

Evaluation of Radiological Service Quality on Patients Satisfaction at Abubakar Tafawa Balewa University Teaching Hospital Bauchi, Nigeria

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Abstract

Radiological Service quality is essential in Health care in order to achieve a competitive advantage and to differentiate them in the market. Patient Satisfaction is an important indicator for measuring the quality of health care. The aim of this study was to assess the quality of Radiological Services on Patients satisfaction at Abubakar Tafawa Balewa University Teaching Hospital (ATBUTH) Bauchi. The Study was a prospective cross-sectional study conducted among patients attending Radiology department for radiological services. A total of three hundred and sixty-two questionnaires were filled by patients attending Radiology department. The Questionnaire was collected using validated service quality scale (SERVQUAL). The scale is measures quality based on five key dimensions to include Tangibility, Reliability, Responsiveness, Assurance and Empathy. Results showed that the overall level of patient's satisfaction of care received in ATBUTH, Bauchi was significant. Patient's level of satisfaction differs between the different radiological examination types $p < 0.05$. The study revealed that socio-demographic variables had no impact on radiological services and patients satisfaction. There is significant relationship between quality of Radiological services and patients satisfaction.

Keywords: Radiological services, Quality, Patient Satisfaction, care, Radiology department

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INTRODUCTION

Patient satisfaction is an important commonly used indicator for measuring the quality of healthcare (Ramos *et al.*, 2018; Wafaa & Shaimaa, 2017). Patient satisfaction is defined as the extent to which the patients feel that their needs and expectations are being met by the service provider and it's an expression of the gap between expected and perceived characteristics of service (Boshoff & Gray, 2014). Patient satisfaction is regarded as the most important indicator of the quality of healthcare and can be used to enhance programs within the healthcare facilities (Prakash, 2014). Interest has, therefore, increased not only in the assessment and treatment interventions by the healthcare givers, but also in the systematic evaluation of delivery of that care (Boshoff & Gray, 2014). Patient satisfaction is an attitude, though it does not ensure that the patient will remain loyal to the health care giver or the hospital, it is still a strong motivating factor (Prakash, 2014). Patient satisfaction is only an indirect or a proxy indicator of the quality of a care giver or hospital performance (Prakash, 2014). Over the past 20 years, patient's satisfaction surveys have gained increasing attention as meaningful and essential sources of information for identifying gaps and developing an effective action plan for quality improvement in health care organizations (Rashid & Amina, 2014). However, there are few published studies reporting the improvements resulting from feedback information of patients satisfaction surveys, and in most cases, these studies are contradictory in their findings (Rashid & Amina, 2014). In the increasing competitive market of the health care industries, health care managers should focus on achieving high or excellent ratings of patient satisfaction to improve the quality of service delivery; therefore health managers need to characterize the factors influencing patient's satisfaction which is used as a means to assess the quality of health care delivery (Rashid & Amina, 2014).

The World Health Organization (WHO) states that its overall goal is to provide highest possible health for all and one goal of achieving this is through quality health care (WHO, 2016). A patient's evaluation of the quality of a hospital, its staff and medical treatment is affected by variety of factors such as health outcomes, unmet expectations and socio-demographic characteristics (Anita *et al.*, 2013). Previous research has focused on indicators relating to satisfaction and quality of care, although it remains unclear whether the factors leading to satisfaction also lead to dissatisfaction. Effective verbal and non-verbal communication is one prominent factor that is consistently linked to patient's satisfaction and evaluation of the quality of care (Joseph, 2017).

Ensuring excellent service quality is essential for the healthcare companies to achieve a competitive advantage and to differentiate themselves in the market (Hamed & Salem, 2014). The most perplexing issue facing healthcare financiers and politicians is the debate on how to improve the quality of healthcare delivered (Lochoro, 2014). Patient satisfaction is an important commonly used indicator for measuring the quality in healthcare. It affects clinical outcomes, patient retention, and medical malpractice claims (Tam, 2017). Also, it affects the timely, efficient, and patient-centered delivery of quality healthcare (Tam, 2017). Satisfaction questionnaires were used in previous studies and showed good results and proven to be valid and reliable (Gercia *et al.*, 2014).

