration quality
Wellstood et al (2005)	Ontario, Canada	The emergency room (ER)	41 men and women from two socially distinct neighborhoods in Hamilton, Ontario, Canada	Physician-patient interaction, information/communication between the physician and patient, and wait time
Sower et al. (2001)	Texas	Hospital	663 recently discharged patients	Respect and Caring, Effectiveness and Continuity, Appropriateness, Information, Efficiency, Effectiveness-Meals, First Impression, Staff Diversity
Yeşilada and Direktör (2010)	Northern Cyprus	Public and Private Hospital in Northern Cyprus	806 users	Reliability/confidence, empathy, tangibles
Teng et al. (2007)	Taiwan	Hospital	271 patients in surgical wards	Needs management, assurance, sanitation, customization, convenience and quiet, attention

Table 2
Service Quality Indicators

No	Service Quality Indicators	Reference
1	SQ1 Conditions of healthcare facilities and equipment	Lim and Tang (2000),
2	SQ2 Comfort and cleanliness of the environment	Lim and Tang (2000), Narang (2011), Zineldin (2006)
3	SQ3 Sufficiency of medical equipment	Haddad et al. (1998), Baltussen and Ye (2005), Duong, et al (2004), Narang (2011)
4	SQ4 Sufficiency of available room	Haddad et al. (1998), Duong, et al (2004), Narang (2011)
5	SQ5 Sufficiency of personnel (doctors, nurses, and administrative staff)	Haddad et al. (1998), Baltussen and Ye (2005), Duong, et al (2004), Narang (2011)
6	SQ6 Sufficiency of available medicines	Haddad et al. (1998), Baltussen and Ye (2005), Narang (2011)
7	SQ7 Staff appearance (doctors, nurses, and administrative staff)	Lim and Tang (2000),
8	SQ8 Employee hospitality and courtesy	Lim and Tang (2000), Tomes and Ng (1995), Zineldin (2006)
9	SQ9 Employees' sense of respect towards the patients	Baltussen and Ye (2005), Tomes and Ng (1995), Duong, et al (2004), Haddad et al. (1998), Narang (2011)

To be continued

Continued

No	Service Quality Indicators	Reference
10	SQ10 Employees' sense of care towards the patients	Baltussen and Ye (2005), Haddad et al. (1998), , Duong, et al (2004), Narang (2011)
11	SQ11 Employees' genuine desire to help patients	Baltussen and Ye (2005), Narang (2011), Haddad et al. (1998), Duong, et al (2004)
12	SQ12 Willingness of employees to listen to patients' problems	Lim and Tang (2000), Zineldin (2006),
13	SQ13 Doctors'/ nurses' professionalities in diagnosing patients	Haddad et al. (1998), Baltussen and Ye (2005), Duong, et al (2004), Narang (2011)
14	SQ14 Doctors'/ nurses' professionalities in examining patients	Baltussen and Ye (2005), Duong, et al (2004), Narang (2011), Haddad et al. (1998),
15	SQ15 Doctors'/ nurses' professionalities in determining medicines	Haddad et al. (1998), Baltussen and Ye (2005)
16	SQ16 Guarantee the availability of doctors in operational hours	Haddad et al. (1998), Baltussen and Ye (2005), Duong, et al (2004), Narang (2011)
17	SQ17 The quality of medicines	Baltussen and Ye (2005), Narang (2011), Haddad et al. (1998), Duong, et al (2004)
18	SQ18 The ease of registration procedures	Zineldin (2006), The Decree of Indonesian Minister of Administrative Reform (MENPAN) No. 81 Year 1993 concerning guideline for Management of Public Services.
19	SQ19 The speed of registration process	Zineldin (2006), The Decree of Indonesian Minister of Administrative Reform (MENPAN) No. 81 Year 1993 concerning guideline for Management of Public Services.
20	SQ20 The ease of payment procedures	Zineldin (2006), The Decree of Indonesian Minister of Administrative Reform (MENPAN) No. 81 Year 1993 concerning guideline for Management of Public Services.
21	SQ21 The speed of payment process	Zineldin (2006), The Decree of Indonesian Minister of Administrative Reform (MENPAN) No. 81 Year 1993 concerning guideline for Management of Public Services.
22	SQ22 Conformity between health services of health center with the expectations of patients to be healthier than ever	Baltussen and Ye (2005), Haddad et al. (1998)
23	SQ23 The effectiveness of health center services in treating patients	Baltussen and Ye (2005), Haddad et al. (1998)
24	SQ24 The efficacy of drugs given	Baltussen and Ye (2005), Duong, et al (2004), Narang (2011), Haddad et al. (1998)
25	SQ25 The conformity of medicines and the illness	Baltussen & Ye (2005), Duong, et al (2004), Narang (2011), Haddad et al. (1998)
26	SQ26 Doctors competence in treating disease	Tomes and Ng (1995), Lim and Tang (2000), Zineldin (2006)
27	SQ27 Doctors effectivity in treating disease	Tomes and Ng (1995)
28	SQ28 The effectivity of treatment method	Baltussen and Ye (2005), Haddad et al. (1998)
29	SQ29 The conformity of treatment with the disease	Baltussen and Ye (2005), Haddad et al. (1998)

