



Patients' perception of quality service delivery of public hospitals in Nigeria using analytical hierarchy process

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ABSTRACT

Introduction: Patients are recently more aware and conscious. This is because of the belief that a high level of quality can translate into patient satisfaction. This is critical for healthcare providers as they deal with life. This recognition by both the service provider and service receivers made the government to establish units of service commission (SERVICOM) in each of the governmental agencies including hospitals in Nigeria to monitor the level of quality of service delivery. However, to what extent do patients' perceptions about health services seem to have been largely recognized remain unclear by health care providers, despite the (SERVICOM) units in public institutions in Nigeria?

Method: A cross-sectional analytical study using convenient sample method, based on the fact that not every patient of the selected hospitals can be chosen, was performed on 400 patients who received health services at four different public hospitals in Ogun state Nigeria. The selection of these hospitals was based on the zones in the state (Egba, Ijebu, Remo and Yewa area of Ogun-state). The instrument was a valid and reliable analytical hierarchy process based questionnaire containing five service quality dimensions. Data were analyzed using SPSS, Expert choice and Microsoft Excel software to determine the perception of patients towards service quality delivery in pairwise comparison of judgment consistent at less than 10%.

Results: The results showed the composite priorities of the patients' perception with respect to determinants of the patients' perception towards quality of services delivered in the public hospitals in Nigeria. The most important factor to patients was the reliability dimension with composite priority 0.24 or 24% followed by the responsiveness dimension with 0.22 assurance dimension 0.21, tangibility dimension with 0.21, and the least determinant factor was the empathy dimension with 0.1101.

Conclusion: Based on the results, the weights and rank order of the criteria (service quality dimensions) and the alternatives (sub-criteria) are essential research driven output for policy formulation and implementation in the healthcare sector for workers' capacity building towards better service delivery.

JEL Code: I1, I12, C80, C83.

Keywords: Service quality, Patients, Perception, Analytical hierarchy process, Healthcare, Hospitals, Service delivery

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Introduction

Patient satisfaction and service quality are becoming a critical objective in health care delivery systems. Patients demand more information than ever and do not hesitate to switch to another health care provider if they are not satisfied (1). As a result, the provision of quality service and improvement of patient's satisfaction are key strategies and are crucial to the long-run success and profitability of health care providers (2). Patients' perception of health care has gained increasing attention over the past 20 years (3). It is currently admitted that patients' opinion should supplement the usual indicators of quality in health

care (4, 5). Patient expression is an important source of information in screening for problems and developing an effective plan of action for quality improvement in health care organizations (6).

SERVQUAL model is a widely used model in measuring service quality. As to this model, the evaluation of customer satisfaction (patient satisfaction) level is obtained by discrepancy or gap measures between customers' (patients) expectations, "P", and their perceptions, "E", that is. $Gap = P - E$ (7). Therefore, customers' dissatisfaction is collected for the service aspects in which a negative Gap value is obtained. But, the Analytic Hierarchy Process (AHP) is a useful methodology to

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provide information about subjective judgments and has been suggested for measuring service quality (8-10). AHP presents several advantages as: full differentiation among important ratings, consistency in judgments by means of the inconsistency ratio IR, convenience in use and so on. It also allows the structuring of complex problems in the form of a hierarchy or a set of integrated levels and can be combined with operations research techniques to handle problems that are more difficult. The results of AHP is unique, as it affords pairwise comparison of the service quality dimensions, prioritizes and ranks the factors in their order relative importance to strategic decision making. The result will guide policy implementation rather than only identification of consumers' (patients) expectation. Thus, this study integrated SERVQUAL model into AHP methodology.

AHP is a multi-criteria decision making (MCDM) method that helps the decision-maker facing a complex problem with multiple conflicting and subjective criteria. However, most of the applications of AHP adopted it to compare two or more services. In the paper of Ramanathan and Karpuzcu, 2010, AHP was proposed to measure service quality by comparing the expected and perceived service quality. The authors compared their AHP-based method and SERVQUAL, concluding that users could express their satisfaction and compare more easily with the AHP questionnaire than with SERVQUAL.