The quality of medical services can refer to some factors as: external environment, perceptions of payment, commitments and promises and these factors can propose suggestions to improve

the hospital patient satisfaction (Miao & Sen, 2011). It is important to measure all time patient satisfaction because, nowadays is increasing in importance and is associated with increased market share, decreased malpractice claims and financial gains (Eric & James, 2013), but also the efforts should be made to give more attention and more time to the patient (Prahlad *et al.*, 2010). It is important to investigate how the health conditions of the patients influence the way they combine the healthcare experiences and how in some cases patients correlates satisfaction with some factors as staff attitudes or provision of explanation. (Taylor & Benger, 2004). To ensure excellence of care services, hospitals and healthcare systems should invest in programs to determine how patients evaluate their experiences and maintain a positive relationship between the interpersonal continuity of care and patient satisfaction (John & Waleed, 2014). Patient satisfaction should be accepted as an integral part of quality health because quality outcomes and patient satisfaction with services are now a priority and the primary competitive edge in healthcare (Joseph, 2017).

Much research has been focusing on defining and measuring patient satisfaction in other health departments, little attention is given to patient satisfaction and quality of care in Abubakar Tafawa Balewa University Teaching Hospital (ATBUTH) Bauchi, Nigeria. The aim of this study is to assess the quality of Radiological care on patient's satisfaction at Radiology department of ATBUTH Bauchi.

MATERIALS AND METHODS

This study was a prospective cross-sectional study conducted at Radiology department of ATBUTH Bauchi, using a structured 5 point likert square SERVQUAL questionnaire developed by Parasuraman, (1988) with slight modifications to include questions on consumer satisfaction. Primary source of data was obtained for the study. The study location ATBUTH Bauchi is a 650 Bed capacity located in North Eastern Part of Nigeria. The hospital provides a wide range of medical, surgical, diagnostic, out-patient, rehabilitative and support services to residents of Bauchi. It has a functional Accident and Emergency Unit which provides 24 hour emergency services all year round. The multi-disciplinary approach to service makes it the best point of call for a number of subjects including Pediatrics, General Medicine and Surgery, Obstetrics and Gynecology, Laboratory Services, Radiology, HIV/STI Services, Anesthesiology, Intensive Care Unit, Ophthalmology, Dietetics, Physiotherapy, Psychiatry, and many more.

The study population involves adult patients from age 18 years and above referred to Radiology department of ATBUTH Bauchi for Radiological services from all outpatient and inpatient departments and all units in the hospital. Three hundred and sixty questionnaires were administered to patients that presented for radiological care in the hospital under study. Data was collected using validated service quality (SERVQUAL) scale which was created by Parasuraman, *et al.*, (1993). The SERVQUAL model is a way to measure the service quality in terms of expectations and perception, and is based on 5 key-quality dimensions of the services; tangibles, reliability, responsiveness, assurance, and empathy. The questionnaires were slightly modified to assess the patients' satisfaction of care and radiological service quality from related research works (Kudra & Khamis, 2014). The SERVQUAL has been tested in health care environments and has produced various reliable results (Kofi *et al.*, 2016 & Dean,

et al., 1999). Its validity and reliability was also tested in our locality in some studies (Joseph, 2017 & Ochonma *et al.*, 2017).

The questionnaire is divided into three major parts; the first part is on background information and social-demographic variables. The second part is on SERVQUAL questions with five sections: tangibles, reliability, responsiveness, assurance, and empathy. However additional questions were added to SERVQUAL model to address consumer satisfaction in the study location. One of the most important elements of the SERVQUAL model is the ability to determine the relative importance of the five dimensions in influencing patients' overall quality (Lim, *et al.*, 1999). The third part focused on care on patients' perceive satisfaction through a five points likert scale (Strongly agree, Agree, Not sure, Disagree and Strongly Disagree). The questionnaire adopted for the study has been tested in a similar environment and with good validity and reliability. However Cronbach's Alpha value was tested for the study to ascertain the research instrument. The participants were informed of the purpose of the research via an informed consent. Participants will be assured that any information provided would be treated with strict confidentiality. The questionnaires were then distributed to all the participants after they gave their verbal consent. The questionnaire was administered and retrieved by the researcher and six (6) research assistants who are trained on data administration and collection. All completed questionnaires were coded appropriately after the collection.