2.4 Data Analysis

Data analysis consists of three phases, which are: exploratory factor analysis, confirmatory factor analysis, and stability analysis of service quality measurement model. Exploratory factor analysis was conducted to identify the number of service quality dimensions and their respective indicators. It was done using software SPSS 16 with confidence level of 95%. Confirmatory factor analysis was carried out in order to test goodness of fit, construct validity (discriminant and convergent validity), and the stability of the model was confirmed using Structural Equation Modelling (LISREL 8.80). In addition, Cronbach Alpha Analysis was also done to test the reliability of service quality measurement model.

3. RESULT AND DISCUSSION

3.1 Respondent Profile

The respondent of this study was 800 PHC service users. The respondent comprised of 403 males (50.4%) and 397 females (49.6%). Their age are below or equal 20 years old (22.41%), 21-30 years old, (29.97%), 31-40 years old (21.03%), and equal or above 41 years old (26.57%). Most of the respondents are unemployed (29.10%), some

of them are students (23.08%), workers at prive sectors (18.20%), day labor (12.56%), entrepreneurs (12.18%), civil servants (4.23%), and military personnel (0.64%).

Respondents profile also shows that 57.56% of them graduated from high school. The rest of them graduated from junior high school (19.77%), university (12.1%), elementary school (8.94%), and small number of respondents did not go to school or did not finish elementary school (1.7%). Forty five point five percent (45.5%) of respondents has no income, 40% has income below or equal with Rp1,800,000, and the rest of them has income of more than Rp1,800,000.

3.2 The Result of Explortory Factor Analysis

The result of Kaiser-Meyer-Olkin (KMO) test was 0.942 which means that the sample size of this test was adequate for factor analysis (Hair et al., 2010). In addition, Bartlett's Test of Sphericity (BTS) shows the significance number of below 0.05 which indicates this study use an appropriate model for factor analysis (Gupta & Bansal, 2012).

Exploratory factor analysis was done by using principal component analysis in order to extract indicators and categorize them into minimum numbers of dimensions (Gupta & Bansal, 2012). Varimax rotation procedures use

to obtain simple factors structure (Hair et al., 2010). The result of exploratory factor analysis can be seen in Table 3.

Referring to Table 3, there are four factors that have eigenvalue of more than 1 and able to represent 65.98% of variance in indicators. Those four factors could be seen as a group of indicators which illustrates the quality of healthcare delivery (SQ22, SQ23, SQ24, SQ25, SQ26, SQ27, SQ28, SQ29), the quality of healthcare personnel (SQ8, SQ9, SQ10, SQ11, SQ12, SQ13, SQ14, SQ15), the adequacy of healthcare resources (SQ3, SQ4, Q5, SQ6), and the quality of administration process (SQ18, SQ19, SQ20, SQ21). Furthermore, there were five indicators removed. Four indicators (SQ1, SQ2, SQ7, SQ17) were removed since their communalities value is less than

0.5 while one indicator (SQ16) was removed because its factor loading is less than 0.5 (Hair et al., 2010).