In view of the above analysis, this study aimed at determining the perception of patients towards service quality delivery of public hospitals in Nigeria with the help of analytical hierarchy process (AHP) model to assess and prioritize the generic dimensions or factors for measuring service quality from the perspective of the patients who have emerged as the core concern in health care provision and quality assurance efforts (3).

The aim of this study was to assess the patients' perception of service quality delivery of public hospitals in Nigeria, using Analytical Hierarchy Process. The specific objectives are to:

- (i) Identify the factors for measuring service quality.
- (ii) Examine the perception of patients as to the quality of health care provided in hospitals using analytical hierarchy process.
- (iii) Prioritize the factors for measuring service quality from the perspective of the patients.
- (iv) Recommend necessary measures to improve the quality of hospitals' service delivery.

Improving delivery of service to the poor in developing countries like Nigeria involves all the major stakeholders in the health system - the policymakers in ministries of health, finance, and public administration, health service managers and workers, public and private providers, clients and communities themselves. As better access to quality service depends on a wide range of factors - health policies, strategy and plans that prioritize health needs and set out revenue sources and resource requirements (including mechanisms to address inequalities), unmotivated and properly trained and remunerated health workers, infrastructure, drugs and equipment, and good referral links and communication. Thus, there is a need to

assess the perception of patients receiving the treatment (services) in order to enhance development of the sector through research driven policies emanated from studies of this nature.

Service quality

Service quality is defined as "a global judgment or attitude relating to the overall excellence or superiority of the service" (7). Service quality is also defined as a customer's overall service quality evaluation by applying a disconfirmation model – the gap between service expectations and performance (11, 12). Perceptions of service quality enable the providers of healthcare to detect services and processes in need of improvement. Providers perceive that satisfying patients can save them time and money spent on resolving patient complaints in future (13). The SERVQUAL instrument is a popular instrument applied in the healthcare industry extensively to measure service quality. Five dimensions (assurance, empathy, reliability, responsiveness and tangibles) are proposed and the magnitude of the differences between customer perceptions and expectations is implemented for measuring perceived service quality (7).

Tangibles: The appearance of physical facilities, equipment, appearance of personnel, and communication materials.

Reliability: The ability of the hospital to perform the promised service dependably and accurately (that is, when something is promised, it is done and provision of services at the time is promised).

Responsiveness: The willingness of hospital's personnel to help customers and provide prompt service.

Assurance: The knowledge and courtesy of hospital employees and their ability to inspire trust and confidence.

Empathy: The caring, individualized attention of the hospital provided to its customers (that is, employees understand specific needs and employees give personal attention).

Patient satisfaction and perceived service quality in healthcare

Healthcare sector's research on patients' perceptions of the dimensions of service quality (perceived service quality) has been limited (14); yet, studies seeking to assess the components of the quality of care in health services predominately continue to measure the patient's satisfaction (15). There is no consensus on how to best conceptualize the relationship between patient satisfaction and their perceptions of the quality of their healthcare. O'Connor and Shewchuk (2003) indicated that much of the work on patient satisfaction is based on simple descriptive and correlation analyses with no theoretical framework. They concluded that, with regard to health services, the focus should be on measuring technical and functional (how care is delivered) quality, which stimulates the patient's satisfaction.

A study by Gotlieb, Grewal and Brown (1994) on patient discharge, hospital perceived service quality and satisfaction offered revealed a clear distinction between the perceived service quality and patient satisfaction.