The statistical package for social sciences (SPSS) version 23.0 (Chicago version) was used for data analysis. Data was subjected to Normality test using Kolmogorov Smirnov. The descriptive method was used to present the socio-demographic characteristics of the data in tables and frequencies. Multiple regression was used to ascertain the model summary, Likert scale measurement was used to assess the overall level of patients satisfaction with Radiological care in ATBUTH Bauchi. Research Hypothesis was tested using Chi-square. Pearson- correlation was used to determine the relationship between quality of Radiological services on patients satisfaction in the hospital. Analysis of Variance was used to compare the satisfaction level between different Radiological examinations from different imaging modality. Statistical level of significant was set at p-value less than 0.05.

RESULTS

Assessment of the overall level of patients' satisfaction of care on ATBUTH Bauchi.

Respondents were asked to rate their perceptions of level of satisfaction of care received in ATBUTH Bauchi, using five likert scale as follows: 5-Strongly Agree; 4-Agree, 3-Undecided; 2-Disagree; 1-Strongly Disagree table 1 presents the result

The items by items analysis used to determine the overall level of satisfaction of patients revealed that the grand mean score fall within the criterion for agree that is the cumulative mean score obtained was also within index score for agree (4) which is M=3.5. The result shows that the respondents generally agree that they are satisfied with care they received at ATBUTH Bauchi.

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Table 1: Assessment of the overall level of patients' satisfaction

	Mean Index	SD	Remark
The registration process at the front desk is efficient	4.35	1.00	Agree
The process of scheduling appointment is appropriate	4.19	1.03	Agree
Explanation of preparation for your specific test/exam is good	4.24	0.94	Agree
Radiologist/radiographers carry out their work with respect	4.11	1.00	Agree
It is difficult to get appropriate care at short notice	1.87	1.07	Disagree
The radiologist/radiographers are too businesslike and impersonal	2.21	1.27	Disagree
The personnel and other staff in the department seem too much in a hurry to attend to you	2.14	1.20	Disagree
Radiologist/radiographers have genuine interest in you as a person	3.80	1.34	Agree
The radiologist/radiographers need to pay more attention to your privacy	3.83	1.32	Agree
The personnel and other staff in the department keep you from worry	3.90	1.19	Agree
I always get appropriate care in the department	3.96	1.21	Agree
The radiologist/radiographers and other staff are competent and well trained in their job	4.23	0.99	Agree
You are satisfied with the length of time waited for this appointment	3.77	1.33	Agree
There is need for more improvement on care you received in the department	1.81	1.01	Disagree
Grand mean	3.46	0.14	Agree

Null hypothesis one

Chi-square test was used to test the null hypothesis which related to research question two. Significant level of 0.05 was used to reject or accept the null hypothesis as stated below:
The overall level of patients' satisfaction of care received in ATBUTH, Bauchi is not significant.

Result from Table 2 indicates that the overall level of patients' satisfaction of care received in ATBUTH, Bauchi is significant, $X^2 (8) = 834.4$, $p < 0.05$. This resulted in rejecting the null hypothesis and accepting the alternative hypothesis that; the overall level of patients' satisfaction of care received in ATBUTH, Bauchi was significant. This Indicates that patients significantly agree that they are satisfied with the care received from ATBUTH Bauchi. This is presented in table 2.

Table 2: Chi-square Test Statistics for hypothesis two

	Level of satisfaction of care
Chi-Square	834.400
Df	8
Asymp. Sig.	0.001

0 cells (0.0%) have expected frequencies less than 5.
The minimum expected cell frequency is 40.0.

Evaluation of Radiological Service quality on Patients satisfaction of care at ATBUTH, Bauchi.

In order to evaluate the quality of Radiological services on patients satisfaction in ATBUTH Bauchi, parameter such as tangibility, reliability, responsiveness, assurance, empathy, patient loyalty, and care were used as items for assessment of patient satisfaction of service and care received in ATBUTH Bauchi. Table 3 present the result.

Analysis of results revealed that the mean score of each of the six items are within the index score for agree (4). The grand mean score obtained was also within the index score for agree (3.94) with meanstandard deviation of 0.03. The result indicates that patients were satisfied with the radio-diagnostic service and care received in ATBUTH Bauchi.