3.3 The Results of Confirmatory Factor Analysis

To see the goodness of fit of the model, some criteria, which are *Root Mean Square Error of Approximation (RMSEA)*, *Normed Fit Index (NFI)*, *Non-Normed Fit Index (NNFI)*, *Comparative Fit Index (CFI)*, *Incremental Fir Index (IFI)*, *Relative Fit Index (RFI)*, were employed. Table 4 shows the results of the analysis.

Referring to Table 4, Confirmatory Factor Analysis shows that the model met the criteria. Thus, four dimensions emerged from exploratory factor analysis are fit to become the building block of PHC service quality measurement model in Indonesia.

Table 3
The Results of Exploratory Factor Analysis

Quality Indicators	Factor Loading	Eigen Value	Variance Explained (%)	Dimension
SQ22	0.545	10.738	42.952	The quality of healthcare delivery (qs1)
SQ23	0.709			
SQ24	0.761			
SQ25	0.687			
SQ26	0.735			
SQ27	0.751			
SQ28	0.728			
SQ29	0.694			
SQ08	0.709			
SQ09	0.758			
SQ10	0.807			
SQ11	0.780			
SQ12	0.747			
SQ13	0.613			
SQ14	0.580	1.703	6.811	The adequacy of healthcare resources (qs3)
SQ3	0.768			
SQ4	0.826			
SQ5	0.796	1.824	7.296	The quality of administration process (qs4)
SQ6	0.780			
SQ18	0.747			
SQ19	0.807			
SQ20	0.820			
SQ21	0.821			

Note: see Table 3 for explanations on the indicators

Table 4
CFA Results of Goodness of Fit Measurement

Criteria	Cut off Value	Test Value	Conclusion	References
RMSEA	≤ 0.08	0.07	Good	Hair et al., 2010
NFI	≥ 0.90	0.96	Good	Hair et al., 2010
NNFI	≥ 0.90	0.97	Good	Hair et al., 2010
CFI	≥ 0.90	0.97	Good	Hair et al., 2010
IFI	≥ 0.90	0.97	Good	Hair et al., 2010
RFI	≥ 0.90	0.96	Good	Hair et al., 2010
GFI	≥ 0.90	0.72	Good	Hair et al., 2010

Confirmatory Factor Analysis also shows that the model met the criteria of discriminant and convergent validity Table 5 and 6). Convergent validity is fulfilled since (1) the value of Standardized Factor Loading for each indicators are higher than 0.5 with significance level below 5% (Hair et al., 2006); (2) the value of Composite Reliability of each dimensions are greater than 0.6 (Hair et al., 2006) and (3) the value of AVE for all dimensions are higher than 0.5 (Fornell and Larcker, 1981). Discriminant validity is also fulfilled because the value of AVE for each dimension fell within the range of 0.55 and 0.6 (greater than squared correlation between constructs) (Fornell and Larcker, 1981).

Dimensions reliability was proven by the value of Cronbach Alpha (CA) of each dimension. They exceeds the cut-off value of 0.6 (Lai and Chen, 2011; Tari et al., 2007; Hair et al., 2006) (see Table 5). With the fulfillment of reliability criteria, we concluded that the four dimensions are reliable to be used in PHC service quality measurement model.

