Patients' Satisfaction with Radiological Examination: A Cross-Sectional Assessment of the Impact of Facility Services and Tangibles in a Private and a Public Hospital in Enugu, Southeast Nigeria

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Abstract
Delivering quality radiological services have been reported to have significant relationship with customer satisfaction. This study was aimed at understanding how patients' satisfaction could be influenced by radiological services, the physical appearance of the facilities and the quality of equipment's in the hospital. A cross-sectional survey was used in the investigation and patients self-administered the questionnaire to ascertain their satisfaction with radiological services and tangibles. There were 92(30.7%) male and 208(69.3%) female respondents who were interviewed. Patients in the private hospital were more satisfied in ten areas of service delivery including registration process at the front desk/courtesy of staff 68.211, p<0.001. Respondents in the public hospital were more satisfied with the waiting time before examination 20.881, p<0.001 and the overall patients' satisfaction was 42.945,

p<0.001. Logistic regression indicates that patients in the public hospital were less likely to be satisfied in eight service areas. However, patients in the private hospital were more likely to be satisfied in four areas of service delivery. Patients' satisfaction with radiological services is found to be more favourable in the private hospital of our study compared to the public hospital. Service providers in the public hospital were recommended to be provided with better orientation on patient-provider relationship aimed at improving patients' satisfaction with radiological services. Seminars and workshops were also recommended in the short term, while curricula changes to reflect provider-patient relationship at the university education level was recommended in the long run to enhance professionalism for the providers.

Key words: *Nigeria, Patient satisfaction, radiological services, facility tangibles.*

INTRODUCTION

Background

Accordingly service quality is customers' perception of how well a service meets or exceeds their expectations and it is judged by customers, not by organizations (Yesilada and Direktor, 2010), (Boulding et al; 1993), (Kara et al; 1995), (Reichheld, Sasser, 1990), (Boshoff, Gray, 2004), (Zeithaml, Parasuraman, Berry, 1990). Differentials in health care satisfaction are also noted between public and private health care institutions (Chingarande et al; 2013). A study confirms that tangible dimensions--environmental cleanliness, equipments and personnel do not seem to influence customer satisfaction in the public hospital, while it is found to exert satisfaction in the private hospital (Yesilada and Direktor, 2010). Providers' reliability of service, confidence, empathy and tangibles are also significant influences on patient satisfaction with health care services (Yesilada and Direktor, 2010). Service attitudes of radiographers/nurses have also been noted to differ between private and public hospitals (Chingarande et al; 2013). Patients in a private hospital viewed their professional interaction with radiographers more favourable than those from a public hospital which was a source of satisfaction for patients in the private hospital (Chingarande et al; 2013). The satisfying areas according to the study were adequate time allocation for examination, communication with patients and the overall patient satisfaction with the radiological examination was also rated well by the patients. Patients found that public hospital tangibles—facilities, medical equipment's and physical environment were inadequate and so were the registered attitude of medical personnel (Cong, and Mai, 2014). Study of four public radiology departments revealed that service delivery should be improved on radiographers' friendliness and courteousness (Hall, 1995).

Investigations exploring overall patient satisfaction with health care services and indeed specific health care services like radiology has been limited in the developing countries, but beginning to pick up momentum in Nigeria (Rajani et al; 2011), (Nyongesa, 2014). In a study on patients' perception of radiological examination in Nigeria, it was revealed that the way in which patients view the care that they receive from their health care providers can greatly influence their satisfaction with their examinations (Ugwu, Shem, Erondu, 2009). Having radiologists directly communicate results to patients would not only increase the speed at which imaging results are delivered to patients, but also improve patient satisfaction (Ugwu, Shem, Erondu, 2009). In another study in a public hospital on ultrasound scan, results show inadequate provision of information to patients required for them to make a knowledgeable decision about their scan (Eze and Okaro, 2006). Large number of the women waited for a long time (1-4 hours) before their scan. About half of the respondents were satisfied with the way the result of the scan was communicated to them (Eze and Okaro, 2006). That study concluded that full implementation of informed consent; reduced waiting time, better

communication, explanation and counseling of scan findings to patients would improve the quality of obstetric ultrasound service (Eze and Okaro, 2006). A customer satisfaction survey in ultrasound reveals that in the area of staff service at reception, the overall rating was a little above seventy five percent as good, while in area of staff service in ultrasound, 87% rated service as good (Charan and Biswara, 2013) In the category of promptness in service 19% rated as just good and for areas of giving clear instruction and being attentive when serving, staff rating was 20% and 16% by patients respectively (Charan and Biswara, 2013).

