

Full Length Research Paper

An investigation using multivariate analyses in predicting respondents' perception of satisfaction, professionalism, skill and competence of radiographers in routine radiological services in Enugu, Southeast Nigeria

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Assessing patients' perception of satisfaction, professionalism, competence and skill of health care providers helps health institutions and providers respond to the needs and expectations of the patients. Little work is known to have taken place to understand this phenomenon especially in radiological services in Nigerian hospitals. This study is therefore aimed at investigating the perception of patients' satisfaction, professionalism, competence and skill of radiographers during routine radiological examination in two Nigerian hospitals. Materials and Methods: Three hundred patients were interviewed from two hospitals on their perception of satisfaction, professionalism, competence and skill of radiographers during routine radiological examination. The data was analyzed in terms of descriptive statistics using 95% confidence interval. ANOVA, Chi-Square and multivariate (intercept) statistical tools were applied. Results: The result of Test of Equality of Covariance Matrices giving a Box's M result of 47.745 and F-value of 1.787 >Fcritical of 1.52 (p < 0.05), indicates that respondents' perception of level of satisfaction, radiographers' professionalism, skill and competence are dependent on the combined factors of the respondents age, type of hospital where service is received, gender, level of education and patient length of experience of radiological services.

Key-words: Satisfaction, professionalism, skill and competence, Nigeria, patient perception of care, radiological examination.

INTRODUCTION

Assessing patients' perspectives on health care gives them a voice, which can make public health services more

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responsive to people's need and expectations (WHO, 2000; Rao et al., 2006; Sodani et al., 2011). In the recent past, studies on patient satisfaction gained popularity and usefulness as it provides the chance to health care providers and managers to improve the services in the public health facilities (Sodani et al., 2011). Patient's feedback is necessary to identify problems that need to be resolved in improving the health services (Boyer et al., 2006). This type of feedback triggers a real interest that can lead to a change in their culture and in the perception of patients (Boyer et al., 2006). Patients' perception of care is an indicator of the quality of care and is frequently included in health care planning and evaluation (Ozsoy et al., 2007). The content analysis of the comments made by patients of their expectations from radiology staff indicated that 30% noted that service delivery should be improved as a requirement, 11% requested that friendliness should be improved and that radiology staff should be more courteous (Ugwu et al., 2003).

The code of conduct for radiographers provides guidelines and a framework for professional behaviour expected for the profession and includes professional relationships and responsibilities to patients (Peer et al., 2003).

Accordingly, a patient's physical and psychological needs must be taken care of and abuse of patients must be avoided at all times (Gunn et al., 1991; Beyer et al., 2010). In a study in South Africa, majority of the patients were greeted in a friendly manner by the radiographers, however, about 20% of the patients did not even know the radiographer's name (Beyer et al., 2010). Again in the same study, majority of the patients experienced satisfactory communication between themselves and the radiographer who performed their respective examinations and 13% of the patients were not told what was expected from them and what the examination entailed (Beyer et al., 2010).

In a study on the effects of verbal communication in managing pains in mammographic examination, the patients indicated that professional friendliness of the radiographer was critical in alleviating discomfort (Arthur et al., 2013).

Problem solving is a vital competency for healthcare professionals in an era of rapidly advancing technology. It requires critical thinking, and improves the quality of a clinical service offered and the efficiency of delivering such a service (Castle, 2009; Distler, 2007; Pieterse et al., 2014). How patients' view of the competence and skill of radiographers becomes an important issue for this work. Service quality can be described in terms of professionalism and skills, attitudes and behaviour, accessibility and flexibility, reliability and trustworthiness, service recovery, servicescape, reputation and credibility (Groenroos, 2000; Alrubaiee et al., 2011).

Competency incorporates a combination of skills, knowledge, attitudes and the ability required in the performance of clinical practice (Cowin et al., 2008; Anderson et al., 2012). Competency is closely related to

patient safety and quality improvement, as well as to cost-effective health care (Cowin et al., 2008; Anderson et al., 2012; Anderson et al., 2008). The increasing complexity and multiplicity of patient needs as well as changes in patient profiles have raised the requirements on competency in medical imaging departments, for example (Anderson et al., 2012; Larsson et al., 2007; Fridell, 2011; Aspelin, 2011).

Hence, health care professionals must become aware of the need for optimal competencies in relation to patient care outcomes and the importance of developing a shared understanding of future competency requirements (Anderson et al., 2012; Meretoja et al., 2011).

