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Improving the quality of Community Health Centres services in Province of Jambi: an integrated quality management model based on the European Foundation Quality Management (EFQM) and Six Sigma

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A B S T R A C T

The quality of health services is essentially required to achieve the optimal health status through community-based policies by prioritizing prevention and promotion at the primary healthcare level. However, the deficient quality of healthcare services has been a complicated problem in the public health sector that must be solved immediately. Practically, there are four aspects of quality management, including management, infrastructure, core, and the quality of Community Health Centres (CHSs) services. This study aims to develop a quality management model at 24 CHCs in Province of Jambi using the EFQM and Six Sigma model. The questionnaire was used to collect data from 560 health workers and analysed using a second-order model of Smart PLS software. The research found that the implementation of four aspects in quality management was classified as a good category. The aspects were statistically associated with the quality of the CHCs services. The infrastructure and core practices were able to partially mediate between the management practice and the quality of CHCs services. Nevertheless, the implementation of quality management still remained low in several targeted CHCs.

INTRODUCTION

Healthcare and the demand for its quality are essentially required to support the achievement of an optimal community health status. Nevertheless, the public recently is still questioning that how far the relevant agency has focused on the development of service quality at the primary healthcare level, particularly at the CHCs. The CHC is the main entry point into the health system. The service quality is even far from public expectations as the service delivery is often complained by the community. The major complaints against the CHCs services include the complicated procedure for service delivery, staff behaviours, an insufficient ratio of health professionals and the users, ineffective treatment, and inadequate facilities. Moreover, service errors sometimes come up when the CHCs staff fail to implement proper service management and drug management. All these drawbacks lead to dissatisfaction of the public who want to use CHC services (Kristianto, 2012).

Most primary healthcare institutions, including the CHC, have tried to find solutions to improve the quality of institutional services. Some scholars argue that the implementation of quality management is associated with an increased in institution eminence competitively. In addition, the utilization of quality management approach systematically improves organizational performance mainly related to the quality of products and services (Guion, 2010). Quality management is defined as an effort to involve all strengths and resources of an organization that focus on continuity of service improvement to achieve customer satisfaction (J.R. Evans & Lindsay, 1996; Manaf, 2005). The implementation of quality management has been widely

identified and recognised as one of the most essential components in organization. There are several prominent quality management models that have competitive advantage factors including EFQM and Six Sigma.

EFQM is a self-assessment framework for measuring the position of an organization towards an excellent organization across all of its activities. The EFQM consists of nine criteria, and it is separated into enablers and results. The enablers criteria include leadership, policy and strategy, partnership and resources, process. The other four criteria of results are concerned with customer satisfaction, staff satisfaction, society results, and key performance results.

The six sigma model refers to a quality management strategy to increase profitability, effectiveness, and efficiency of organizational operations, and all components aim to meet customer needs and expectations (Anbari & Kwak, 2016; Ayon & Kay, 2007; Hendry & Nonthaleerak, 2005; Mehmet et al., 2007). The model is considered as an innovative program to achieve defect-free processes, and reduce variation (Woodard, 2005). This principle suits to the health sector that is mostly not tolerant towards errors (Kwak & Anbari, 2006). Moreover, the six sigma model performs the positive sign of service quality improvement, and reduce errors (Black & Revere, 2006). The model also effectively helps improving systems and processes, including the provision of healthcare services at the CHCs (Lloyd & Holsenback, 2006).

The implementation of EFQM and Six Sigma quality management model has been empirically proven as the quality improvement tool that facilitates organizational performance. This study generally aims to identify the implementation of integrated quality management from the EFQM and Six Sigma approaches into quality management practice aspects (management practice, infrastructure practice, and core practice) to improve the service quality at the CHCs level.

METHODS

This is a quantitative study with a cross-sectional design through two stages of research. First, the study aims to develop a model and measurement instrument for the quality management model at the CHCs level. The tool is expected to obtain variables and indicators that enable the construction of the model. In the second stage, the researcher conducted a survey by distributing the questionnaires to targeted respondents of CHCs in the Province of Jambi. The survey objective is mainly to assess the implementation of the quality management model of the CHCs.