They found that patient satisfaction mediated the effect of perceived service quality on behavioral intentions, which include adherence to treatment regimen and following the provider’s advice. Cleary and Edgman-Levitan (1997) pointed out that satisfaction surveys in the health care sector did not measure the quality of care as they did not include important aspects of care items such as being treated with respect and being involved in treatment decisions. In addition, Taylor (1999) highlighted that confusion continued in the sector regarding the differentiation of service quality from satisfaction and reported that some authors, for example Kleinsorge and Koenig (1991), referred to them as synonymous terms. Nevertheless, patient satisfaction continues to be measured as a proxy for the patient’s assessment of service quality (16). Thus, there is a need to measure the stakeholders’ perspectives of service delivery as a way of measuring their satisfaction with health care service delivery in Nigeria.

Conceptual framework and model development of Analytical Hierarchy Process

The analytical hierarchy process (AHP) model was introduced by Saaty (1980). The AHP was adopted because it has been successfully applied to solve multi-criteria decision making problems (8, 9, 17, 18).

This method mixes the opinions and evaluations of expert people and turns a complex decision making system into a hierarchical one. Then, the evaluation method is applied by proportional scale so that it could continue its applications by proportional importance of pairwise comparisons between the criteria. This method breaks down the complex hierarchical problems from the upper levels to the lower ones. We can calculate the proportional weight of the criteria by using the special vector of pairwise comparisons matrix. Therefore, this research used this method to evaluate the proportional weight of five criteria in measuring the quality of service.

Before using AHP model for this study, we needed to identify the goal (Determine the patients’ perception towards quality of services rendered); the criteria were five generic dimension of service quality. The alternatives were: (physical facilities (PF), employee appearance (EA), equipment (EQ), prompt service (PS), accuracy of medical report (AMR), accuracy of expense report (AER), willingness of administrative staff to attend to patients’ queries (WASPQ), adequate information to patients (AIP), warm and caring attitude (WCA), proficient medical staff (PMF), employees’ attention to the patient (EAP), employees’ understanding towards feelings of discomfort (EUFD), and affordable service charges(ASC)).