Even though patients' perception of their providers' is seen to influence their satisfaction, help form an opinion on professionalism, skill and competence of radiographers, it has received minor attention in radiological practice in Nigeria. No study in Nigeria at least to the best of the authors' knowledge has been devoted to studying and quantifying these three aspects of patients' perceptions on radiographers' conduct in Nigerian hospitals.

Hence, this study is aimed at investigating patients' perceptions of satisfaction, professionalism, skill and competence of radiographers during routine radiological examination, the result of which, it is hoped will enable radiographers improve patient care and proper health care planning in Nigeria.

MATERIALS AND METHODS

This is a cross-sectional and descriptive study in which three hundred (300) patients who had come for radiological examination in one public hospital (University of Nigeria Teaching Hospital, Ituku/Ozalla, Enugu) and one private health care institution (Life Chart Diagnostic Centre, Abakpa Nike, Enugu) in Enugu, Eastern Nigeria were surveyed by ten (10) post graduate assistant students to ascertain their perceptions of satisfaction, professionalism, skill and competence of radiographers/staff during routine radiological examination. Convenience sampling method was used in the study for the choice of hospitals for the study while the respondents were chosen through systematic sampling method. One hundred and forty five respondents were interviewed at the public hospital while one hundred and fifty five were interviewed at the private hospital. The study population interval was calculated at 1.48 respondents.

In no particular order, patients were scheduled for examination on radiologist's recommendation. The examination is held every Monday in the public hospital in which the first forty (40) candidates who showed up were examined and about twenty (20) candidates were surveyed per clinic day at the public hospital. They also applied the same technique to the private hospital that equally examines about twenty five (25) candidates on its clinic day of Friday. About thirteen (13) candidates were surveyed per clinic day in the private hospital. The indicators used in the assessment of satisfaction with radiological services include—patient preparation for specific test/exam, registration process at the front desk/courtesy of staff, waiting time before procedure, courtesy of the radiographer, explanation of what to expect during the exam, how questions from the respondents were answered by the radiographer/staff during the examination.

The survey was carried out between March and July of 2013. A validated questionnaire was used by the students who had received

Table 1. Showing the socio-demographics of both hospital.

Socio demographic	Site		Total	Chi-square (P-value)	
	Public n=145	Private n=155			
Age category					
Under 30	53 (36.6)	89 (57.4)	142 (47.3)	23.194(0.001)	
31-40	26 (17.6)	35 (22.6)	61 (20.3)		
41-50	27 (18.6)	15 (9.7)	42 (14.0)		
Over 50	39 (26.9)	16 (10.3)	55 (18.3)		
Gender					
Male	71 (49.0)	21(13.5)	92 (30.7)	44.197(0.001)	
Female	71(51.0)	134 (86.5)	208 (69.3)		
Level of education					
No school	15 (10.3)	2 (1.3)	17 (5.7)	0.001f	
Elementary	26 (17.9)	11 (7.1)	37 (12.3)		
High school	41 (28.3)	69 (44.5)	110 (36.7)		
College university	50 (34.5)	65 (41.9)	115 (38.3)		
Higher education	12 (8.3)	8 (5.2)	20 (6.7)		
Literacy classes only	1 (0.7)	0 (0.0)	1 (0.3)		
Marital status					
Married	37 (25.5)	26 (16.8)	63 (21.0)	0.001f	
Separated	1 (0.7)	1 (0.6)	2 (0.7)		
Divorced	2 (1.4)	0 (0)	2 (0.77)		
Married with children	42 (29.0)	80 (51.6)	122 (40.7)		
Married without children	4 (2.8)	28(18.1)	32 (10.7)		
Single	59 (40.7)	20 (12.9)	79 (26.3)		
Length as a radiological patient					
One month	82 (56.6)	72 (46.5)	154 (51.3)	0.001f	
Tow months	8 (5.5)	3 (1.9)	11 (3.7)		
Three to six months	6 (4.1)	21 (13.5)	27 (9.0)		
Seven months to two years	9 (6.2)	16 (10.3)	25 (8.3)		
Three years to 5 years	3 (2.1)	20 (12.9)	23 (7.7)		
Five years and above	8 (5.5)	16 (10.3)	24 (8.0)		
Can't say	29 (20.0)	7 (4.5)	36 (12.0)		
Occupation					
Student	38 (26.2)	18 (11.6)	56 (17.8)	0.001f	
Government employee	26 (17.9)	28 (18.1)	54 (18.0)		
Private employee	28 (19.3)	13 (8.4)	41 (13.7)		
Unemployed	14 (19.3)	27 (17.4)	41 (13.7)		
Self employed	13 (9.0)	26 (16.8)	39 (13.0)		
Retired	4 (2.8)	1 (0.6)	5 (1.7)		
Teaching	1 (0.7)	2 (1.3)	3 (1.0)		
Trader	17 (11.7)	32 (20.6)	49 (16.3)		
Applicant	0 (0)	2 (1.3)	2 (0.7)		
Farming	3 (2.1)	5 (3.2)	8 (2.7)		
Rev sister	0 (0)	1 (0.6)	1 (0.3)		
Priest	1 (0.7)	0 (0)	1 (0.3)		
Average monthly income					
No income	49(33.8)	43 (27.7)	92 (30.7)		0.006f
5000 and below	23 (15.9)	13 (8.4)	36 (12.0)		

Table 1. Contd.