Table 3: Patients’ satisfaction of the quality of Radiological Services on Patient’s satisfaction

Quality of Radiological Services	Mean Index	SD	Remark
Quality of care	3.52	0.71	Agree
Tangibility	4.06	0.12	Agree
Reliability	3.95	0.13	Agree
Responsiveness	3.97	0.05	Agree
Assurance	4.02	0.06	Agree
Empathy	3.83	0.06	Agree
Patient Loyalty	3.89	0.07	Agree
Grand Mean	3.98	0.23	Agree

Null hypothesis three

Chi-square test was used to test the null hypothesis which related to research question two. Significant level of 0.05 was used to reject or accept the null hypothesis as stated below:
Thepatients were not satisfied with the quality and care of Radiological services received in ATBU, Bauchi

The chi-square result in table 4 used in analyzing the evaluation of patients’ satisfaction of the quality of radio-diagnostic care and quality of radio-diagnostics service in ATBUTH, Bauchi, revealed that; : patients were satisfied with the quality of Radio-Diagnostic services and care received in ATBU, $p < 0.05$. This resulted in rejecting the alternative hypothesis leading to the acceptance of alternative hypothesis that; patients were significantly satisfied with the quality of Radio-Diagnostic services and care received in ATBU, Bauchi at significant level of 0.05.

Table 4: Chi-square Test Statistics for hypothesis three

Quality of Radiological Services	Chi-Square	df	Asymp. Sig.
Tangibility	338.801	22	0.001
Assurance	393.249	24	0.010
Responsiveness	291.204	20	0.001
Assurance	345.028	22	0.001
Empathy	286.215	20	0.000
Loyalty	250.000	33	0.000
Care	678.178	46	0.011

Determining the Relationship between Patients' Satisfaction of Care and Radiological Service quality at ATBUTH Bauchi.

Pearson's Correlation was used to determine the relationship between patients' satisfaction of care and quality of radiological services in ATBUTH Bauchi. Based on the data collected and analyzed; Pearson correlation test in Table 4 shows significant positive relationship between patients' satisfaction of care and quality of radiological services, $r=0.598$. Indicating that the higher the quality of radiological services rendered by ATBUTH, the more patients were satisfied. This resulted in accepting the alternative hypothesis that there is a significant relationship between patients' satisfaction of care and quality of radio-diagnostic services in ATBUTH Bauchi.

Table 5: Relationship between Patients' Satisfaction of Care and Quality of Radiological Services

Variables	Mean	SD	r-value	Sig.
Patients satisfaction of care	3.52	0.38	0.598	0.001
Radiological service quality	3.95	0.71	0.622	0.002

Comparing Satisfaction Level between different Radiological service quality

Analysis of variance (ANOVA) test was used to carryout analysis on comparing the satisfaction level of patients between different radiological examination types. Null hypothesis formulated is stated below:

Patient's level of satisfaction do not differs between the different radiological examination types.

Based on the data collected and analyzed; ANOVA test in Table 4.11 indicate that patient's level of satisfaction differs between the different radiological examination types, $F(7, 347) = 2.157, p < 0.05$. The findings of the analysis indicate that patients derive different level of satisfaction from the different radiological examination types. This resulted in accepting the alternative hypothesis that; patient's level of satisfaction do significantly differs between the different radiological examination types.

Table 6: Satisfaction Level between different Radiological Service Quality

Type of radiological service	M	SD	Sum of Squares	Df	Mean Square	F	Sig.
X-ray	3.95	0.71	Between Groups	7.378	7	1.054	2.157
Ultrasound	3.94	0.76	Within Groups	169.561	347	0.489	0.037
Mammography	4.50	0.46					
Dental X-ray	3.79	0.60					
IVU	4.05	0.77					
HSG	4.30	0.47					
Barium Studies	3.86	0.38					
RUG/MCUG	4.27	0.65					
Total	3.97	0.71		176.939	354		

