

PRIORITIZATION OF SERVICE QUALITY INFLUENCES ON PATIENTS' SATISFACTION USING ANALYTIC HIERARCHY PROCESS: THE NIGERIA EXPERIENCE

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Abstract

This paper proposed the use of Analytic Hierarchy Process (AHP) for the prioritization of factors influencing patients' satisfaction with service quality dimensions of public teaching hospitals in Southwest Nigeria. To accomplish this purpose, data were collected from 326 respondents who were patients of public teaching hospitals in southwest Nigeria. The data were modeled and analysed with AHP excel software. The results show the rank of service quality dimensions criteria and the alternatives based on the respondents preferences for satisfaction. The finding revealed that empathy dimension criteria were given the highest preference while the waiting time dimension was the least preferred. In the global ranking of all the decision alternatives of the service quality dimensions of hospitals, the interaction of patients with hospital staff were given highest preference while the least preferred were the unpredictable time for treatment. This study recommends that there is need for healthcare managers to consider the perception of patients towards service quality dimensions alternatives on how they ranked those factors so as to improve their quality of service that would enhance patient satisfaction.

Keywords:

Patient satisfaction, Analytic Hierarchy Process, service quality, healthcare delivery.

1. Introduction

The importance of providing a responsive, quality healthcare delivery and understanding patient satisfaction is widely acknowledged in developed and developing countries. Healthcare service quality is an indicator aiding the discovering

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of the aspects of service quality that require changes to improve patient satisfaction (Jackson and Kroenke 1997). The importance of patients' views as an essential tool for monitoring and managing as well as improving service quality has been stressed by many studies. Seeking patients' opinion while providing treatment improves their responses to respective treatment (Ahmed, Amir and Haran 2004).

Satisfaction surveys done in some developed countries showed greater satisfaction and quality of care from patients whose views were sought in tertiary institutions (Asekun-Olarinmoye, Bamidele, Egbewale, Asekun-Olarinmoye and Ojofeitimi 2009; Benjamin, 1999). This is in line with one of objective of health care team to provide the best quality of health care and service to patient in Qatar (Emadi, Falamarzi, Al-Kwuwari and Al-Ansari 2009). Peprah (2013) argues that for the limited healthcare resources to be allocated and managed effectively, it is therefore prudent for healthcare providers to access and identify patients' priorities among various service quality dimensions and to improve these dimensions for patient satisfaction. Despite various studies done in assessing the quality of services rendered by the hospitals in developing country like Nigeria, to the best of the researchers' knowledge, there is rarity of literature that has explored the use of Analytic Hierarchy Process (AHP) in prioritizing the service quality dimensions of teaching hospitals in Nigeria. Thus, the aim of this study is to prioritize factors influencing service quality dimensions of public teaching hospitals in Nigeria using AHP and proffer strategies for improving health care service delivery so as to achieve higher level of patients' satisfaction in Nigeria.

AHP is a widely used multi-criteria decision making tool. Unlike the conventional methods, AHP uses pair-wise comparisons which allow verbal judgments and enhances the precision of the results. The pair-wise comparisons are used to derive accurate ratio and scale priorities developed by Saaty (1980), AHP provides a proven, effective means to deal with complex decision making and can assist in identifying and weighing criteria, analyzing the data collected and expediting the decision-making process (see Adebisi, Oyatoye and Amole, 2015; Oyatoye Adebisi and Amole, 2015). This study is very significant in the way it expands the frontier of knowledge on how to enhance health care delivery, increase patient satisfaction as well as contributes to the body of literature that dwell with the application of operations research models to health sector.

The rest of the paper is organized as follows. In the next section, relevant literature on service quality with reference to medical services is reviewed. While the subsequent section describes the methodology used. Thereafter the result of the study were analysed and discussed. The paper finally concludes based on findings and made recommendations.

2. Literature Review

The study of Gotlieb, Grewal, and Brown (1994), explored patient discharge, perceived hospital service quality and satisfaction, and identified evidence of a clear distinction between perceived service quality and patients' satisfaction. In this way, they found out that patients' satisfaction mediated the effect of perceived service quality on behavioural intentions, which include adherence to treatment regimes and following provider's advice. However, Cleary and Edgman-Levitan (1997) pointed out that satisfaction surveys in the health care sector did not measure 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) noted that confusion continued in the sector regarding the difficulty in differentiation of service quality from satisfaction and reported that some authors, like Kleinsorge and Koenig (1991), referred to them as synonymous terms. Despite this, patients' satisfaction continues to be measured as a proxy for patient's assessment of service quality (Turris, 2005).