5000-20000	31 (21.4)	20 (12.9)	51 (17.0)	
21000-50000	21 (14.5)	46 (29.7)	67 (22.3)	
50000-100000	15 (10.3)	24 (15.5)	39 (13.0)	
101000-200000	3 (2.1)	6 (3.9)	9 (3.0)	
201000-400000	1 (0.7)	2 (1.3)	3 (1.0)	
401000-600000	2 (1.4)	1 (0.6)	3 (1.0)	
Main source of payment				
Insurance	11 (7.6)	5 (3.2)	16 (5.3)	
Self pay	114 (78.6)	147 (94.8)	261 (87.0)	
Free medical care	11 (7.6)	1 (0.6)	12 (4.0)	
Children	1 (0.7)	0 (0.0)	1 (0.3)	0.001f
Parents	4 (2.8)	2 (1.3)	6 (2.0)	
Allowance	1 (0.7)	0 (0)	1 (0.3)	
NHIS	1 (0.7)	0 (0)	1 (0.3)	
Was this your first experience with this centre				
No	44 (30.3)	56 (36.1)	-	1.128 (0.288)
Yes	101 (69.7)	99 (63.9)	100 (33.3)	

training on questionnaire administration to collect information from the respondents after securing their consent. Content validity was assured as the questionnaire was first translated into the local language—*igbo* and again translated back to English language; thereby making sure the content remained the same. Modifications were made where necessary. More so, the questionnaire was pre-tested with different radiology patients in the same hospitals four months prior to the interview where the research took place to agree on the contents of the questionnaire and those questions that did not make sense were either modified or discarded altogether.

The research was conducted in compliance with Helsinki Declaration and local legislation. Ethical clearances were obtained from University of Nigeria Teaching Hospital and Life Chart Diagnostic Centre all in Enugu. Informed consent was also obtained from individual patients before questionnaire administration.

The data were analyzed in terms of descriptive statistics using 95% confidence interval. ANOVA test for significance, Chi-Square for association and regression for differences in data and multivariate (intercept) of Pillai's Trace, Wilks' Lambda, Hotelling's Trace and Roy's Largest Root for predictive results of independent variables on dependent variables were applied.

Sample size calculation

The appropriate sample size for the work was achieved using the formula which was developed by Charan et al. (2013) for calculating sample size in medical research and the findings from a previous work, (Iliyasu et al., 2010) in which eighty three percent (83%) of the patients were satisfied with overall health services in the hospital. The calculated sample size was one hundred and eleven (111) for each hospital and two hundred and twenty two (222) for both hospitals, but in order to improve on the result and conclusion of the study and more so because of patient availability, the sample size was increased to three hundred (300) respondents—one hundred and fifty five (155) for the private hospital and one hundred and forty five for the public hospital. Few patients whose number was not tracked decided not to partake in the study. They decided mostly not to partake because of time

factor.

RESULTS

Socio-demographic statistics of the respondents

Table 1 shows a difference in some of the socio demographic characteristics of the respondents. It revealed that the higher the age of the respondents, the fewer their seeking for radiological services at the private facility. In other words, this means that older age groups would not favorably be disposed to using private radiological services. The result confirms this with a Chi-square statistically significant test statistics 23.194(0.001).

The result also showed that greater percentage of the patients who visited the radiological centre are females and it as well showed that more females visited the private radiological centre than they would the public center. Again the test statistics confirmed this at 44.197(0.001). Again the result showed that a greater percentage of those who visited the private radiological services (44.5+41.9%) are those who have attained between high school and College University as compared to those who attend the public centre (28.3+34.5%). In addition, more than half (51.6%) of the patients that attended health service at the private radiological center are those who are married with children as compared to their counterparts in the public that were just 29.0%. The cross tabulation produced a statistically significant Fisher Exact value less than 0.001.

Moreover, more than half (56.6%) of patients seeking care at the public radiological center are those who have been radiological patients for at least one month while at

Table 2. Multivariate analyses predicting respondents' perception of satisfaction, professionalism, skill and competence of Radiographers.