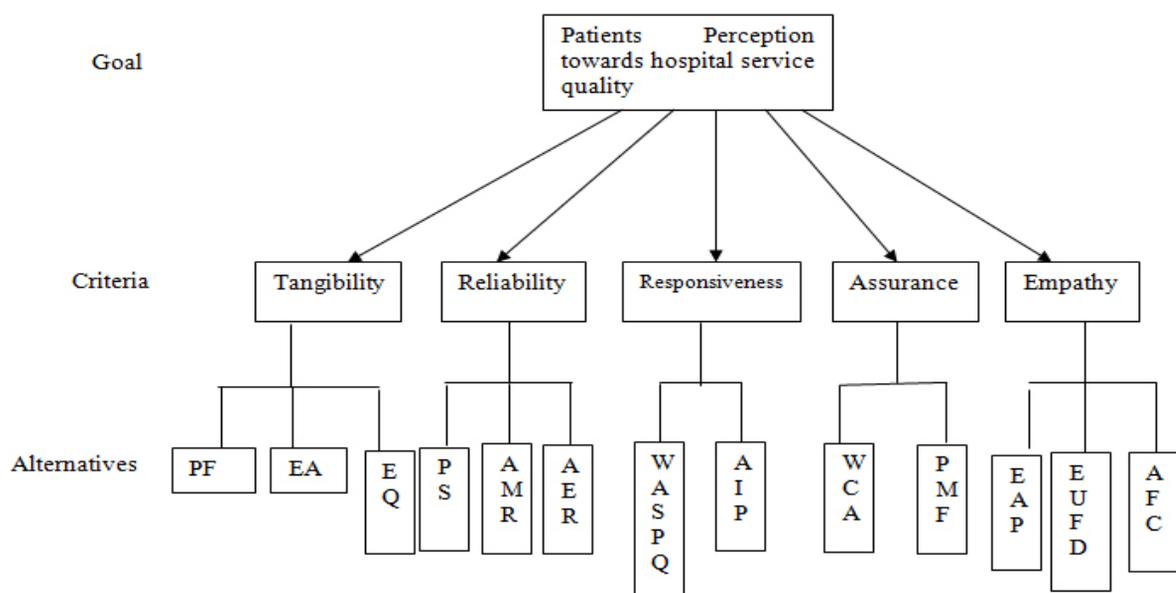
Methods

This research is descriptive and analytical in nature. Data were obtained from the patients that patronized the public hospitals selected in four different hospitals from four zones (Egba, Ijebu, Remo and Yewa) of Ogun-state, Nigeria in other to assess and rate the various factors of service quality dimension using questionnaire structured in an analytical hierarchy process (AHP) format. All patients in the hospitals at the time of conducting the field survey and those that received medical services in the selected hospitals within the last twelfth months constituted the population of the study, since the population of these groups is very large, Cochran (1963) developed a model to determine the sample for proportions in large populations:

$$n_0 = \frac{Z^2 * p * (1 - p)}{e^2}$$

Where: n0 = sample size, Z = the abscissa of the normal curve that cuts off an area α at the tails (e.g. 1.96 for a 95 percent confidence level), e = the acceptable sampling error, p = the estimated proportion of an attribute that is present in the population, and q = 1 - p.

Figure 1. Authors’ conceptualization of the AHP model based on the five-quality dimensions proposed by Parasuraman et al. (1988)



Therefore, the patients' sample size for the study at 95% confidence level and 1% precision was denoted by $Z = 1.96$, $p = (0.5 \text{ maximum variability assumed})$ since actual variability in the proportion is not known, $q = 0.5$; $e = 0.05$. Therefore, the sample size for the study was computed as follows:

$$n_0 = \frac{(1.96)^2(0.5)(0.5)}{(0.05)^2} = 384.16$$

The sample size for this study as determined through Cochran formulae was 384 patients across the four hospitals. In order to guide against incomplete entries/ low response rate which are the main disadvantage of questionnaire as an instrument for data collection, the researchers administered more questionnaires than the determined sample size.

The AHP-based questionnaire was the main instrument used in gathering data needed for the study. The questionnaire comprised of two sections, section A contains socio-economic characteristics of the respondents, while section B contains the questions relating to the research objectives of the study. The questionnaire was administered on 420 respondents (patients) by non-probability convenience samplings of patients that patronized the selected public hospitals in Ogun state, Nigeria. We hypothesised that health treatment was similar in all the states of the federation depending on the type of the hospital (Federal, State, primary health care or private) and the nature of the patients' health issues. Four hundred (400) responses, representing 95.24% were found usable on retrieval and were analysed using SPSS version 20 for Section A. The Section B was analysed using Expert choice and Microsoft Excel softwares. The weight for calculation in AHP method was derived from the pairwise comparison in the questionnaires filled by respondents/patients. The process of analysis using AHP method involved two stages as follows (19):

First Stage: Determining the patients' perception towards service quality of public hospitals in Nigeria: (a) Establishing the pair-wise comparison matrix for each decision alternative for each criterion; (b) Synthesizing; (c) Establishing the pair-wise comparison matrix for each criteria; (d) Establishing the normalized matrix; (e) Establishing the preference vector; (f) Calculating the overall values for each decision alternative; and (g) Determining the rank of alternatives according to the values that have been acquired in the previous stage.