Andaleeb (2008) studied patient satisfaction (measured by using factor analysis). This study was conducted on caregivers who had accompanied a child came to a hospital in Dhaka. A regression model was constructed by using factor analysis based upon the five dimensional SERVQUAL model. The model explained 67.4% of the variation in the patients' satisfaction which was taken as the dependent variable. The behavior of the nurses, the behavior of the doctors and facilitation payments (staff expectation of extra payment for normal services that were provided to the patients) had been appeared as statistically significant determinants of patients' satisfaction. Tangibles composite (all the items that were related to the cleanliness of the hospital and staff) and input adequacy (availability of medicines and equipment whenever needed), appeared as statistically insignificant.

Karassavidou, Glaveli and Papadopoulos (2009) aimed to identify the service quality dimension used by patients for service quality evaluation in Greek NHS (National Services Hospitals). A SERVQUAL questionnaire, including an expectation and perception section, each consisting of 26 statements having seven point Likert scale was used for the survey. A survey of 137 patients was conducted in six hospitals located in Northern Greece. In this study, principal component method was used to extract factors. Factor analysis resulted in three extracted factors. Alpha coefficient ranged from 0.785 to 0.996 and confirmed the reliability of all three dimensions. Gap analysis was also performed to determine the degree to which the difference between expectations and perceptions exist among patients surveyed.

In the study of Mejabi and Olujide (2008), they provided insight into the nature and characteristics of consumer focused service quality, as it pertains to the Nigerian hospital setting, through identifying a workable measurement scale and determining the underlying service quality dimensions. Two teaching hospitals were used. The instruments had a battery of 39 consumer focused service quality attributes on which respondents rated the hospital on importance and performance. The dimensions were confirmed through factor analysis of importance data, performance data and computed quality data. The results indicated that eight dimensions - resource availability, quality of care, condition of clinic/ward, condition of facility, quality of food, attitude of doctors and nurses, attitude of non-medical staff and waiting time for service, best described the service quality phenomena, producing Cronbach-alpha reliability coefficients of 0.74 to 0.94.

According to Ahmed and Samreen (2011) aimed at evaluating the performance of some selected hospitals in Karachi on the basis of the SERVQUAL model related to customer service quality. For this purpose, data was collected from 252 outpatients visiting three selected hospitals each from public sector, private sector and semipublic sector. Factor analysis was used to extract the important factors on the basis of responses obtained from patients. The factor analysis result indicated five factors which are tangibility and professionalism, reliability & responsiveness, assurance and empathy, feedback and guidance, affordability. Based on these factors, regression models were obtained for all three hospitals. These models have the predictors that are statistically significant determinants of the patients' satisfaction for each hospital.

Umar, Oche and Umar (2011) researched the patient waiting time in tertiary institution; through a study conducted in the Northern part of Nigeria. They observed that the amount of time a patient waits to be attended to is one factor which affects the utilisation of health care services. Patient satisfaction has emerged as an increasingly important parameter for assessing the quality of health care; therefore, health care facility performance can be best assessed by measuring the level of patient's satisfaction. In this study also, a cross-sectional descriptive study was carried out at the outpatients' departments of the Uthman Danfodio University, Sokoto. Here a total of 384 new patients were randomly selected. Furthermore, a set of pre-tested questionnaires was used to extract information from the respondents while descriptive statistics was used for analysis. In all, a total of 118 (31%) of the patients waited for less than an hour in the waiting room, while 371 (96.6%) spent less than 30 minutes with the doctor. More than half, 211 (55%) of the respondents were satisfied with the service delivery in the hospital, while only 63 (16%) of the respondents admitted to being given health talks while waiting to be attended to by the doctor. Although

majority of the patients waited for more than one hour before being attended to, more than half of them were, however, satisfied with the services rendered to them. It is imperative, therefore that health care institutions and providers put in place measures aimed at reducing waiting time and ensuring patients' satisfaction.

Obamiro (2013) examined the effects of waiting time on patients' satisfaction in Nigerian hospitals. It discussed the relationship between waiting time and patients' satisfaction. In so doing, data was obtained through structured questionnaire distributed to a randomly selected 240 outpatients of the selected public and private health centres so as to ascertain their views with regards to waiting time and evaluation of level of satisfaction with service delivery. The data obtained were in turn analysed using descriptive statistics. This study revealed that a good number of patients were satisfied with the service delivery, despite experiencing long waiting time. Though, lengthy waiting line is rampant in the public hospitals than in the private ones. However, this does not affect patients perception of quality care offered because long waiting time is a general occurrence in Nigerian hospitals especially in publicly funded health centers. Based on the findings, Obamiro concluded that efforts should be made by hospital administrators and medical personnel to eliminate unnecessary delay in service delivery and where unavoidable; the waiting time should be made productive. In addition, emphasis should be directed toward the training of medical personnel on ways to create patient-oriented services and deliver more efficient services.