3.4 The Result of Model Stability Analysis

To test the stability of the service quality measurement model, stability analysis was conducted. In accordance with Hair et al. (2006) opinion, this analysis utilized confirmatory factor analysis based on differences in

criteria suspected to have influence on respondents' perception. In addition, Cronbach Alpha analysis based on different criteria of respondents was also done. In this stage, the model was tested for its stability across three demographic profiles category (sex, age, and income). The three were selected because those are the ones that often being mentioned in consumer behavior literature as having influence on attitude and purchasing behavior (see Abreu and Lins, 2010; Choi et al., 2005; Alrubaiee and Alkaa'ida, 2011; Akman and Rehan, 2010; Farah et al., 2011; Al-Khayri and Hassan, 2012) and the number of sample allowed us to run statistical inference analysis after the samples were divided and regrouped (Hair et al, 2006).

3.4.1 Sex-Based Stability Analysis

Table 7, 8, 9, and 10 show the results of stability test based on sex. Referring to those tables, this PHC Service Quality Model was stable for both sexes. Stability analysis shows that the model has adequate goodness of fit for the group of male respondents and female respondents (see Table 7). In both groups we found RMSEA values were well below the cut-off value of 0.08. The value of NFI, NNFI, CFI, IFI, and RFI for each group also met the cut-off value criteria (above 0.9).

Table 5
Results of Reliability and Validity Test

Service Quality Dimensions and Indicators	Standardized Factor Loading (SFL)*	Error Variance	CA	CR	AVE
QS 1			0.91	0.91	0.55
SQ22	0.64	0.60			
SQ23	0.75	0.44			
SQ24	0.77	0.41			
SQ25	0.72	0.48			
SQ26	0.74	0.46			
SQ27	0.78	0.39			
SQ28	0.78	0.39			
SQ29	0.75	0.44			
QS 2			0.91	0.91	0.55
SQ08	0.72	0.48			
SQ09	0.77	0.41			
SQ10	0.81	0.34			
SQ11	0.79	0.38			
SQ12	0.74	0.46			
SQ13	0.72	0.48			
SQ14	0.67	0.55			
SQ15	0.71	0.50			
QS 3			0.86	0.86	0.60
SQ03	0.76	0.42			
SQ04	0.78	0.38			
SQ05	0.77	0.41			
SQ06	0.79	0.37			
QS 4			0.86	0.86	0.60
SQ18	0.76	0.43			
SQ19	0.79	0.38			
SQ20	0.80	0.36			
SQ21	0.76	0.42			

Table 6
The Value of AVE and Correlation Between Constructs/ Dimensions of Service Quality

	AVE	QS 1	QS 2	QS 3	QS 4
QS1	0.55	1			
QS2	0.55	0.53	1		
QS3	0.6	0.29	0.30	1	
QS 4	0.6	0.28	0.29	0.16	1

Table 7
Goodness of Fit of Sex-Based Stability Analysis

Indicator Measurement	Result	
	Male	Female
RMSEA	0.057	0.058
NFI	0.96	0.95
NNFI	0.98	0.98
CFI	0.99	0.98
IFI	0.99	0.98
RFI	0.95	0.94

Table 8
Results of Reliability and Validity Test on Sex-Based Stability Analysis

LV / OV	Male		Female	
	SFL	CA / CR / AVE	SFL	CA / CR / AVE
SQ 1		0.91/0.91/0.57		0.90/0.90/0.54
SQ22	0.68		0.59	
SQ23	0.77		0.73	
SQ24	0.76		0.79	
SQ25	0.73		0.72	
SQ26	0.73		0.75	
SQ27	0.80		0.77	
SQ28	0.79		0.77	
SQ29	0.76		0.74	
SQ 2		0.83/0.91/0.56		0.90/0.90/0.54
SQ08	0.71		0.73	
SQ09	0.76		0.78	
SQ10	0.81		0.82	
SQ11	0.81		0.77	
SQ12	0.74		0.72	
SQ13	0.73		0.71	
SQ14	0.71		0.63	
SQ15	0.72		0.69	
SQ 3		0.85/0.85/0.58		0.87/0.87/0.63
SQ03	0.80		0.72	
SQ04	0.76		0.81	
SQ05	0.73		0.81	
SQ06	0.76		0.82	
SQ 4		0.85/0.86/0.60		0.86/0.86/0.61
SQ18	0.76		0.74	
SQ19	0.78		0.80	
SQ20	0.80		0.80	
SQ21	0.74		0.79	