Statistic	Value	F	Sig
Box's M	47.745	1.787	0.04
Multivariate (intercept)			
Pillai's trace	0.943	1124.409	P<0.0001
Wilks' lambda	0.057	1124.409	P<0.0001
Hotelling's trace	16.617	1124.409	P<0.0001
Roy's largest root	16.617	1124.409	P>0.0001
Levene's equality of error variances			
Mean level of satisfaction	-	1.522	0.007
Mean level of professionalism in radiology	-	2.249	P<0.0001
Mean level of knowledge required for practice	-	2.794	P<0.0001
Tests of between-subjects effects (Corrected model)			
Mean level of satisfaction	-	2.257	P<0.0001
Mean level of professionalism in radiology	-	0.696	0.976
Mean level of knowledge required for practice	-	0.855	0.805
Tests of between-subjects effects (Intercept)			
Mean level of satisfaction	-	2326.939	P<0.0001
Mean level of professionalism in radiology	-	594.334	P<0.0001
Mean level of knowledge required for practice	-	630.285	P<0.0001

the private centre, those attending service within one month were just 72 (46.5%) and as high as 29(20%) of Never-the-less the occupation with the highest appearance at the public radiological centre was the student group 38(26.2%). In the Private radiological centre, the occupation with the highest occurrence is trader as they were 32 and the figure represents 20.6% of the patients at the public radiological center could not state how long they had been radiological examination patients. Here again the test statistics showed to be statistically significant at 0.001 Fishers Exact value. There were more respondents who had no income that sought care at the public radiological centre than those who sought care at the private radiological centre. It shows that 49(33.8) were those who sought care at the public radiological centre who had no income while their counterparts in the private centre were just 43(27.7%) accounting for those within that category.

The main source of payment at the two centres was self-pay, however it was more in the private centre (147(94.8%)) than in the public centre 114(78.6%). Also there were more patients who paid through insurance at the public center compared to those who paid using insurance at the private center. It showed that 11(7.6%) paid using Insurance at the public centre and their counterparts in the private was 5(3.2%). Finally there was no difference as to whether the patient was first time

visitor or a re-visitor at both hospitals as it showed that 101(69.7%) and 99(63.9%) for public and private centres respectively. The test statistics gave a non-statistical chi-square value of 1.128, $p=0.288$.

The result presented in Table 2 the Box's Test of Equality of Covariance Matrices giving a Box's M result of 47.745 and F-value of 1.787 $>F_{critical}$ of 1.52 ($p > 0.05$), indicates that respondents' perception of level of satisfaction, radiographers professionalism, skill and competence (knowledge) are dependent on the combined factors of the respondents age, type of hospital where service is received, gender, level of education and patient's length of experience of radiological services.

This result is confirmed in the multivariate tests which give an F-value of 1124.409 ($p < 0.05$) for the combination (intercept) of the factors of respondents age, type of hospital where service is received, gender, level of education and length of experience of radiological services on respondents' perception of level of satisfaction, radiographers professionalism skill and competence.

Particularly, the multivariate test results for Pillai's Trace, Wilks' Lambda, Hotelling's Trace and Roy's Largest Root all have the same F-values of 1124.409 and significance value $p < 0.0001$. This show the dependent variables (level of satisfaction, radiographers' professionalism, skill and competence) are really determined

by the combined effects of respondents' age, type of hospital where service is received, gender, level of education and length of experience of radiology service.

From the Levene's Test of Equality of Error Variances, F-values of 1.52, 2.45 and 2.79 for satisfaction, professionalism, skill and competence were obtained. These were greater than $F_{critical}$ of 1.52 ($p < 0.05$). This further indicates that the above results are acceptable as the equality in error variances across the dependent variables is established. In clearer terms, variation in the response of each respondent from the group response is almost the same among all the respondents. This applies to the level of satisfaction, the level of professionalism in radiology and the level of knowledge radiographers required for practice. So the respondents have the same opinion about the dependent variables, not minding their unique qualities.

From the test of between-subjects effects, the F-values for corrected model and intercept, which are greater than the $F_{critical}$ of 1.52 further establishes the combined effects of respondents' age, type of hospital where service is received, gender, level of education and length of experience of radiology service on respondents' perception of level of satisfaction, radiographers professionalism, skill and competence.

The R (r) value of 0.509 for the respondents perception of level of satisfaction, being greater than the critical R ($r_{critical}$) value of 0.095 reveals that there is a coefficient of determination (relationship) between respondents' age, type of hospital where service is received, gender, level of education and length of experience of radiological services and level of satisfaction. This is indicative that with higher respondents' demographic characteristics, there is more likelihood that respondents' level of satisfaction will increase.