DISCUSSION

Radiological services is done in relatively large numbers, for medical personnel's who are actively involved in carrying out these Radiological services, an in-depth understanding and knowledge of patient satisfaction is important (Ugwu *et al.*, 2009). An explanation of the procedures and etiquettes has been reported to improve patient's satisfaction as psychological factors have a very powerful influence on physiological wellbeing (Ugwu *et al.*, 2008). The main objective of the study was to assess the quality of Radiological services on patient's satisfaction in ATBUTH Bauchi, Nigeria. The study has revealed that most respondents are within the ages of 20 to 39 years old but the females are more than the male in patronizing radiological services. This results are compatible with the age and gender level shown by the annual statistical health report for 2006 issued by Minister of Public Health Yemen (MoPHP) and that of James, (2013). The socio- demographic characteristics of patients does not significantly impact on patients satisfaction of care at ATBUTH Bauchi. The socio-demographic characteristics of patients are responsible for about 4.4% of the satisfaction level. This agrees with the findings of Kudra and Bernard, (2014) that quality of care is applicable to all care givers irrespective of their gender. The study dis-agrees with that of Wafaa and Shaimaa, (2017) that socio-demographic characteristics significantly affect the overall impression of radiological services and disagrees with the study by Teshome *et al.*, (2017). Their study showed that on a binary linear regression analysis, satisfaction towards radiological services was significantly associated with educational level, occupation, age, monthly income, marital status, patient's attitude and time taken to enter into examination room. Their study was also in line with another study in Nigeria (73.4%) by Ochunma *et al.* ,(2015) and Pakistan (71.2%) by Ahmed *et al.*,(2015). Moreover, the same or comparable proportion of satisfied patients in the study will imply on the necessity of patient focused approach to care.

Patient's satisfaction is a multidimensional concept influenced by pre-conceived thoughts or even previous experiences, which make its measurement and concept difficult. From the findings of the study, patient's satisfaction has been rated on a likert scale multi regression analysis, student's t- test and ANOVA were carried out to determine the overall level of satisfaction and radiological quality. The rating of general satisfaction with Radiological quality reflects the quality of radiological services rendered from well qualified and trained

personnel in ATBUTH Bauchi. The overall level of satisfaction of patients revealed that the grand mean score shows that the respondents generally agree that they were satisfied with the care they received. These findings is similar to that of Wafaa and Shaimaa, (2017); Kyei *et al.*, (2016). Quality Radiological care is vital in achieving expected health outcome and effective management policies in hospitals.

The findings on SERVQUAL (Tangibility, reliability, responsiveness, empathy, assurance and loyalty) from this study showed that the patients are satisfied with the quality of service in radiology department. The result of our study is similar to another study conducted in Northwestern part of Nigeria with the same method and model (Ramos *et al.*, 2018). Another study further stated that the patients service quality were believed to positively influence the patient's satisfaction level (Nwobi *et al.*, 2014). Our study is also in agreement with another study in Ghana in private and public hospitals who reported that the tangibles, technical quality, interaction, professionalism, efficiency and accessibility are significant and important dimensions to measure care service quality (Kofi *et al.*, 2016). Of all the dimensions used to assess the quality of radiological care on patient's satisfaction at ATBUTH, it was noted that respondents were satisfied with the tangibility, reliability, responsiveness, assurance, empathy, and patient loyalty. However, the mean index score for tangibility and assurance were higher compared to reliability, responsiveness, and empathy and consumer loyalty. The finding in this study concurs with that of Kudra and Bernard, (2014).

In this study reliability dimension ranked higher mean index score. Reliability dimension is used to assess the process domain however tangibility and assurance ranked higher. The willingness to go back to the same facility is affected by the level of improvement in the cost, assurance, reliability and empathy of the services rendered. This shows that intra personal relationship and communication has great influence on patient willingness to come back to the hospital. Generally, hospital managers pay close attention on improvement of building and facility.

There was significant relationship between Radiological quality and patient's satisfaction level indicating that the higher the quality of care the more the patients will be satisfied. This agrees with the studies of James, (2013). Health care systems today are technically proficient and strong emphasis is placed on patient's service with organized efforts to understand measure and meet the needs of clients (James, 2013). The level of patient's satisfaction varies from person to person and product to service. The state of satisfaction will depend on the number of physiological and physical factors. Patient satisfaction may be considered to be one of the desired outcomes of care and that information about patient satisfaction should be as indispensable as assessment of quality (James, 2013). Achievements of patients' satisfaction can be hindered by several factors. A study done in Italy showed high level of burnout among healthcare givers due to poor patient satisfaction regarding quality of services offered (Argentero, 2008). In South Africa patient's satisfaction with quality of care among health care providers depended upon rapport, personal quality, and relationship with the patient (James, 2008).