Peprah and Atarah (2014) assessed patients' satisfaction using SERVQUAL model in Suyani Regional hospital in Ghana. The SERVQUAL instrument was adapted and modified to capture the relevant data. A total of 214 patients were employed in the study. Data were analysed using SPSS (version 16.0) for descriptive statistics and patients satisfaction were determined by the services quality gap model. The result indicated that the overall satisfaction of patients concerning the service quality of the hospital was good. On the other hand the gap scores showed negative gaps for four of the service quality dimensions out of six used in the study, indicating that patients were not satisfied with the service quality in relation to those dimensions. This therefore calls for management action to improve service delivery in those areas. These dimensions were Reliability, Communication/interpersonal relationship, Assurance, and Responsiveness. On the contrary, Tangibility and Empathy dimensions scored positive which affirms patients' impression about the service.

Umeano-Enemuoh, Onwujekwe, Uzochukwu and Ezeoke (2014) examined patients' satisfaction and quality of care in tertiary institution in Southeast Nigeria. In their contribution, they aim to determine the factors which enhance and deter patients'

satisfaction in a tertiary institution and the quality of care. To do this, the study used a cross sectional survey design in which 360 carefully selected participants completed self-administered questionnaire to rate their satisfaction level, quality of services provided, as well as factors of importance where best service was provided. Overall, participants were quite satisfied (Mean score = 3.75) with the services provided by the different service providers. Equally, respondents also noted that the overall quality of care of the health facility was good (mean score = 3.45). Pharmacy received the highest satisfaction level with a mean rating of 4.1. Over a third participants (38%) rated the services provided by the doctors as best despite giving the highest quality ratings with a mean of 3.9 to pharmacy compared to mean ratings of 3.4 for the doctors. In the same vein, respondents' greatest displeasure was with the time spent at the facility as 63.9% of them were displeased. More than a third (36.9%) of the patient was most pleased with information given to them as a factor of importance. Moreover, participants were quite satisfied with the services provided as well as the quality of care by the different service providers of the health facility. As a consequence, it was concluded that there is need for interventions in terms of time spent at the facility which would promote good customer focused service delivery.

Based on the review of literature so far, there is limited study that has been able to prioritize the factors influencing the service quality dimensions of teaching hospitals using the Analytic Hierarchy Process technique which this study set out to do and proffer effective strategies for improving the health care service delivery in Nigeria.

3. Methodology

This study employed cross sectional survey research design. The study covers all the public teaching hospitals in southwest geopolitical zone of Nigeria. The public teaching hospitals in the zone are: Lagos University Teaching Hospital (LUTH), Idi-Araba; Lagos State University Teaching Hospital (LASUTH), Ikeja; Olabisi Onabanjo University Teaching Hospital (OOUTH), Sagamu; University College Hospital (UCH), Ibadan; Obafemi Awolowo University Teaching Hospital (OAUTH), Ile-Ife; Ladoke Akintola University Teaching Hospital (LAUTH), Osogbo; and Ekiti State University Teaching Hospital (EKSUTH), Ado – Ekiti. Purposive sampling technique was used to select six public teaching hospitals in southwest Nigeria. Random sampling technique was used to distribute copies of questionnaire to 420 patients who had received services from the public teaching hospitals within a year. That is 70 patients representing each of the public teaching hospital in south west Nigeria. Out of the copies of questionnaire

distributed 326 copies of questionnaire were found useful for the analysis. Figure 3.1 shows hierarchical model of the hospital service quality assessment which include the main goal which is determinant of patients' satisfaction with respect to the service quality dimensions of hospitals. The criteria are the seven service quality dimensions and the alternatives.

The AHP analysis was done using Microsoft Excel software with specific instructions to make it adaptable to the analysis. The value for calculation in the AHP method is acquired from the questionnaires that have been filled by respondents/patients. The process of analysis by using the AHP method is done in two stages as follows (Taylor III, 2002):

(i) First Stage: Determinant of patients' satisfaction with hospitals service quality dimensions: (a) Establishing the Pairwise Comparison Matrix for each decision alternative and for each criterion, (b) Synthesisation, (c) Establishing the Pairwise Comparison Matrix for each of the criteria, (d) Establishing the Normalised Matrix, (e) Establishing the Preference Vector (f) Calculating 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.