The researcher selected 24 CHCs in 6 regencies across Province of Jambi. All targeted CHCs have been operational for more than five years considering the period of time for the quality management implementation (Schroeder, Linderman, & Zhang, 2005). The population of this study is all CHCs staff, except the head of CHCs. The sample size was determined by considering Confirmatory Factor Analysis (CFA) and Structural Equation Model (SEM), and calculated using Maximum Likelihood estimation. The minimum sample size was 560, and they were randomly selected as the respondents.

The primary data was collected from the questionnaire, and the secondary data was collected through document review at CHCs including the human resources document, strategic plan, achievement indicators, and other related documents which support the implementation of quality management at the CHCs.

The conceptual framework model in this research was developed from the implementation of EFQM quality management integrated with Six Sigma. The researcher used 5 criteria of 9 criteria from EFQM model, including leadership, policies and strategies, staff focus, partnerships and resources, and processes, while Six Sigma practice includes leadership involvement, quality structure, priority activities, and structured methods. In this integration, leadership practices (EFQM) are integrated with leader engagement practices (Six Sigma), and process practices (EFQM) are integrated with quality structure practices, priority activities, and structured methods (Six Sigma). In order to measure the CHCs service quality, the researcher use the following criteria: tangibles, reliability, responsiveness, assurance, and empathy (Parasuraman, et al., 1990). The quality management practices are classified into categories: management practices; infrastructure practices; core practices, and the quality of the CHCs services, which refers to the research of Lakhal et al. (2006); Flynn et al. (1995); Anderson et al. (1995); Pannirselvam & Ferguson (2001).

The conceptual framework of this study consists of 4 research constructed variables, as follow:

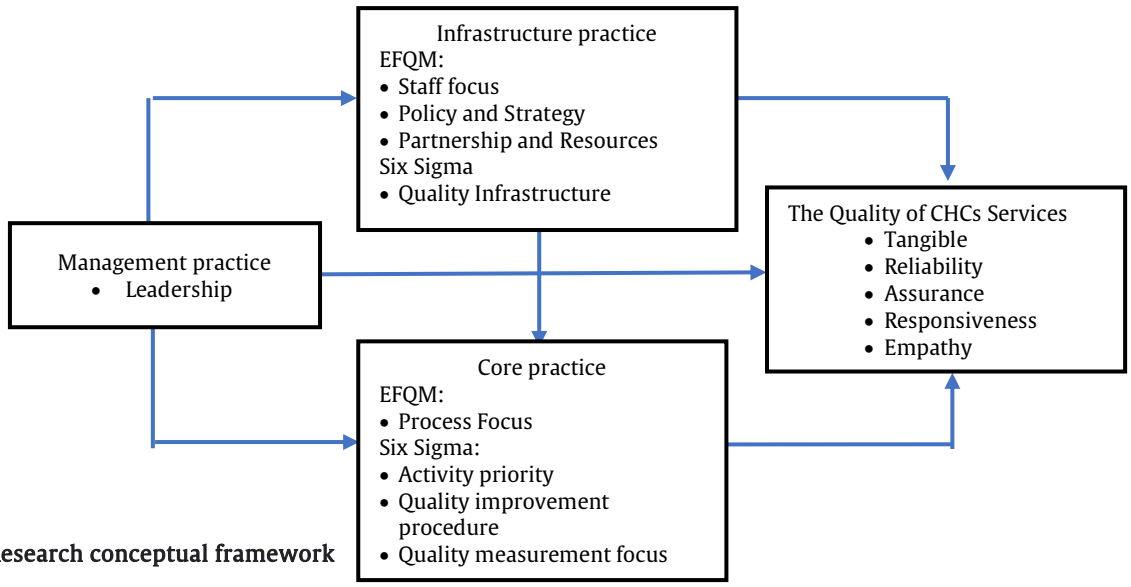

Figure 2. Research conceptual framework

The framework explains the association between quality management practices, management practices (leadership), infrastructure practices, and core practices, and its effect on the quality of the CHCs services with the following hypothesis:

Hypothesis 1: There is a direct effect of management practices on the quality of the CHCs services integration of EFQM and Six Sigma. Hypothesis 2: There is a direct effect of Infrastructure Practices on the quality of the CHCs services integration of EFQM and Six Sigma. Hypothesis 3: There is a direct effect of core practice the quality of the CHCs services integration of EFQM and Six Sigma. Hypothesis 4: There is a direct effect of management practices on the infrastructure practice of EFQM and Six Sigma integration. Hypothesis 5: There is a direct effect of management practices on the core practice of EFQM and Six Sigma integration. Hypothesis 6: There is a direct effect of infrastructure practice on the core practice of EFQM and Six Sigma integration. Hypothesis 7: There is an indirect effect of management practices the quality of the CHCs services through EFQM and Six Sigma Integration of Infrastructure Practices. Hypothesis 8: There is an indirect effect of management practices the quality of the CHCs services through the core practice of EFQM and Six Sigma integration. Hypothesis 9: There is an indirect effect of Management Practices the quality of the CHCs services through infrastructure practice and core practice integration of EFQM and Six Sigma.

The hypothesis testing was carried out through the analysis of the Structural Equation Model (SEM) with SmartPLS 3.0 software. The analysis aims to test the construct model path and confirm a supporting theory. The statistical modelling illustrates the effect between latent variables within the construct simultaneously. The results are used to obtain the ultimate construct of the quality management model which are expected to be applied to the CHCs in the Province of Jambi.

RESULTS AND DISCUSSION

Data shows that the CHCs staff are dominated by women (85.84%), age range 31-40 years old (47.68%), diploma III educational level (72.68%). Most of the staff have health education backgrounds including nursing, midwifery, dental nursing, health analyst, pharmacy, environmental health, nutrition, medicine, dentistry, and public health. The vast majority of the employees are full-time health workers with 11-15 years of working period (51.07%). The staff is primarily assigned to the maternal and child health unit (24.29%).

The study finds a shortage of health analysts at the CHCs. The staff plays important role in carrying out laboratory examinations to support disease diagnosis. Ideally, each CHC employs at least 2 health analyst to meet the standard. The researcher notes that 15 health analyst are available in charge at 24 targeted CHCs.

The first step for this data analysis is to determine the research conceptual models and research operational models.

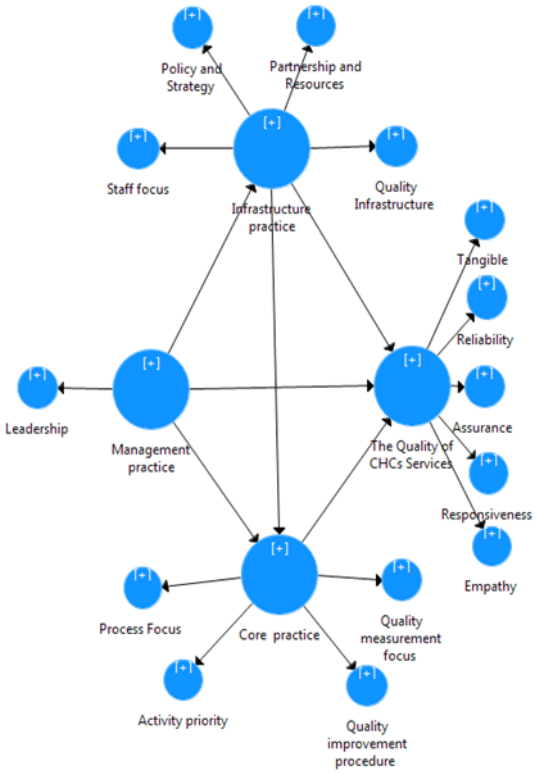

Figure 3. The research conceptual and operational models

From the operational framework, a feasibility analysis of indicators was carried out using SmartPLS 3.0 with a loading factor > 0.7 on (1) management practice with leadership dimensions; (2) EFQM infrastructure practice with the staff focus dimensions, policy and strategy, partnerships and resources, six sigma with the dimensions of quality infrastructure; (3) EFQM core practice with process dimensions and six sigma with activity priority dimensions, quality improvement procedures, quality measurement, and (4) service quality of the CHCs with five quality dimensions,

including Reliability, Tangibles, Responsiveness, Assurance and Empathy.

The feasibility test results in 90 proper indicators of 113 indicators (Table 1). This means that the indicators are able to describe the average of management practice, infrastructure practice, core practice, and the service quality at the CHCs respectively.