Table 9
AVE Value and Correlation Value between Constructs/ Dimensions on Sex-Based Stability Analysis: Male

	AVE	SQ1	SQ2	SQ3	SQ4
SQ1	0.57	1			
SQ2	0.56	0.58	1		
SQ3	0.58	0.40	0.45	1	
SQ4	0.6	0.40	0.31	0.20	1

Table 10
AVE Value and Correlation Value between Constructs/ Dimensions on Sex-Based Stability Analysis: Female

	AVE	SQ1	SQ2	SQ3	SQ4
SQ1	0.54	1			
SQ2	0.54	0.48	1		
SQ3	0.63	0.19	0.20	1	
SQ4	0.61	0.20	0.26	0.07	1

The result of stability analysis also shows that the model met the criteria of validity and reliability. The value of Standardized Factor Loading (SFL) for all indicators that are above 0.5 and significant on 5% alpha (Hair et al., 2006), the value of Composite Reliability for each dimension that is bigger than 0.6 (Hair et al., 2006), and the values of AVE that are above 0.5 (Fornell and Larcker, 1981) indicate that the model met the criteria of convergent validity in both groups (see Table 8). The model also fulfilled the requirement of discriminant validity where the value of AVE of each construct/ dimension is bigger than the value of squared correlation between constructs except for the dimension of “the quality of healthcare delivery” and “the quality of personnel” in male group. The values of their AVE fell slightly below their squared correlation (see Table 9 and 10). The value of Cronbach Alpha above 0.6 indicates that the model was reliable (Lai and Chen, 2011; Tari et al., 2007, Hair et al., 2006).

3.4.2 Age-Based Stability Analysis

Table 11, 12, 13, 14, 15, and 16 show the results of age-based stability analysis. Referring to those tables, in general, PHC service quality measurement model was stable across all age groups.

In Table 11 we can see that generally, PHC Service Quality Model still had decent goodness of fit since some of the criteria (NFI, NNFI, CFI, IFI, and RFI) were met. Furthermore, PHC Service Quality Model also satisfied the criteria of validity and reliability in for all age groups. Table 12 shows that the values of Standardized Factor Loading (SFL) for all indicators are greater than 0.5 and significant on 5% alpha (Hair et al., 2006). All the dimensions have Composite Reliability values of more than 0.6 (Hair et al., 2006) and most of them have AVE values above 0.5 (Fornell and Larcker, 1981). These results indicate that PHC Service Quality Model satisfied the criteria of convergent validity. The fulfillment of discriminant validity criteria was shown by the majority of values of AVE that exceed the value of squared correlation

between constructs (see Table 13-16). Cronbach Alpha for each dimension in all age groups are bigger than 0.6, indicating a reliable model (Lai and Chen, 2011; Tari et al, 2007; Hair et al, 2006).

Table 11
Goodness of Fit of Age-Based Stability Analysis

Indicator Measurement	Results			
	≤ 20 yo	20 – 30 yo	30 – 40 yo	≥ 40 yo
RMSEA	0.092	0.090	0.089	0.10
NFI	0.88	0.95	0.94	0.90
NNFI	0.92	0.97	0.96	0.92
CFI	0.93	0.97	0.96	0.93
IFI	0.93	0.97	0.96	0.93
RFI	0.87	0.97	0.94	0.89

Table 12
Results of Reliability and Validity Tests of Age-Based Stability Analysis