(ii) Second Stage: Test of Consistency, after analysng the data by using the AHP method, the result of the selection process must be tested for consistency. The test of consistency is done by using the following formulae:

(iii)

$$CI = (\lambda_{Max} - n)/(n - 1) \tag{3.1}$$

Where

$$\lambda_{Max} = \sum_i wi ci$$

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

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

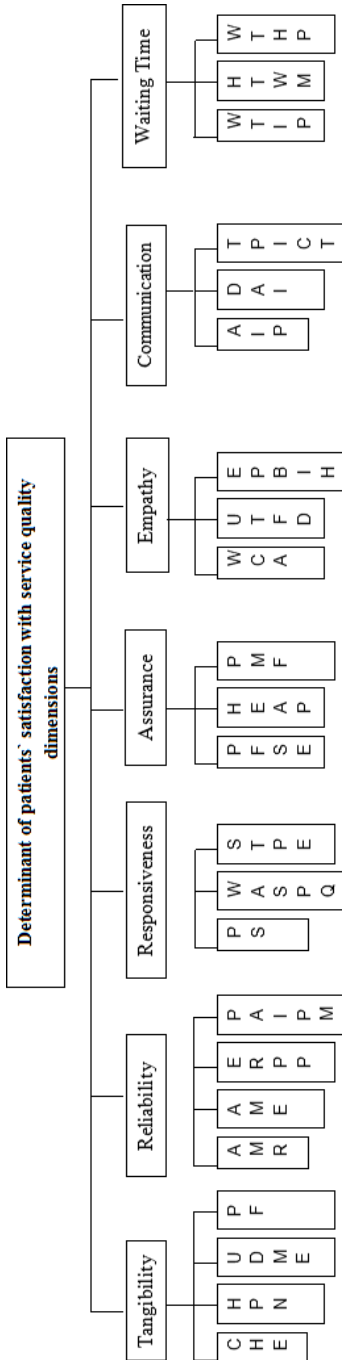


Figure 3.1 Hierarchical model for hospital services quality assessment

CHE	- Cleanliness of the hospital environment	PMF	- Proficient Medical Staff
HPAN	- Hospital's personnel appears neat	HEAP	- Hospital Employees are Polite
UDME	- Up to date Medical Equipment	UTFD	- Employee Understanding Towards
PF	- Physical facilities are usually appealing	EPBIH	- Employees keep Patient Best Interest at Heart
AMR	- Accuracy of Medical Report	WCA	- Warm and Caring Attitude
AME	- Accuracy of Medical Expenses	AIP	- Adequate Information for Patient
ERPP	- Employees Respect Patients Privacy	DAI	- Doctors give Adequate Instruction
PAIPMC	- Provision of Adequate Information about Patient Medical Condition	TPICT	- Taking Patient Opinion into consideration in Treatment
PS	- Prompt Service	WTIP	- Waiting Time is Important to Patient
WAS PQ	- Willingness of Administrative Staff to Attend to Patient Queries	WTHP	- Waiting Time at the Hospital is Predictable
STPE	- Hospital staff tell patient exactly when services will be performed	HTWM	- Hospital tries to Keep Waiting time to a Minimum
PFSE	- Patient feel safe in their interaction with employees		

Where:

n = Number of items compared

Wi = Weight

Ci = Sum along column

CR = Consistency Ratio

CI = Consistency Index

RI = Random Consistency Index

The Random Consistency Index (RI) can be observed in Table 3.1 as follows:

Table 3.1

Random Index

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 ≥ 10%, the data acquired is inconsistent

If CR < 10%, the data acquired is consistent.

4.0 Results and Discussion

Table 4.1

Summary of the social economic characteristics of the respondents

Variables	Frequency	Percentage (%)
Gender		
Male	145	44.5
Female	181	55.5
Total	326	100
Age		
18-25years	120	36.8
26-35yrs	63	19.3
36-45yrs	77	23.6
46 and above	66	20.2
Total	326	100

Educational Qualifications		
SSCE	98	30.1
NCE/ND	23	7.1
HND	34	10.4
B.Sc./BA	146	44.7
MBA/M. Sc/ M.Ed.	9	2.8
Others	16	4.9
Total	326	100
Filling questionnaire for		
Myself	274	84.0
My child	8	2.5
Spouse/partner	8	2.5
Relative/family member	26	8.0
Others	10	3.1
Total	326	100
Reasons for visiting the hospital		
For an advice	80	24.5
For medical treatment	156	47.9
For routine checkup	77	23.6
Others	13	4.0
Total	326	100