The R (r) value of 0.242 for the respondents perception of level of professionalism in radiology, being greater than the critical R ($r_{critical}$) value of 0.095 reveals that there is a coefficient of determination (relationship) between respondents' age, type of hospital where service is received, gender, level of education and length of experience of radiological services and level of professionalism in radiology. This is indicative that with higher respondents' demographic characteristics, there is more likelihood that respondents' perception will increase. However, this coefficient of determination (relationship) is not as strong as the coefficient of determination between the respondents' demographic characteristics and level of satisfaction.

The R (r) value of 0.282 for the respondents' perception of level of knowledge (skill and competence) required for practice, being greater than the critical R ($r_{critical}$) value of 0.095 reveals that there is a coefficient of determination (relationship) between respondents' age, type of hospital where service is received, gender, level of education and length of experience of radiology service and level of knowledge required for practice. This is indicative of the fact that with higher respondents' demographic

characteristics, there is more likelihood that respondents' perception will increase. However, this coefficient of determination (relationship) is not as strong as the coefficient of determination (relationship) between the respondents' demographic characteristics and level of satisfaction but stronger than the coefficient of determination (relationship) between the respondents' demographic characteristics and perception of level of professionalism in radiology.

From the above, the perceptions of the respondents about levels of satisfaction, professionalism in radiology and knowledge required for practice are influenced by the combination of the respondents' age, type of hospital where service is received, gender, level of education and length of experience of radiological services. However, the combination of these factors has more coefficient of determination (relationship) with level of satisfaction, followed by respondents' perception about the skill and knowledge required for practice, and lastly the respondents' perception about professionalism in radiology.

A breakdown of the multivariate analyses highlighting the predictive values of the independent variables on the dependent variables

Based on the result presented in Table 3, with high Chi-Square values and p-values < 0.05 , the demographic characteristics of the sampled respondents are associated with their level of satisfaction. In particular, respondents that are aged 31 to 40 years are more satisfied with the routine radiological services offered to them by radiographers than respondents of the other age groups, and this satisfaction decreases with increasing age. This shows that the younger respondents are more satisfied than the older respondents. Respondents that attended the private hospital are more satisfied than respondents that attended the public hospital. Female respondents are more satisfied than male respondents. Respondents with secondary school education are more satisfied than respondents with other educational qualifications. Respondents with higher length of experience with radiology are more satisfied than respondents that have lesser length of experience. This shows that level of satisfaction with radiological services rendered by radiographers varies within the different groups as in their demographic characteristics.

Based on the result presented in Table 4, with low Chi-Square values and p-values > 0.05 , the demographic characteristics of the sampled respondents are not associated with their perceived level of professionalism among radiographers. In particular, majority of the respondents from all the age groups, the private and the public hospitals, males and females, the different educational groups and irrespective of how long they have accessed radiological services, believed that the radiographers exhibited professionalism. This reveals that the respondents' perception about the level of

Table 3. Level of satisfaction.