From this study, patient's level of satisfaction differs between different radiological services. The disparities in patients satisfaction may be due to the work environment and the personal

attributes of the health care providers as they communicate with the patients. These results are consistent with previous studies which documented strong association between health professionals and quality of care (Aiken *et al.*, 2008) and patients satisfaction (Kutney-Lee *et al.*, 2009). Our findings add to this literature but suggest that attention must be directed to improve quality of care and differences through a more comprehensive approach by health care providers.

CONCLUSION

There was significant relationship between quality of radiological services and patients satisfaction. Patients are increasingly satisfied with the radiology departments if the perception that they have on the service quality is more favorable. Therefore, there will be many advantages in setting internal goals for patient's satisfaction and service quality. The relationship between quality radiological service and patient's satisfaction proves the importance of quality improvement in effective management of patients and healthcare providers for health systems strengthening efforts with the support of leadership at health facility and country levels.

Conflict of interest: Nil

Acknowledgement: To all the staff of Radiology Department ATBUTH Bauchi

REFERENCES

- Ahmed, R., Ahmed, N & Nasir F. (2014). Patient's satisfaction and quality health services: An investigation of private hospital at Karachi, Pakistan. *Research Journal RecentScience*,3(7) : 37-38.
- Aiken L. H., Clarke S. P., Sloane DM & Cheney T. (2008). Effects of hospital care environment on patient mortality and nurse outcome. *Journal of Nursing Administration*. 38 (5) : 222-229. Pubmed: 18469615. Accessed 16th December 2018.
- Al-Abri, R. & Al-Balushi, A. (2014). Patient satisfaction survey as a tool towards quality improvement. *Oman Medical Journals*, 29(1) 3-7. doi:10 5001/omj2014.02, PMC3910415.
- Ali, M.M. (2012). A conceptual framework for quality of care. *Social Medical Journal*, 24(4), 251-261, doi: 10.5455/msm.2012.24.251-261.
- Alrubaiee, L. (2001). The mediating effect of patient satisfaction in the patients' perceptions of healthcare quality – patient trust relationship. *International Journal of Marketing Studies, Published by Canadian Center of Science and Education* 103 52, 3(1): www.ccsenet.org/ijms. [accessed date June, 2016]
- Annual Abstract of Statistic (AAS). Population of Nigeria by state and sex (1991 and 2006). 16-17.
- Arab, M., Ghazi, S, M., Rashidian, A., Rahimi, A. F & Zarei, E. (2012), The effect of service quality on Patients Loyalty: A study of private hospitals in Tehran, Iran. *Iranian Journal of Public Health*. 41(9): 71-77