Source: Field survey 2014

Table 4.1 shows the social economic characteristics of the respondents. It reveals that 145 (44.5%) of the respondents were males, while 181 (55.5%) were females. Two hundred and sixty (260) or 80% of them were between 18- 40 years of age, while 66 (20%) were above 45 years of age; 98 (30.1%) respondents were SSCE Degree holders, 23(7.1%) were NCE/ND certificate holders, 180 (55.1%) were HND/BSC/BA degree holders; 9 (2.8%) were MBA/M. Sc/ M.Ed. degree holders while 16 (4.9%) had other qualification. With regards to filling the questionnaire, 274 (84%) respondents did it themselves, while the remaining 52 (16%) respondents were assisted by their children, spouse, and other relatives. With respect to the reason for

visiting the hospital, 156 respondents (47.9%) came for medical treatment, 80 (24.5%) respondents came for advice, 77 (23.6%) respondents came for routine checkup, and 13 (4%) respondents came for other reasons known to them.

4.1 Composite Priorities

The Analytic Hierarchy Process model deployed for this study has three levels: The goal, the criteria, and the alternatives. The priorities for the patients critical preference of the factors that determine their satisfaction towards the quality of service rendered in the selected teaching hospitals in Southwest, Nigeria are presented in Tables 4.2 to 4.9.

4.1.1. Analysis of alternatives with respect to the criteria

Table 4.2

Composite priorities of the decision alternatives about tangibility dimension

Decision alternatives with regards to tangibility	Cleanliness of the hospital environment (CHE)	Hospital`s personnel appears neat (HPAN)	Up to date Medical Equipment (UDME)	Physical facilities(PF)
Pooled Average Composite priority	0.2525	0.2300	0.3938	0.1237
Relative preference ranking	2	3	1	4

Source: Survey Data (2014).

Table 4.2 shows the patients` perception with regards to decision alternatives of tangibility dimension using the composite priorities. The most preferred alternative under the tangibility is up-to-date medical equipment with a priority of 0.3938, followed by the cleanliness of the hospital environment with a priority of 0.2525. Next is `hospital personnel appears neat` with a priority of 0.2300, while the least preferred alternative is the `physical facilities` with priority of 0.1237.

Table 4.3

Composite priorities of the decision alternative about reliability dimension

Decision alternative with regards to reliability dimension	Accuracy of medical report (AMR),	Accuracy of expense report (AER)	Employees Respect Patients Privacy(ERPP)	Provision of Adequate Information about Patient Medical Condition (PAIPMC)
Pooled Average Composite priority	0.3843	0.1685	0.2351	0.2120
Relative preference ranking	1	4	2	3

Source: Survey Research (2014).

Table 4.3 displays the patients' perception with regards to decision alternative of reliability dimension. The most preferred alternative under the reliability dimension is the 'accuracy of medical report' (AMR) with a priority of 0.3843. This is followed by employees respect patients privacy with a priority of 0.2351, 'provision of adequate information about patient medical conditions' has a priority of 0.2120 and the least preferred is the 'accuracy of expense report' (AER) with a priority of 0.1685.

Table 4.4

Composite priorities of the decision alternative with regards to responsiveness dimension

Decision alternative with regards to responsiveness dimension	Prompt Service	willingness of administration staff to attend to patients queries (WASPQ)	Hospital Staff tell Patient exactly when services will be performed (STPE)
Pooled Average Composite priority	0.5411	0.3111	0.1478
Relative preference ranking	1	2	3

Source: Survey Research (2014).

Table 4.4 reveals patients` perception with regards to the decision alternatives of responsiveness dimension using composite priorities. This dimension has three alternatives in this study. Patients` mostly preferred `prompt service` with a priority of 0.5411, followed by `willingness of administration staff to attend to patients` queries` (WASPQ) with a priority of 0.3111, and the least preferred is the `hospital staff to inform patient exactly when services will be performed` with a priority of 0.1478.

Table 4.5

Composite priorities of the decision alternatives with regards to assurance dimension

Decision alternatives with regards to responsiveness dimension	Patient feel safe in their interaction with employees (PFSE)	hospital employees are polite (HEAP)	proficient medical staff (PMF)
Pooled Average Composite priority	0.6329	0.2171	0.1500
Relative preference ranking	1	2	3

Source: Survey Research (2014).

Table 4.5 shows patients` perception with regards to the decision alternatives of assurance dimension using the composite priorities. The most preferred alternatives under the assurance dimension is that `patient feel safe in their interaction with employees` (PFSE) with a priority of 0.6329. This is followed by `hospital employees are polite` (HEAP) with a priority of 0.2171 and the least preferred is the `proficient medical staff` (PMF) with a priority of 0.1500.