Demographic characteristic	Options	Very dissatisfied (%)	Dissatisfied (%)	Neutral (%)	Satisfied (%)	Very satisfied (%)	Total	Chi-square (p-value)
Age	Under 30	1 (0.7)	5 (3.5)	40 (28.2)	85 (59.9)	11 (7.7)	142 (100.0)	18.043 (0.114)
	31-40	0 (0.0)	1 (1.6)	13 (21.3)	38 (62.3)	9 (14.8)	61 (100.0)	
	41-50	0 (0.0)	2 (4.8)	10 (23.8)	24 (57.1)	6 (14.3)	42 (100.0)	
	over 50	3 (5.5)	4 (7.3)	18 (32.7)	27 (49.1)	3 (5.5)	55 (100.0)	
Type of hospital	Public	3 (2.1)	12 (8.3)	61 (42.1)	57 (39.3)	12 (8.3)	145 (100.0)	55.033 P<0.0001
	Private	1 (0.6)	0 (0.0)	20 (12.9)	117 (75.5)	17 (11.0)	155 (100.0)	
Gender	Male	2 (2.2)	6 (6.5)	39 (42.4)	40 (43.5)	5 (5.4)	92 (100.0)	21.738 P<0.0001
	Female	2 (1.0)	6 (2.9)	42 (20.2)	134 (64.4)	24 (11.5)	208 (100.0)	
Highest level of education	No school	1 (5.9)	2 (11.8)	4 (23.5)	9 (52.9)	1 (5.9)	17 (100.0)	99.440 P<0.0001
	Elementary	0 (0.0)	3 (8.1)	13 (35.1)	16 (43.2)	5 (13.5)	37 (100.0)	
	High school	0 (0.0)	4 (3.6)	24 (21.8)	77 (70.0)	5 (4.5)	110 (100.0)	
	College/ university	2 (1.7)	2 (1.7)	33 (28.7)	61 (53.0)	17 (14.8)	115 (100.0)	
	Higher education	0 (0.0)	1 (5.0)	7 (35.0)	11 (55.0)	1 (5.0)	20 (100.0)	
	Literacy classes only	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	
Length of experience With radiology	One month	2 (1.3)	8 (5.2)	32 (20.8)	94 (61.0)	18 (11.7)	154 (100.0)	40.075 (0.021)
	Two months	0 (0.0)	0 (0.0)	7 (63.6)	4 (36.4)	0 (0.0)	11 (100.0)	
	Three to six months	1 (3.7)	0 (0.0)	5 (18.5)	19 (70.4)	2 (7.4)	27 (100.0)	
	Seven months to two years	0 (0.0)	1 (4.0)	6 (24.0)	15 (60.0)	3 (12.0)	25 (100.0)	
	Three years to 5 years	0 (0.0)	0 (0.0)	6 (26.1)	14 (60.9)	3 (13.0)	23 (100.0)	
	Five years and above	0 (0.0)	0 (0.0)	5 (20.8)	16 (66.7)	3 (12.5)	24 (100.0)	
	Can't say	1 (2.8)	3 (8.3)	20 (55.6)	12 (33.3)	0 (0.0)	36 (100.0)	

professionalism exhibited by radiographers is not based on the demographic characteristics of the patients. Based on the result presented in Table 5, with low Chi-Square values and p-values > 0.05, the demographic characteristics of the sampled respondents are not associated with their perceived level of knowledge of skills and competence among radiographers. In particular,

majority of the respondents from all the age groups, from the public and the private hospitals, males and females, the different educational groups and irrespective of how long they have accessed radiological services, believed that the radiographers have adequate knowledge of their practice.

This reveals that the respondents' perception

about the level of knowledge (skill and competence) exhibited by radiographers is not based on their demographic characteristics.

DISCUSSIONS

The results of this work clearly show that the

Table 4. Level of professionalism in radiology.

Demographic characteristic	Option	Professional (%)	Not professional (%)	Total	Chi-square (p-value)
Age	Under 30	116 (81.7)	26 (18.3)	142 (100.0)	2.555 (0.465)
	31-40	54 (88.5)	7 (11.5)	61 (100.0)	
	41-50	35 (83.3)	7 (16.7)	42 (100.0)	
	over 50	49 (89.1)	6 (10.9)	55 (100.0)	
	Total	254 (84.7)	46 (15.3)	300 (100.0)	
Type of hospital	Public	126 (86.9)	19 (13.1)	145 (100.0)	1.075 (0.300)
	Private	128 (82.6)	27 (17.4)	155 (100.0)	
Gender	Male	81 (88.0)	11 (12.0)	92 (100.0)	1.165 (0.280)
	Female	173 (83.2)	35 (16.8)	208 (100.0)	
Highest level of education	No school	17 (100.0)	0 (0.0)	17 (100.0)	6.909 (0.228)
	Elementary	31 (83.8)	6 (16.2)	37 (100.0)	
	High school	94 (85.5)	16 (14.5)	110 (100.0)	
	College/university	92 (80.0)	23 (20.0)	115 (100.0)	
	Higher education	19 (95.0)	1 (5.0)	20 (100.0)	
	Literacy classes only	1 (100.0)	0 (0.0)	1 (100.0)	
Length of experience	One month	133 (86.4)	21 (13.6)	154 (100.0)	3.549 (0.737)
	Two months	10 (90.0)	1 (9.1)	11 (100.0)	
	Three to six months	23 (85.2)	4 (14.8)	27 (100.0)	
	Seven months to two years	22 (88.0)	3 (12.0)	25 (100.0)	
	Three years to 5 years	17 (73.9)	6 (26.1)	23 (100.0)	
	Five years and above	19 (79.2)	5 (20.8)	24 (100.0)	
	Can't say	30 (83.3)	6 (16.7)	36 (100.0)	

dependent variables (level of satisfaction, radiographers' professionalism, skill and competence) are determined by the combined effects of respondents' age, type of hospital where services are received, gender, level of education and length of patient's experience of radiological services. At the same time, the results equally vary among the different population groups in the study as the effects of the independent variables differ among the dependent variables.