- Argentero, P., Dell'Olivo, B & Clarke, S.P. (2008). Staff burnout and patient's satisfaction with the quality of dialysis care. *American Journal of kidney diseases*, 51: 80-92. Doi:10.1053/j.ajkd.2007.09.11.
- Badri, M. A., Attia, S.T. & Ustadi, A. M. (2008). Testing the not so obvious models of healthcare quality. *International Journal of Healthcare Quality Assurance*, 21 (2), 159-174.
- Baker, R. (1990). Development of a questionnaire to assess patients' satisfaction with consultations in general practices. *British Journal of General Practice*; 40(3), 487-490.
- Bowers, M. R., Swan, J. E & Koehler, W.F. (1990). What attributes determine quality and satisfaction with health care delivery? *Health Care Management Review*. 9(4): 49-55.
- Boshoff, C & Gray, B. (2014). The relationship between service quality, customer satisfaction and buying intentions in the private hospital industry. *South Africa Business Management*, 35 (4) : 27-33
- Camacho, F., Anderson, R., Safrit, A., Jones, A.S & Hoffmann, P. (2006). The relationship between patients' perceived waiting time and office-based practice satisfaction. *Medical Journal*, 67 (6): 409-413
- Chang, C.S., Chen, S. Y & Lan, Y.T. (2013). Service quality, trust, and patient satisfaction in interpersonal-based medical service encounters. *BMC Health Services Reserve*. 20 (3)13-22.
- Dawn, A. G & Lee, P.P. (2003). Patient satisfaction instruments used at academic medical centers: results of a survey. *American Journal of Medical Quality*. 18(6): 265-269.
- Donabedian, A. (1988). The quality of care: How can it be assessed. *Journal of the American Medical Association*, 260(12): 1743-1748.
- Dyyana, S.R & Venkatesh, R. (2015). An empirical study of a factors influencing quality of healthcare and its effects on patient satisfaction. *International journal of innovation, research in science, engineering and technology*, 4(4): 111-115. doi: 10.15680/ijirset.2015.0402009.
- Eric L R. (1987). Patient satisfaction: an indicator of nursing care quality. *Journal of nursing management*, 18: 31-35.
- García-Vicente, A. M., Soriano, A., Martínez, C., Poblete, V. M., Ruiz-Solís S., Cortés, M., et al. (2017). Patient satisfaction as quality indicator in a nuclear medicine department. *Revised Experimental Medicine*, 26(3): 146-52.
- Godil, S.S., Parker, S.L., Zuckerman, S.L., Mendenhall, S.K., Devin, C.J., Asher, A.L., McGirt, M.J. (2013). Determining the quality and effectiveness of surgical spine care: patient satisfaction is not a valid proxy. *Spine Journal*, 13(9):1006-1012.
- Gronroos, C. (1992). A service quality model and its marketing implications. *European Journal of Marketing*, 18 (4), 36-44.
- Hamed, M. A & Salem, G. M. (2014). Factors affecting patients' satisfaction. *Egypt Journal Radiology and Nuclear Medicine*. 2014; 45:219-24. <https://doi.org/10.1016/j.ejrm.2013.11.006>
- Harkreader, H & Hogan, M. A. (2004). Fundamentals of nursing caring and clinical judgments" Elsevier science, 2: 45-51.
- Healthcare management organization (2016). Improving the Radiology service patients experience. *Healthcare management Journal*; 16(2).
- Hoe J, (2007). Quality service in radiology, *Biomed Imaging Intervention Journal*, 3(3): 24. <https://doi.org/10.2349/bij.3.3.e2doi:10.2349/bij.3.3.e24> PMID: PMC3097673

- Iftikhar, A., Allah N., Shadiullah, K., Habibullah, K., Muhammad, A., R & Muhammad, H., K. (2011). Predictors of patient satisfaction. *Gomal Journal of Medical Sciences*, 9 (2): 183-188.
- James, N. (2013). The level of Patient's satisfaction and perception on quality of nursing services in the renal unit, Kenyatta National Hospital Nairobi, Kenya. *Open Journal of Nursing*, 3, 186-194. Doi.org/10.4236/ojn.2013.32025.
- Joseph, D. Z. (2017). Patient satisfaction of care during obstetric ultrasound at Abubakar Tafawa Balewa University Teaching Hospital Bauchi. *Pakistan Journal of Radiology*, 27(3): 125-129..
- Kiois, W., Cowden, R., & Karodia, A. M. (2015). An evaluation on in-patient satisfaction at meridien equator hospital Kenya. *Arabian Journal of Business and management Review*, 4(7): 12-17.
- Kofi, A. D., Antwi, W. K., & Brobbey, P.K., (2016). Patient Satisfaction with Radiology service in two major Public and Private Hospitals in Ghana. *International Journal of Radiology and Radiation Therapy*, 1(1): 12-15. Doi:10.15406/ijrrt.01.0004.
- Kudra, K & Bernard, N. (2014) . Patients level of satisfaction on quality of health care at Mwananyamala hospital in Dar es Salaam, Tanzania. *Health Service Research*, 14:400-408
- Lin, H. C., Xirasagar, S., Laditka, J. N., (2004). *Patient perceptions of service quality in group versus solo practice clinics. Internatinal Journal Quality Health Care*, (16) 437-445. 10.1093/intqhc/mzh072.
- Linda, D. U. (2002). *Patient satisfaction measurement: Current issues and implications. Lippincott's case management*, 7(5): 194-200.
- Lochoro, P. (2014). Measuring patient satisfaction in UCMB Health Institutions. *Health Policy Development*, 2(3): 243-8.
- Miao, S., Lvlin, Z., & Sen, W. (2011). Measures to enhance the hospital patient satisfaction based on perceived service quality, *2nd International Conference on Artificial Intelligence, Management Science and Electronic Commerce (AIMSEC)*. 4667.
- Mitchell, P.H & Lang, N.M. (2004). Framing the problem of measuring and improving healthcare quality: has the Quality Health Outcomes Model been useful. *Medical Care*. 42: 4-11.
- Nwobi, C. E., Luntsi, C. Ahmad, M. S., Nkubli, F. B., Kanu, H. D., Dauda, F & Moi, A. S. (2014). The assessment of patients 'perception and satisfaction of Radiology waiting time in Maiduguri teaching University Hospital. *Kanem Journal of Medical Sciences*, (8) 19-26
- Nyongesa, M.W. (2014). Determinants of clients' satisfaction with healthcare services at Pumwani Maternity hospital in Nairobi-Kenya. *International Journal of Social Behaviour Science*, 2(2): 11-17.
- Ochonma, O. G., Eze, B. S & Eze, C. U. (2016). Differential in patients' satisfaction with routine radiological services: A cross sectional study in a developing country. *African Journal of Business management*, 10(18); 429-39. Doi:10.5897/AJBM 2016.8093
- Ochonma, O. G., Eze, C. U., Eze S.P & Okaro O.A. (2015). Patients reaction to ethical conduct of radiographers and staff services as predictors of radiological experience satisfaction: A cross- sectional study. *Biomed Central Medical Ethics*. 16: 1-9.
- Ochonma, O. G., Nwodoh, C.O., Maduakolam, I., Ogbonna, P. N., Ani, G. J *et al.*, (2017). Patient's satisfaction with radiological examination: A cross-esctional assessment of