Table 4.6

Composite priorities of the decision alternatives with regards to empathy dimension

Decision alternatives with regards to empathy dimension	Warm and Caring Attitude (WCA)	employees understanding towards feelings of discomfort (EUFD)	Employees keep Patient Best Interest at Heart (EPBIH)
Pooled Average Composite priority	0.5287	0.2933	0.1780
Relative preference ranking	1	2	3

Source: Survey Research (2014).

Table 4.6 shows patients' perception with regards to the decision alternatives of empathy dimension. This dimension has three decision alternatives in this study. The most preferred alternatives under the empathy dimension is 'warm and caring attitude' with a priority of 0.5287, followed by 'employees understanding towards feelings of discomfort' (EUFD) with a priority of 0.2933 and 'employees keep patient best interest at heart' (EPBIH) with a priority of 0.1780.

Table 4.7

Composite priorities of the decision alternatives with regards to effective communication dimension

Decision alternatives with regards to effective communication dimension	Adequate information to patients (AIP)	Doctors give adequate instruction (DAI)	Taking patient opinion into consideration in treatment (TPICT)
Pooled Average Composite priority	0.4662	0.3809	0.1529
Relative preference ranking	1	2	3

Source: Survey Research (2014).

Table 4.7 shows patients' perception with regards to the decision alternatives of effective communication dimension. The most preferred alternatives under the effective communication dimension are that giving 'adequate information to patient' with a priority of 0.4662. This is followed by 'doctors giving adequate instruction' with priority 0.3809, while the least preferred is taking 'patients' opinion into consideration in treatment' with a priority of 0.1529.

Table 4.8

Composite priorities of the decision alternatives with regards to waiting time dimension

Decision alternatives with regards to waiting time dimension	Waiting time is important to patient (WTIP)	Hospital tries to keep waiting time to a minimum (HTWM)	Waiting time at the hospital is predictable (WTHP)
Pooled Average Composite priority	0.5755	0.2182	0.2063
Relative preference ranking	1	2	3

Source: Survey Research (2014).

Table 4.8 shows the patients` perception with regards to the decision alternatives of waiting time using composite priorities. This dimension has three decision alternatives. The most preferred alternatives under the waiting time dimension is `waiting time is important to patient` (WTIP) with a priority of 0.5755, followed by `hospital tries to keep waiting time to a minimum` (HTWM) with a priority of 0.2182 and the least preferred is `waiting time at the hospital is predictable` (WTHP) with a priority of 0.2063.

Table 4.9

Composite priorities of the criteria with regards to Goal

Goal: Patients perception towards service quality	Tangi-bility	Relia-bility	Respon-siveness	Assurance	Empa-thy	Effective communi-cation	Wai-ting time
Pooled Average Composite Priority	0.1619	0.1560	0.1562	0.1435	0.1646	0.1480	0.0698
Relative Preference Ranking	2	4	3	6	1	5	7

Source: Survey Research (2014).

Table 4.9 shows the priorities of the criteria with respect to the main goal which is to determine patients` satisfaction towards quality of services rendered in the teaching hospital. This is done by considering the five generic dimensions of service quality as propounded by Parasuraman Berry and Zeithaml (1991), and two additional important dimensions namely: effective communication and waiting time which are equally important to patients in determining their satisfaction with hospitals. Based on the perception and pairwise comparison of the patient the most important factor which determines their satisfaction, is the empathy dimension with a priority of 0.1646, followed respectively by the tangibility dimension with a priority of 0.1619, responsiveness dimension with a priority of 0.1562, reliability dimension with a priority of 0.1560, effective communication dimension with a priority of 0.1480, assurance dimension with a priority of 0.1435, while the least determinant factor is the waiting time dimension with a priority of 0.0698.

Following the procedure of AHP analysis using Microsoft excel which is done in two stages as stated under the methodology. This procedure was used to derive individual weight for each of the service quality dimension criteria and also calculate the individual weight of the decision alternatives with respect to the decision criteria. These weights are also known as local priority and it is presented in table 4.10.