Take for instance, the case of satisfaction with radiological services. Respondents aged 31 to 40 appear to be more satisfied with radiological services compared to other age groups. Respondents that attended the private clinic, the females, the better educated and those with longer experience with radiological examination are also more satisfied with their radiological experiences. These results are self explanatory as the younger population (31 to 40) years of age may be less concerned with details of being addressed personally and are more likely to be in a hurry to attain to other personal issues of the day. Overall, the respondents are highly educated (115)(38.3%) and most likely may include this (31 to 40) age group, making it easier for them to understand and

follow instructions compared to the younger and elderly population groups.

This result does not exonerate the radiographers as they may have failed in their duty to provide adequate instructions to the other groups bearing in mind the unequal levels of the different population groups to follow and comprehend radiological examination instructions. The elderly and the younger groups require more attention as time must be taken to address their personal needs to improve satisfaction. This finding agrees with Ugwu et al. (2003) where it was recommended that services in delivery related to radiography, friendliness should be improved as a requirement and that radiology staff should be more courteous. Respondents that attended the private clinic expressed more satisfaction than those that attended the public clinic. This result suggests that the private clinic is more at work in meeting the demands of its patients in service delivery. They are hard at work to improve their bottom line and increase their market share as this is the only option of not being edged out in the radiology competitive business.

In Nigeria, public hospitals are less likely to engage in patient satisfaction strategies as the government shoulders

Table 5. Level of knowledge (skill and competence) required for practice.

Demographic Characteristic	Option	Adequate knowledge (%)	Inadequate knowledge (%)	Total	Chi-square (p-value)
Age	Under 30	115 (81.0)	27 (19.0)	142 (100.0)	2.508 (0.474)
	31-40	53 (86.9)	8 (13.1)	61 (100.0)	
	41-50	36 (85.7)	6 (14.3)	42 (100.0)	
	over 50	49 (89.1)	6 (10.9)	55 (100.0)	
	Total	253 (84.3)	47 (15.7)	300 (100.0)	
Type of Hospital	Public	127 (87.6)	18 (12.4)	145 (100.0)	2.248 (0.134)
	Private	126 (81.3)	29 (18.7)	155 (100.0)	
Gender	Male	80 (87.0)	12 (13.0)	92 (100.0)	0.691 (0.406)
	Female	173 (83.2)	35 (16.8)	208 (100.0)	
Highest level of education	No school	16 (94.1)	1 (5.9)	17 (100.0)	4.026 (0.546)
	Elementary	30 (81.1)	7 (18.9)	37 (100.0)	
	High school	93 (84.5)	17 (15.5)	110 (100.0)	
	College/university	94 (81.7)	21 (18.3)	115 (100.0)	
	Higher education	19 (95.0)	1 (5.0)	20 (100.0)	
	Literacy classes only	1 (100.0)	0 (0.0)	1 (100.0)	
Length of experience	One month	136 (88.3)	18 (11.7)	154 (100.0)	7.359 (0.289)
	Two months	10 (90.9)	1 (9.1)	11 (100.0)	
	Three to six months	22 (81.5)	5 (18.5)	27 (100.0)	
	Seven months to two years	21 (84.0)	4 (16.0)	25 (100.0)	
	Three years to 5 years	16 (69.6)	7 (30.4)	23 (100.0)	
	Five years and above	20 (83.3)	4 (16.7)	24 (100.0)	
	Can't say	28 (77.8)	8 (22.2)	36 (100.0)	

the responsibility of staff salary payments, recurrent and capital expenditure regardless of the internally generated revenue (IGR). Never-the-less, strategies must evolve to make government hospitals more responsive to patient care. Patient-centred care should be introduced through in-service training, seminars and workshops. In this study, it is equally not hard to understand that the better educated are more satisfied than the less educated. This is because they are more likely to understand and follow instructions than the less educated groups, thereby improving their chances of being more satisfied with radiological services. The implication of which is that radiographers should be more at work in explaining radiological procedures and preparations for the less educated groups who are likely to be among the elderly and youngest population groups.

The independent variables of respondents' age, type of hospital where service is received, gender, level of education and patient's length of experience with radiological services equally established no relationship with radiographers' professionalism with none of them having a better or significant relationship with radiographers' professionalism than the other. This is

because the R (r) value of 0.242 for the respondents' perception of level of professionalism in radiology is greater than the critical R ($r_{critical}$) value of 0.095. This result is to say that that the radiographers were equally very professional among the various age groups, between the hospitals, the genders, the education groups and among patients with different lengths of radiological services.