LV / OV	≤ 20 yo		20 – 30 yo		30 – 40 yo		≥ 40 yo	
	SFL	CA / CR / AVE	SFL	CA / CR / AVE	SFL	CA / CR / AVE	SFL	CA / CR / AVE
SQ 1		0.87/0.87/0.46		0.92/0.92/0.60		0.94/0.94/0.65		0.88/0.88/0.49
SQ22	0.61		0.59		0.79		0.54	
SQ23	0.76		0.77		0.80		0.65	
SQ24	0.71		0.84		0.81		0.66	
SQ25	0.69		0.75		0.80		0.65	
SQ26	0.63		0.80		0.79		0.73	
SQ27	0.67		0.82		0.83		0.83	
SQ28	0.73		0.82		0.82		0.72	
SQ29	0.64		0.79		0.81		0.77	
SQ 2		0.85/0.85/0.42		0.93/0.93/0.61		0.92/0.92/0.59		0.91/0.91/0.56
SQ08	0.53		0.79		0.79		0.73	
SQ09	0.61		0.86		0.78		0.77	
SQ10	0.70		0.87		0.83		0.79	
SQ11	0.67		0.87		0.77		0.83	
SQ12	0.69		0.74		0.77		0.78	
SQ13	0.72		0.70		0.75		0.74	
SQ14	0.58		0.68		0.72		0.68	
SQ15	0.65		0.74		0.72		0.64	
SQ 3		0.85/0.85/0.60		0.87/0.87/0.64		0.85/0.85/0.60		0.82/0.82/0.54
SQ03	0.64		0.80		0.82		0.77	
SQ04	0.78		0.82		0.73		0.78	
SQ05	0.82		0.78		0.73		0.70	
SQ06	0.84		0.79		0.80		0.68	
SQ 4		0.75/0.76/0.44		0.90/0.90/0.69		0.81/0.87/0.62		0.90/0.90/0.70
SQ18	0.60		0.83		0.82		0.80	
SQ19	0.65		0.83		0.77		0.88	
SQ20	0.73		0.83		0.82		0.84	
SQ21	0.66		0.84		0.75		0.82	

Table 13
AVE Value and Correlation Value between Constructs/ Dimensions on Age-Based Stability Analysis: ≤ 20 yo

	AVE	SQ1	SQ2	SQ3	SQ4
SQ1	0.46	1			
SQ2	0.42	0.61	1		
SQ3	0.6	0.10	0.10	1	
SQ4	0.44	0.24	0.31	0.04	1

Table 14
AVE Value and Correlation Value between Constructs/ Dimensions on Age-Based Stability Analysis: 20-30 yo

	AVE	SQ1	SQ2	SQ3	SQ4
SQ1	0.42	1			
SQ2	0.61	0.58	1		
SQ3	0.64	0.44	0.34	1	
SQ4	0.69	0.27	0.27	0.13	1

Table 15
AVE Value and Correlation Value between Constructs/
Dimensions on Age-Based Stability Analysis: 31-40 yo

	AVE	SQ1	SQ2	SQ3	SQ4
SQ1	0.6	1			
SQ2	0.59	0.56	1		
SQ3	0.6	0.40	0.55	1	
SQ4	0.62	0.53	0.45	0.37	1

Table 16
AVE Value and Correlation Value between Constructs/
Dimensions on Age-Based Stability Analysis: ≥ 40 yo

	AVE	SQ1	SQ2	SQ3	SQ4
SQ1	0.44	1			
SQ2	0.56	0.29	1		
SQ3	0.54	0.19	0.35	1	
SQ4	0.7	0.18	0.18	0.12	1

3.4.3 Income-Based Stability Test

Tables 17 to 21 show the results of income-based stability test. According those tables, overall, PHC Service Quality Model was stable across all income groups.