Table 4.10

Tabular presentation of the decision criteria and alternatives local priority

Criteria	Local Priority	Alternatives	Local Priority
Tangibility	0.1619	Up-to- date medical equipment(UDME)	0.3938
		Cleanliness of hospital environment(CHE)	0.2525
		Hospital's personnel appears neat(HPAN)	0.2300
		Physical facilities (PF)	0.1237
Reliability	0.1560	Accuracy of medical report (AMR)	0.3843.
		Employees respect patients' privacy (ERPP)	0.2351
		Provision of adequate information about patients' medical condition (PAIPMC)	0.2120
		Accuracy of expense report (AER)	0.1685
Responsiveness	0.1562	Prompt service (PS)	0.5411
		Willingness of the administration staff attend to patients queries (WASPQ)	0.3111
		Hospital Staff tell Patient exactly when services will be performed (STPE)	0.1478
Assurance	0.1435	Patient feel safe in their interaction with employees (PFSE)	0.6329
		Hospital Employees are Polite(H EAP)	0.2171
		Proficient medical staff (PMF)	0.1500
Empathy	0.1646	Warm and Caring Attitude (WCA)	0.5287
		Employees understanding towards feelings of discomfort (EUFD)	0.2933
		Employees keep patient best interest at heart (EPBIH)	0.0173
Effective Communication	0.1480	Adequate Information for Patient (AIP)	0.4662
		Doctors give Adequate Instruction (DAI)	0.3809
		Taking patient opinion into consideration in treatment (TPCIT)	0.1529
Waiting time	0.0698	Waiting Time is Important to Patient (WTIP)	0.5755
		Hospital tries to keep waiting time to a minimum (HTWM)	0.2182
		Waiting time at the hospital is predictable (WTHP)	0.2063

Source: Data Analysis 2014.

Table 4.10 shows the individual local weight of the service quality dimension criteria and the local weight of the decision alternatives with respect to the service quality dimension criteria. These local weights of the decision criteria and alternatives were now used to calculate the total weight or global weight/priority.

Computation of the global weight

When the weight among elements on every level is derived, the weight of the whole level is calculated. In AHP, it is observed that each level in the hierarchy is independent of the other. This implies that the probability multiplicative law holds. Moreover, the total weight of each alternative was calculated by multiplying the weight of decision criteria by decision alternative weight.

Table 4.11

Tabular presentation of the decision alternatives with their corresponding global /total weight

Decision Alternatives	Total/ Global Priority	Ranking
Up-to-date medical equipment (UDME)	0.0638	5 th
Cleanliness of hospital environment (CHE)	0.0409	10 th
Hospital`s personnel appears neat (HPAN)	0.0372	12 th
Physical facilities (PF)	0.0200	21 st
Accuracy of medical report (AMR)	0.0600	6 th
Employees respect patients` privacy (ERPP)	0.0367	13 th
Provision of adequate information about patient medical condition (PAIPMC)	0.0331	14 th
Accuracy of expense report (AER)	0.0263	17 th
Prompt service (PS)	0.0845	3 rd
Willingness of the administration staff attend to patients queries (WASPQ)	0.0486	8 th
Hospital Staff tell Patient exactly when services will be performed (STPE)	0.0231	18 th
Patient feel safe in their interaction with employees (PFSE)	0.0908	1 st
Hospital Employees are Polite (H EAP)	0.0311	15 th
Proficient medical staff (PMF)	0.0215	20 th
Warm and Caring Attitude (WCA)	0.0870	2 nd

Employees understanding towards feelings of discomfort (EUFД)	0.0483	9 th
Employees keep patient best interest at heart (EPБИH)	0.0293	16 th
Adequate Information for Patient (AIP)	0.0690	4 th
Doctors give Adequate Instruction (DAI)	0.0564	7 th
Taking patient opinion into consideration in treatment (TPCIT)	0.0226	19 th
Waiting Time is Important to Patient (WTIP)	0.0402	11 th
Hospital tries to keep waiting time to a minimum (HTWM)	0.0152	22 nd
Waiting time at the hospital is predictable (WTHP)	0.0144	23 rd