It was also observed that the demographic characteristics of the sampled respondents are not associated with their perceived level of knowledge among radiographers. This is because majority among the respondents' age, type of hospital where service is received, gender, level of education and patient's length of experience with radiological services equally believed that radiographers have adequate knowledge of their practice. None of the independent variables was able to predict more than the others concerning radiographers' knowledge (skill and competence) needed to practice. This indicates that radiographers were found competent equally among the various age groups, type of hospital where service is received, gender, education etc; to practice.

Satisfaction with healthcare services and precisely hospital services has received adequate attention in western democracies where advocacy for patients' right have taken prominence. In the sub-Saharan African countries, advocacy for patients' satisfaction with healthcare services is still at its infancy. Quality services rendered in hospitals which are measured in various dimensions including tangibles, reliability of service, responsiveness, assurance, courtesy and empathy to a larger extent determines satisfaction with hospital services. Measuring service quality becomes the advocacy of this study because through this, specific actions are recommended and applied to improve patient satisfaction which invariably increases the bottom line of hospitals through improved patient patronage. These elements of quality are needed to improve service satisfaction in radiology especially in the Nigerian setting and modified to our unique character.

Patient number has continued to climb much faster in the world due to longer life and improved medical services yet healthcare access has remained elusive to majority of patients in Nigeria. Access to healthcare services means timely use of healthcare services to achieve personal wellbeing. This could be inhibited by a lot of factors including lack of availability of healthcare services and high financial costs associated with access to care. Even when healthcare services are available and affordable, structural barriers personified in the attitude of providers could still constitute a barrier to access. Improving access to radiological services could mean a change in the way providers offer services to patients which invariably affect their perception and this we recommend should be considered in offering radiological services in Nigeria.

As healthcare becomes increasingly complex and medication use rises, the vital role pharmacists play in coordinated care delivery becomes very important. It is expected that pharmacists should give patients greater access to healthcare through their role in patient-care services by working more closely with other healthcare professionals to manage chronic conditions, help patients' transition among healthcare settings, and optimize medication use in radiology services. This invariably will improve satisfaction with radiological services as well if well structured in the Nigerian radiological services.

Finally, given the vastness in disease burden in developing countries, efforts are being made to accelerate the production of new technologies to help ameliorate and contain the expanding and growing problems in disease diagnosis as in radiology. Improving the health of the majority in Nigeria, accelerated development in technological advancements in diagnostic techniques is required. However efforts in this direction are impeded by lack of technical training, research tools, financial resources, and up-to-date scientific information. However, accelerated developments in technological advancements personified in technical know-how and provider/patient relationships will go a long way to

increase satisfaction with radiological services in Nigeria.

STUDY LIMITATION

The study has some limitations. First, only two hospitals were chosen conveniently for this study which invariably affects the generalization of the results. More hospitals ought to have been included especially from the rural settings to understand if results could have been different from what were obtained as only urban hospitals were involved in the study. The study was also beset by the limited time period (4 months) within which it was conducted. A longer period would have included a different character of respondents which could have influenced the findings as well.

RECOMMENDATIONS

From the analyses, it is indicative that satisfaction with radiological services decreases with increasing age. Younger respondent are seen to be more satisfied than the older respondents. Exploring the reasons for this outcome and imploring specific strategies to improve on the satisfaction of older radiology patients will be most welcomed. Devising and implementing concrete provider/patient relationships are recommended. Customer relations like identifying patients by their names, explaining the procedure to be undertaken before examination and the likely outcomes, in essence allaying the fears and apprehensions of the older patients are likely measures to improve the satisfaction of the older patients.

Secondly, it is also noted that respondents that attended the private hospital were more satisfied than respondents that attended the public hospital. Differences in patient management deployed by the two hospitals need to be explored. The public hospital could borrow a leaf from the strategies used by the private hospital to beef up the satisfaction level of its radiology patients. It was also gathered from the results that female respondents were more satisfied than male respondents. Probing into the reasons why the males were less satisfied with the radiological services than the females will help in strengthening services to accommodate the desires of the male respondents in radiological services.

The results equally showed that respondents with secondary school education were more satisfied than respondents with other educational qualifications and respondents with higher length of experience with radiology were more satisfied than respondents that have lesser length of experience. The study do recommend that the less educated and first timers in radiological examination be provided with better attention by explaining what is involved in radiological examination. The likely apprehension of the big machines, not understanding what's involved in radiology especially for

the first timers, not being educated on what to expect before and after radiological examination in a language understood by the less educated and first timers should be emphasized and dealt with in future examinations involving them.

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Conflict of Interests

The authors have not declared any conflict of interests.

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