Table 1. Indicators, loading factors, and mean of variable constructs

Constructs/Dimensions	Indicators		Loading Factor		% Means of Respondent Perception (560)
	Σ	Feasibility	Minimum	Maximum	
Management Practice	**10**	**8**	**0.710**	**0.905**	**64.67**
• Leadership	10	8	0.710	0.905	64.67
Infrastructure Practice	**42**	**31**	**0.705**	**0.879**	**74.83**
• Staff Focus	10	7	0.795	0,879	62.17
• Policy and Strategy	12	10	0,705	0,856	61.69
• Partnership and Resources	12	8	0,745	0,871	79.34
• Quality Infrastructure	8	6	0,751	0,848	62.44
Core Practice	**36**	**30**	**0.704**	**0.903**	**61.50**
• Process	10	8	0,704	0,901	61.09
• Activity Priority	12	12	0,750	0.820	61.65
• Quality Improvement Procedure	8	5	0,766	0,848	60.39
• Quality Measurement	6	5	0,775	0.903	62.86
The Quality Management of CHCs	**25**	**21**	**0.714**	**0.907**	**65.14**
• Reliability	5	4	0,821	0,879	66.79
• Tangibles	5	5	0,761	0,871	64.57
• Responsiveness	5	4	0,769	0.907	69.46
• Assurance	5	4	0,747	0,825	62.44
• Emapthy	5	4	0,714	0.857	62.44

Table 1 shows that the average of the CHCs staff perception on the quality management practice accounts for more than 70% of total responses. Most of the respondents select infrastructure practice statement (74.83%) which is reflected in the staff focus/human resources dimensions (62.17%), policies and strategies (61.69%), partnership and resources (79.34%) and quality infrastructure (62.44%). In addition, the quality of the CHCs services are reflected in the reliability (66.79%), tangibles (64.57%), responsiveness (69.46%), assurance (62.44%) and empathy indicators (62.44%). The management practice dimensions accounts for 64.67% of total responses, and the leadership indicator is about 64.67%. And finally the core practices (61.50%) reflected in process indicators (61.09%), policies and strategies (61.65%), indicators of quality improvement procedures (60.39%) and quality measures (62.86%)).

The reliability test shows that the Cronbach's Alpha accounts for above 0.7 of the total value, and the Average Variance Extracted (AVE) value is above 0.5 (Table 2).

Table 2. Reliability of research indicators (Cronbach's alpha composite, Reliability and AVE)

Constructs/Dimensions	Cronbach's alpha	Composite Reliability	Average Variance Extracted (AVE)
Management Practice	**0.942**	**0.952**	**0.714**
• Leadership	0.942	0.952	0.714
Infrastructure Practice	**0.980**	**0.981**	**0.630**
• Staff Focus	0.940	0.951	0.737
• Policy and Strategy	0.937	0.946	0.639
• Partnership and Resources	0.938	0.949	0.699
• Quality Infrastructure	0.905	0.927	0.679
Core Practice	**0.979**	**0.980**	**0.619**
• Process	0.945	0.954	0.724
• Activity Priority	0.946	0.953	0.627
• Quality Improvement Procedure	0.905	0.930	0.725
• Quality Measurement	0.905	0.930	0.727
The Quality Management of CHCs	**0.965**	**0.969**	**0.561**
• Reliability	0.875	0.914	0.727
• Tangibles	0.864	0.962	0.649
• Responsiveness	0.886	0.922	0747
• Assurance	0.811	0.876	0.640
• Emapthy	0.849	0.899	0.691

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The reliability test shows that all constructs and manifest variables meet the requirements for the further analysis of hypothesis test. Based on both direct and indirect estimation test with second-order model using SmartPLS 3.0 software, the results show as follow (table 3).

Table 3. The hypothesis test results

Direct Influences		Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
H1	Management practice with the CHCs service quality	0.290	0.290	0.058	4.963	**0.000**
H2	Infrastructure practice with the CHCs service quality	0.514	0.513	0.077	6.706	**0.000**
H3	Core practice with the CHCs service quality	0.174	0.175	0.054	3.193	**0.001**
H4	Management practice with Infrastructure practice	0.960	0.960	0.005	200.410	**0.000**
H5	Management practice with core practice	0.333	0.332	0.068	4.867	**0.000**
H6	Infrastructure practice with core practice	0.635	0.637	0.067	9.526	**0.000**
Indirect Influences		Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
H7	Management practice with the CHCs service quality through infrastructure practice and core practice	0.494	0.493	0.073	6.718	**0.000**
H8	Management practice with the CHCs service quality through infrastructure practice	0.058	0.058	0.022	2.606	**0.009**
H9	Management practice with the CHCs service quality through core practice	0.106	0.107	0.035	3.000	**0.003**