Table 17
Goodness of Fit of Income-Based Stability Analysis

Indicator Measurement	Result		
	No Income	Income ≤ Rp1,800,000.00	Income > Rp 1,800,000.00
RMSEA	0.069	0.96	0.12
NFI	0.95	0.93	0.93
NNFI	0.97	0.95	0.94
CFI	0.97	0.95	0.95
IFI	0.97	0.95	0.95
RFI	0.97	0.92	0.92

Table 18
Results of Reliability and Validity Tests of Income-Based Stability Analysis

LV / OV	No Income		Income ≤ Rp1,800,000.00		Income > Rp 1,800,000.00	
	SFL	CA / CR / AVE	SFL	CA / CR / AVE	SFL	CA / CR / AVE
SQ 1		0.89/0.89/0.52		0.91/0.92/0.58		0.91/0.92/0.58
SQ22	0.69		0.55		0.71	
SQ23	0.77		0.75		0.73	
SQ24	0.75		0.78		0.80	
SQ25	0.70		0.74		0.74	
SQ26	0.68		0.77		0.77	
SQ27	0.72		0.84		0.79	
SQ28	0.75		0.81		0.78	
SQ29	0.68		0.81		0.76	
SQ 2		0.89/0.89/0.51		0.90/0.91/0.55		0.92/0.92/0.60
SQ08	0.70		0.69		0.80	
SQ09	0.75		0.76		0.81	
SQ10	0.75		0.83		0.85	
SQ11	0.74		0.79		0.86	
SQ12	0.76		0.69		0.75	
SQ13	0.70		0.74		0.71	
SQ14	0.64		0.68		0.71	
SQ15	0.69		0.73		0.67	
SQ 3		0.84/0.84/0.57		0.89/0.89/0.67		0.84/0.84/0.56
SQ03	0.68		0.87		0.72	
SQ04	0.75		0.83		0.76	
SQ05	0.78		0.81		0.70	
SQ06	0.80		0.78		0.80	

Table 17 shows that some criteria of goodness of fit (NFI, NNFI, CFI, IFI, and RFI) were met. Table 18 shows that the values of Standardized Factor Loading (SFL) for all indicators are greater than 0.5 and significant on 5% alpha (Hair et al., 2006), the values of Composite Reliability (CR) for all dimensions are greater than 0.6 (Hair et al., 2006), and all dimensions have AVE values above 0.5 (Fornell and Larcker, 1981). The results indicate the model met convergent validity. The model also met the criteria of discriminant validity that is indicated by the majority of the value of AVE for each construct/dimension in each income group greater than the squared correlation between constructs (see Table 19-21). The reliability of PHC Service Quality Model was illustrated by the values of Cronbach Alpha. The test yielded Cronbach Alpha values above 0.6 for all dimensions of each income group (Lai and Chen, 2011; Tari et al, 2007; Hair et al, 2006).

To be continued

Continued

LV / OV	No Income		Income ≤ Rp1,800,000.00		Income > Rp 1,800,000.00	
	SFL	CA / CR / AVE	SFL	CA / CR / AVE	SFL	CA / CR / AVE
SQ 4		0.83/0.83/0.55		0.87/0.87/0.62		0.89/0.90/0.68
SQ18	0.75		0.77		0.74	
SQ19	0.75		0.80		0.84	
SQ20	0.74		0.82		0.86	
SQ21	0.72		0.75		0.86	

Table 19
AVE Value and Correlation Value between Constructs/ Dimensions on Income-Based Stability Analysis: No Income

	AVE	SQ1	SQ2	SQ3	SQ4
SQ1	0.52	1			
SQ2	0.51	0.55	1		
SQ3	0.57	0.19	0.23	1	
SQ4	0.55	0.31	0.29	0.10	1

Table 20
AVE Value and Correlation Value between Constructs/ Dimensions on Income-Based Stability Analysis: Income Lower Than or Equal With Rp1,800,000.00

	AVE	SQ1	SQ2	SQ3	SQ4
SQ1	0.58	1			
SQ2	0.55	0.55	1		
SQ3	0.67	0.31	0.29	1	
SQ4	0.62	0.21	0.28	0.14	1

Table 21
AVE Value and Correlation Value between Constructs/ Dimensions on Income-Based Stability Analysis: Income above Rp1,800,000.00