- the impact of facility services and tangibles in a private and public hospital in Enugu, South east Nigeria. *International Journal of Health and Pharmaceutical Research*. 3(2): 11-21.
- Odebiyi, D. O & Aiyejusunle, C. B. (2009). Comparison of Patients' Satisfaction with Physiotherapy Care in Private and Public Hospitals. *Journals of the Nigeria Society of Physiotherapy*, 17(1): 51-60
- Parasuraman, A., Zeithaml, V. A & Berry, L. L. (1988). SERVQUAL: A multiple-item scale for measuring customer perceptions of service quality. *Journal of Retailing*, 64(1): 12-40
- Prakash B. (2010). Patient satisfaction. *Journal of Aneasthetics and Surgery*, 3(3): 151-5. <https://doi.org/10.4103/0974-2077.74491>
- Rajani, A., Salam, B., Shayam, S.M & Ariwa, I.M. (2011). Do we need to improve? A customer satisfaction survey in ultrasound suite. *Pakistan Journal of patient care*. 21(2):84-88.
- Rashid, A & Amina A. (2014). Patients satisfaction survey as a tool towards Quality Improvement. *Oman Medical Journal*, 29(1): 3-7.
- Ramos, F. B., Ugwu, A. C., Idigo, F. U., Joseph, D. Z & Ali, A. M. (2018). Relationship between Patients perception of care and quality of Radio-diagnostic services in tertiary hospitals at North west Nigeria. *Nigerian Journal of Medical Imaging and Radiation Therapy*. 7(1): 68-74.
- Teshome, M., Fasil, T & Hailu M. (2017). Patient's satisfaction towards radiological service and associated factors in Hawassa University Teaching and referral hospital, southern Ethiopia, *BMC Health Service Research*. 17: 441-445. Doi 10:1186/s12913-017-2384-z
- Ugwu, A.C., Shem S.L., Erondy O.F (2009). Perception of care during special radiological examinations. *African Journal of Primary Health Care and Family Medicine*; 1(1):383. <https://doi.org/10.4102/phcfm.v1i1.38>.
- Wafaa & Shaimaa (2017). Assessment of patient satisfaction at radiological department of Fayoum University Hospitals. *International journal of Medicine in Developing countries*, (3): 126-131.
- Westaway, M. S., Rheederzyl, D. G & Seager J.R. (2003), Interpersonal and organizational dimensions of patient satisfaction: the moderating effects of health status. *International Journal of Quality Health Care*, 15(4): 333-337.
- Zeithaml, V.A and Berry, L.L. (1985) A Conceptual Model of Service Quality and its Implications for Future. *Research Journal of Marketing*, 46: 41-50.