Second Stage: Test of Consistency: After analyzing the data by using the AHP method, the result of the selection process must be tested for consistency. The test of consistency was carried out using the following formulas and shown in Table 1.

$$CI = [\lambda_{max} - n]/(n - 1) \tag{3.1}$$

Where $\lambda_{max} = \sum w_i c_i$

After acquiring Consistency Index (CI), the next step is calculating Consistency Ratio (CR) by using the formula

$$CR = CI/RI \tag{3.2}$$

Where n is the number of items compared; W_i is the weight; C_i is the sum along the column; CR is the consistency ratio; CI is the consistency index; and RI is the random consistency index. The Random Consistency Index (RI) can be observed in Table 1, as follows:

Table 1. Random Index (1988)

N	1	2	3	4	5	6	7	8
9	10	11	12	13	14	15		
R.I.	0	0	0.58	0.90	1.12	1.25	1.32	1.41
	1.45	1.49	1.54	1.48	1.56	1.57	1.59	

Adapted from Saaty, (2000)

If $CR \geq 10\%$, the data acquired is inconsistent; otherwise, ($CR < 10\%$) the data acquired is consistent using Expert software for pairwise comparison.

Results

Table 2 presents the patients characteristics; the findings revealed that 184 (46%) respondents were male while 216 (54%) were female. Three hundred and seventy-six (376), representing 94% of the respondents, were in the age range of 16-45 years and the remaining 24 (8%) were above 46 years old and above. The largest proportions of respondents in this study were aged between 26-35 years, which falls within active and working age of average citizen representing 42% of the total respondents. The educational status showed that one hundred and twelve respondents representing (28%) of the total respondents were secondary school certificate (SSCE) holders, 184 (46%) had HND/B. Sc/BA degree while 80 representing 20% were MBA/M. Sc degree holders and 24 patients representing 6% had other qualifications. The answers to the question related to the identity of the patient/respondent revealed that 360 (90%) respondents filled the questionnaire for themselves while the remaining 40 (10%) filled on behalf of the relatives in the hospitals visited for the survey. This shows greater proportion of the total respondents receiving the hospitals service within the period of the research while the remaining proportion stayed around with their relatives when the services were delivered. This group of respondents observed the process and formed their opinions about the hospital's service delivery. With respect to the reason for seeing a doctor or visiting the hospital, 312 respondents (78%) referred for medical treatment, 32 (8%) for an advice and routine checkup respectively, while 24 (6%) attended for other reasons not disclosed.

Consistency Index (CI)

The consistency ratios of most of the pairwise comparison matrices were less than 0.1; hence, judgment of the respondents was all seen to be consistent (reliable) and, therefore, acceptable. A few of them which were not consistent were revised using a revised judgment method of AHP.

Composite Priorities

The analytical hierarchy process model used for this

study has three levels: goal, criteria, and alternatives. The priorities for the patients' critical preference of the factors that determine their satisfaction towards the quality of service rendered through the criteria in the Nigerian public hospitals are presented in Tables 4.2 - 4.7.

Analysis of alternatives with respect to the criteria

Table 3 shows the patients' perception with regards to decision alternatives of tangibility dimension using the composite priorities. The most preferred alternative under tangibility was the equipment available with priority of 0.5118 followed by the physical facilities with 0.3028 and the least preferred, employee appearance, had a priority of respondent 0.1854. Thus, health care providers should ensure that the state-of-art equipment is available for service delivery in their hospitals. In addition, they should ensure appropriate physical facilities in the hospitals as it accounted for 81% of patients' satisfactions with the hospital's service tangibility. This further indicated that a hospital with good equipment and other physical facilities would attract more patients.

Table 4 displays the patients' priorities with regards to decision alternatives of reliability dimension using the composite priorities. The most preferred alternative under the reliability was the prompt service (PF) with priority 0.5176 followed by accuracy of medical report (AMR) with 0.3696, and the least preferred was the accuracy of expense report (AER) with 0.1127. Therefore, lack of delay of services in the hospital's premises accounted for over 51% of what makes the hospitals reliable to patients. By minimizing the delay in service, delivery will equally stimulate operational efficiency, as more patients will be attended to and more lives could be saved. Medical records staff should be encouraged to be up-dated as their work equally accounted for 30% , making the hospitals service reliable.