	AVE	SQ1	SQ2	SQ3	SQ4
SQ1	0.58	1			
SQ2	0.6	0.46	1		
SQ3	0.56	0.42	0.55	1	
SQ4	0.68	0.45	0.30	0.20	1

3.5 Research Implications

This study gave both theoretical and practical implications. In the context of theoretical contributions, there are many researches that had developed service quality measurement models. However, the studies were rarely conducted in developing country. Furthermore, it is also difficult to find the studies that are carried out in public health center context. It is widely-known that in management research, different contexts could lead to different results (Nair, 2006; Bhaskaran and Sukumaran, 2007). This research provided theoretical contribution in the form of service quality measurement model that is appropriate for public health center in Indonesia, a developing country. Next researchers can use this model when they study service quality in similar context.

This PHC Service Quality Measurement Model has four dimensions with 24 indicators (see Table 3 to distinguish the dimensions). Those four dimensions are the quality of healthcare delivery, the quality of healthcare personnel, the adequacy of healthcare resources, and the

quality of administration process. The first dimension illustrates the extent of healthcare service effectiveness in satisfying users expectations related to their illness. In other words, this dimension is related to the outcome of healthcare service. Second dimension, the quality of healthcare personnel describes personnel's' (doctors, nurses, and administrative staff) professionalism and their willingness to genuinely care about the users. Third dimension, the adequacy of healthcare resources, describes the sufficiency of resources owned by PHC. It includes human resource, equipment, rooms, and medicines. The last dimension, the quality of administration process, shows the performance of administrative process from the aspects of easiness and speed.

Besides theoretical contribution, this research also gave contribution on the development methodology of service quality measurement model. Unlike previous researches, this study involved stability analysis based on respondents' socio-demographic profiles. This became important since statistical techniques; factor analysis in this case, is only valuable if researchers can guarantee that differences in respondents' characteristics will not generate different results (Hair et al., 2006). On the other side, consumer behavior literatures indicate that the difference in socio-demographic profiles will potentially influence consumer attitude and purchasing behavior (Batchelor et al., 1994; Pascoe and Attkisson, 1983; Williams and Calnan, 1991; Alrubaiee and Alkaa'ida, 2011; Tucker, 2002). Therefore, future researchers can follow the same method to ensure that service quality measurement models generated from their studies are not affected by the differences of respondents' characteristics.

In the context of practical contribution, this study showed that there are four dimensions of service quality that needed to be closely monitored and improved by the management of public health center. Furthermore, the management of PHC can utilize PHC Service Quality Measurement Model as part of their quality measurement systems. Thus, they can assess their performance in each dimension and identify improvements needed to increase favorable and users-oriented service quality. In the context of Public Health Center in Indonesia, this was needed due to the agenda of bureaucratic reform that required all government-owned organizations to measure user perception.

Another practical contribution of this study was that the service quality dimensions can be utilized as PHC

user segmentation. Using cluster analysis, the groupings based on evaluations towards service quality dimensions can be identified. Thus, management of PHC can identify the most accurate and efficient service strategy for each segment. For more details on how to use service quality dimension as segmentation base can be seen in the work of Lagrosen et al. (2004).

CONCLUSION, LIMITATIONS, AND FUTURE RESEARCH DIRECTIONS

This research aimed to develop Public Health Center Service Quality Measurement Model in Indonesia. Using survey data of 800 users of public health center, research results showed that PHC Service Quality Measurement Model consists of 24 indicators with four dimensions. Those four dimensions are the quality of healthcare delivery, the quality of healthcare personnel, the adequacy of healthcare resources, and the quality of administration process.

In accordance with the research limitations, authors realized that first, this research was designed as a cross-sectional study so the changes of respondent evaluation towards service quality could not be recognized and second, the survey was carried out in five public health centers in Indonesia using convenience sampling. This could limit the generalizability of the results.

Given those limitations, authors recommend some improvements on future research. First, longitudinal researches need to be conducted in order to see the changes in PHC service quality dimensions. Second, to improve the generalizability, future researches should involve bigger numbers of PHC and use better sampling method, such as stratified random sampling.

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