The estimation test in table 3 shows that all p-values are less than 0.05 and the t-value is more than 1.96. This indicates that all hypotheses are statistically significant or accepted. A detailed description of the findings can be seen as follows:

Hypothesis 1 (H1) Management Practice has a significant direct effect on the quality of the CHCs services. The structural model equation shows that the t-value is more than 1.96 (4.963) and the p-value is less than 0.05 (0.000). This means that management practice that is reflected in leadership indictor can provide impact on the quality improvement of the CHCs services with five main indicators (Reliability, Tangibles, Responsiveness, Assurance, and Empathy).

Hypothesis 2 (H2) The infrastructure practice factor has a significant direct effect on improving the quality of the CHCs services. The t-value is more than 1.96 (6.706) and the p-value is less than 0.05 (0.000). This means that infrastructure practices (human resource indicators, strategic policies, partnerships and resources as well as the infrastructure quality are significantly able to influence the improvement of the quality of the CHCs services with indicators that are reflected in Reliability, Tangibles, Responsiveness, Assurance and Empathy.

Hypothesis 3 (H3) Core practice factors have a significant direct effect on improving the quality of the CHCs service. The t-value is more than 1.96 (3.193) and the p-value is less than 0.05 (0.001). This indicates that the core (quality improvement process indicators, activity priorities, quality improvement procedures and quality measurements) can significantly influence the quality improvement of the CHCs services with indicators that are reflected in Reliability, Tangibles, Responsiveness, Assurance and Empathy.

Hypothesis 4 (H4) Management practice has a direct effect on Infrastructure practice. The t-statistic value is more than 1.96, (200,410) and the p-value is less than 0.05 (0.000). This describes that the management practice that is reflected in leadership indicator is significantly able to influence infrastructure practices (human resource indicators, strategic policies, partnerships and resources as well as quality infrastructure).

Hypothesis 5 (H5) Management practice factor has a significant direct effect on core practice. The t-value is more than 1.96 (4,867) and the p-value is less than 0.05 (0.000). This means that management practice that is reflected in leadership indicator can influence core practices (quality improvement process indicators, activity priorities, quality improvement procedures and quality measurements).

Hypothesis 6 (H6) Infrastructure practice has a significant influence on core practices (quality management). The t-value is more than 1.96 (9,526) and the p-value is less than 0.05 (0.000). This means that infrastructure practices (human resource indicators, strategic policies, partnerships and quality resources as well as quality infrastructure) can influence core practices (quality improvement process indicators, activity priorities, quality improvement procedures and quality measurements).

Hypothesis 7 (H7) The indirect specific path analysis test on the indirect effect of management practice on the quality of the CHCs services through infrastructure practice shows that the t-value is 6,718 and the p-value is less than 0.05. This indicates that there is a significant association between the three variables. The infrastructure practices have a partial mediating role between management practices and the quality of the CHCs services.

Hypothesis 8 (H8) The indirect specific path analysis test on the indirect effect of management practice on the quality of the CHCs services through core practice shows that the t-value is 2.606 and the p-value is less than 0.05. This indicates that there is a significant association between the three variables. The core practices have a partial mediating role between management practices and the quality of the CHCs services.

Hypothesis 9 (H9) The indirect specific path analysis test on the indirect effect of management practice on the quality of the CHCs services through infrastructure practice and core

practice shows that the t-value is 3,000 and the p-value is less than 0.05. This indicates that there is a significant association between the four variables. Both the infrastructure practices and core practices have a partial role to mediate between management practices on the quality of the CHCs services.

CONCLUSION

In general, there is a significant influence between management, infrastructure, and core practice dimensions on improving the quality of CHCs services using five standard criteria (reliability, tangibles, responsiveness, assurance, and empathy). The infrastructure and core practices are able to partially mediate between management practice and the quality of the CHCs services. The improvement of service quality at the CHCs level must be taken into consideration by policymakers, particularly integration of three main domains of quality management into the quality of CHCs services.

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