Table 5 displays the patients' perception as to the decision alternatives of responsiveness dimension using the composite priorities. This dimension has only two alternatives in this study. The patients mostly preferred the willingness of administrative staff to attend to patients queries (WASPQ) with priority of 0.7115 to adequate information to patient (AIP) with priority 0.2885.

Table 2. Patients' characteristics

Variables	Frequency	Percentage (%)
Gender		
Male	184	46
Female	216	54
Total	400	100
Age		
16-25years	74	18.5
26-35yrs	168	42
36- 45yrs	134	33.5
46 and above	24	6
Total	400	100
Educational Qualifications		
SSCE	112	28
HND/B.Sc./BA	184	46
MBA/M. Sc/ M.Ed.	80	20
Others	24	6
Total	400	100
Filling questionnaire for		
Myself	360	90
My child	14	3.5
Spouse/partner	18	4.5
Relative/family member	6	1.5
Others	2	0.5
Total	400	100
Reasons for visiting the hospital		
For medical treatment	312	78
For an advice	32	8
For routine checkup	32	8
Others	24	6
Total	400	100

Source: Field survey 2014

This result shows the importance of the role of non-medical staff in the treatment of patients in the hospitals; therefore, non-medical staff of hospitals should be trained on increasing their willingness in attending to patients whenever they visit the hospitals for service.

Table 6 also shows the patients' perception with regards to the decision alternatives of assurance dimension using the composite priorities. The patients mostly preferred the warm and caring attitude (WCA) with priority of 0.7655 to the proficient medical staff (PMF) with priority 0.2345. Warm and caring attitude should be encouraged more since the result revealed that it is demanded 3 times more than having a proficient medical staff. Thus, both medical and non-medical staff of hospitals are expected to show warm and caring attitude when dealing with patients' issues in the hospitals.

Table 7 above shows the patients' perception with regards to decision alternatives of empathy dimension using the composite priorities. The most preferred decision alternative under empathy is the employee's attention to patients (EAP) with priority of 0.4947 followed by the employees' understanding towards feelings of discomfort (EUFD) with 0.3482 and the least preferred was affordable service charges with 0.1572. Thus, when it comes to effective health care delivery, patients may not consider the cost more than the attention given by service providers towards their health care. Therefore, an average patient is an attention seeker; health care providers are encouraged to pay much attention to patients while in the hospitals for treatments.

Table 3. Composite priorities of the decision alternatives with regards to tangibility dimension

Decision alternatives with regards to tangibility	Physical facilities(PF)	Employee appearance(EA)	Equipment (EQ)
Pooled Average Composite priority	0.3028	0.1854	0.5118
Relative preference ranking	2	3	1

Source: Survey Research (2014)

Table 4. Composite priorities of the decision alternative with regards to reliability dimension

Decision alternative with regards to reliability dimension	Prompt service (PS)	Accuracy of medical report (AMR)	Accuracy of expense report (AER)
Pooled Average Composite priority	0.5176	0.3696	0.1127
Relative preference ranking	1	2	3

Source: Survey Research (2014)

Table 5. Composite priorities of the decision alternatives with regards to responsiveness dimension

Decision alternative with regards to responsiveness dimension	Willingness of administration staff to attend to patients queries (WASPO)	Adequate information to patients (AIP)
Pooled Average Composite priority	0.7115	0.2885
Relative preference ranking	1	2

Source: Survey Research (2014)

Table 6. Composite priorities of the decision alternatives with regards to assurance dimension

Decision alternatives with regards to responsiveness dimension	Warm and caring attitude (WCA)	Proficient medical staff (PMF)
Pooled Average Composite priority	0.7655	0.2345
Relative preference ranking	1	2

Source: Survey Research (2014)

Table 6. Composite priorities of the decision alternatives with regards to assurance dimension

Decision alternatives with regards to responsiveness dimension	Employees attentions to patient (EAP)	Employees understanding towards feelings of discomfort (EUFD)	Affordable service charges (ASC)
Pooled Average Composite priority	0.4947	0.3482	0.1572
Relative preference ranking	1	2	3

Source: Survey Research, (2014)

Discussion

The composite priorities of the patients' perception with respect to the main goal, which is to determine the patients' perception towards quality of services rendered in the public hospitals in Nigeria, are considering the five service quality dimensions. Based on AHP analysis, it shows that the patients' favoured the reliability dimension with composite priority of 0.2376 mostly among its' pairs followed by the responsiveness dimension with 0.2239, assurance dimension 0.2151, tangibility dimension with 0.2132, and the least determinant factor was the empathy dimension with 0.1101.