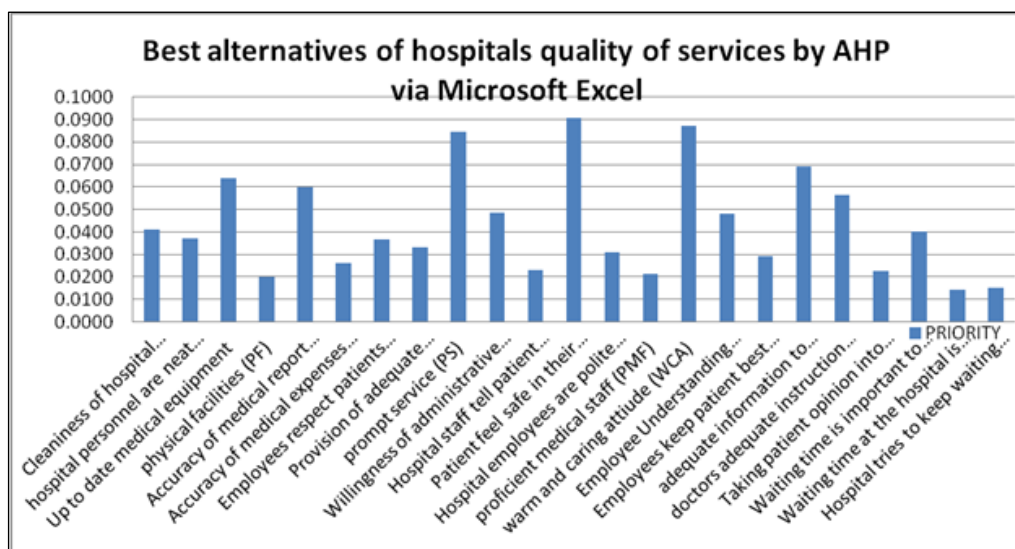


Figure 4.1. Bar chart showing decision alternatives with their corresponding priority

The vertical bar-chart in figure 4.1 represents the pictorial diagram of decision alternatives where the vertical bar length is the priority of each alternative. From the chart, it can be seen that patient feeling safe in their interaction with the hospital employees has the longest bar with priority of 0.0908. This is followed by warm and caring attitude with pr (0.0870), prompt service with pr (0.0845), adequate information to patients with pr(0.0690), up-to-date medical equipment with pr(0.0638), accuracy of medical report with pr (0.0600), doctors give adequate instruction with pr(0.0564), willingness of administration staff to attend to patients queries with pr(0.0486), employee understanding towards feelings of discomfort with

pr(0.0483), cleanliness of hospital environment with pr(0.0409), waiting time is important to patient with pr(0.0402), hospital personnel are neat with pr (0.0372), employee respect patients' privacy with pr(0.0367), provision of adequate information about patient medical condition with pr(0.0331), hospital personnel are polite with pr (0.0311) in that order. From the chart, waiting time at the hospital has the shortest bar with pr(0.0144), followed by hospitals tries to keep the waiting time to barest minimum with pr(0.0152), physical facilities with pr(0.0200), proficient medical staff with pr(0.0215), taking patients opinion into consideration in treatment with pr(0.0226) and then accuracy of medical expenses with pr(0.0263). These priorities must sum up to one, thereby satisfying the law of probability.

5. Conclusion and recommendations

The patients have been able to prioritize the service quality dimensions of hospitals in order of importance in which the policy-maker or health administrators could abide by in order to improve the quality of health care delivery and enhance patients' satisfaction.

The result of the Analytic Hierarchy Process (AHP) model showed that among the seven dimensions of service quality of hospital which were the criteria identified in determining the patient satisfaction, the empathy dimension was rated the highest. This indicated that the patients were most satisfied with the warm and caring attitude of the hospital staff. The second highest ranked was the tangibility dimension which showed that patients were satisfied with having up-to-date medical equipment in the hospitals, compared to cleanliness of the hospital environment. The third dimension that was rated next was the responsiveness dimension which indicated that patients believed that giving prompt services to them in the hospital is paramount, followed by the reliability dimension because patients believed that the teaching hospitals gave accurate medical report when needed. Followed by effective communication dimension which showed that adequate information for the patients is essential compared to others, followed by assurance dimension which showed that patients feel safe in their interaction with the employees of the hospital is most important compared to others, while waiting time dimension was rated the least satisfying, and indicates that the waiting time of the patient before service is still an issue which corroborated the views of Umar *et al* (2011), Obamiro (2013), and Umeano-Enemuoh *et al* (2014). AHP is therefore useful in structuring the complexity of health care decisions and ascertaining values and preferences of those factors involved in health care decision-making. Previous studies in Nigeria which had used the method in

health sector were limited to prioritizing the management function in the pharmaceutical industry (Ogunyemi, Ibiwoye and Oyatoye, 2011).

In ranking all the decision alternatives of the service quality dimension, the alternative that has the highest preference was patient feeling safe in their interaction with the employees, while the least preferred was predicting the waiting time, indicating that majority of the patients are satisfied with their interaction with the employees, but cannot predict the time services would be rendered. There is need for healthcare managers to consider the perception of patients towards service quality dimensions alternatives on how they have been able to rank those factors so as to improve their quality of service that would enhance patient satisfaction. In addition, the priority and the ordering of healthcare service quality dimensions from the patient perspective will enhance international best practices through policy implementation that stimulate patients' satisfaction by meeting their service needs.

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