Regarding the decision alternatives, the probability of the priority of each alternative revealed that warm and caring attitude is the most favoured in the patients' quest for hospitals' quality service with priority of 0.7655, followed by willingness of administration staff to attend to the patients' queries with priority of 0.7115, prompt service with priority of 0.5176, equipment with priority of 0.5118, employees attention to patient with priority of 0.4947, accuracy of medical report with priority of 0.3696, employee understanding towards the feelings of discomfort with priority of 0.3482, and adequate information to patients (0.2885) all followed in that sequence.

It further revealed that accuracy of expense report was the least favoured with priority of 0.1128, followed by affordable service charges (0.1571), employee appearance (0.1854), and then proficient medical staff (0.2345). These probabilities are equal to one, thereby satisfying the law of probability.

Figure 2 shows a summary discussion of the findings of the study:

Conclusion

This study applied AHP to the factors for measuring service quality which are the five generic dimensions of service quality to assess the patients' perception of health care delivery in order to stimulate good policies and strategies aimed at making our health institution more effective and ultimately enhance the patient satisfaction.

With the aid of a scientific model, the study received the patients' perception about the quality of health care provided in hospital and the service quality dimensions were prioritized based on the patients' perspective. The result of the analytical hierarchy process (AHP) model showed that among the five dimensions of service quality, the reliability dimension was rated with the highest rank, indicating that the patients are most satisfied with the service charges of the public hospital because it's a little bit affordable compared to the service charge of private hospitals.

Figure 2. Summary of the findings

Decision Criteria	Alternatives	Total Weight
Tangibility 0.2132	PF 0.3028	0.0646
	EA 0.1854	0.0395
	EQ 0.5118	0.1091
Reliability 0.2376	PS 0.5176	0.1230
	AMR 0.3696	0.0878
	AER 0.1127	0.0268
Responsiveness 0.2239	WASPQ 0.7115	0.1593
	AIP 0.2885	0.0646
Assurance 0.2151	WCA 0.7655	0.1647
	PMF 0.2345	0.0505
Empathy 0.1101	EAP 0.4947	0.0545
	EUFD 0.3482	0.0383
	ASC 0.1572	0.0173

The second highest rank was the responsiveness dimension, showing that patients believed that the public hospitals provided them with adequate information compared to their willingness to attend to patient queries. The third dimension that was rated next was the assurance dimension, indicating that the patients believed that in public hospitals, there are more capable and proficient medical staff that can handle different medical cases they encounter, followed by the tangibility dimension because patients believed that public hospitals has the physical facilities; that is, the system has sufficient equipment to work with in the hospitals but the appearance of the employees is not encouraging and empathy dimension was rated the least satisfying.

There is a need for policy makers to consider the opinions of the patients based on how they have rated the quality of services rendered by the hospitals. Thus, this study has implications for decisions on effective monitoring of the entire health system towards enhancing quality service delivery that will increase the patients' satisfaction as the mission for establishing hospitals. Moreover, with the popular saying "health is wealth", improvement in the health care service delivery will ultimately increase the productive capacity of a healthy being, thereby increasing the wealth of the nation. Moreover, with the popular saying "health is wealth", improvement in the health care service delivery will ultimately increase the productive capacity of n healthy being, thereby increasing the wealth of the Nation.

Competing Interest

None declared.

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