Although, many researches have been conducted on patients' satisfaction with radiological services, no particular work was found on the likely effects of radiographers'/nurses' services and facility tangibles including equipment's on patients' satisfaction with radiology in Nigeria. This paper was an attempt to investigate the likely effects of radiographers'/nurses' professional services within the radiology department that could influence patients' satisfaction. Policy recommendations enabling good service attitudes from radiographers/nurses within the department of radiology becomes the rational for this work.

Methods
This is a cross-sectional, descriptive study in which three hundred respondents (patients) who had received radiological services as out-patients in one public-tertiary hospital (University of Nigeria Teaching Hospital, Ituku/Ozalla, Enugu) and one private health care institution (Life Chart Diagnostic Centre, Abakpa Nike, Enugu) in Enugu, southeast Nigeria were surveyed immediately after their radiological examination to ascertain their satisfaction with the services they have received from radiographers/nurses. The respondents were chosen among outpatients who had visited the hospitals (public or private) for radiological examinations. In no particular order, patients were scheduled for examination which is held on the clinic day of every Monday for the public hospital. To allow for chance alone determine who gets included in our sample, systematic sampling technique was used in which we made a determination that every second examinee who shows up for the examination regardless of gender gets included in our sample.

Sample size calculation
The appropriate sample size for the study was achieved using the formula:

$$S= \frac{Z_{1-\alpha/2}^{2}\, P\,(1-P)}{d^{2}}$$

which was developed by (Charan and Biswara, 2013) used in calculating sample size in medical research and the findings from a previous work in Nigeria--(IIiyasu et al; 2010) in which 83% of the patients were satisfied with the overall health services in the hospital surveyed. The calculated sample sizes for both hospitals were one hundred and eleven (111) each, two hundred and twenty two (222) for both, but in order to improve on the result and conclusion of our work and more so because of patient availability, the sample sizes were increased to three hundred (300) respondents for both hospitals. Based on this, 155 patients were interviewed at the private hospital and 145 at the public hospital.

The public-tertiary hospital sees about forty (40) patients in a day, so about twenty (20) patients get to be interviewed in a day. The same process was repeated for the private clinic that sees about (25) patients on its clinic day of every Friday and about (13) patients get to be interviewed on that day. Patients were interviewed in both hospitals until the required number of patients for each of the hospitals was gotten.

Both sites for our study were conveniently chosen. Each interview lasted for approximately ten minutes and questions challenging to the respondents were explained for appropriate response.

Our study was conducted in strict compliance with the Helsinki Declaration and local legislations as we applied and got ethical clearances from the University of Nigeria Teaching Hospital and Life Chart Diagnostic Centre ethical committees. The facilities for the study were conveniently chosen.

A cross-sectional survey was conducted between March and July 2013. A validated questionnaire was used by the data collection clerks who had training in questionnaire administration to collect information from the respondents. The questionnaire was validated through a pilot study conducted four months prior to the commencement of this study in which a different set of patients from the study hospitals were asked questions regarding their understanding of the study instrument. Questions least understood by patients were either reworded or discarded in entirety until there was a full agreement as to their meaning between patients and the researchers. Moreover, the content validity and reliability of the questionnaire were strengthened by first translating the questions into Igbo language (local language) and back to English language. Each respondent's consent was obtained as well as ethical clearance from the institutions before the questionnaire administration. The indicators used in the assessment of satisfaction with radiological services include—how a patient was prepared for specific test/exam, registration process at the front desk/courtesy of staff, waiting time before procedure, courtesy of radiographers/staff, explanation of what to expect during the exam, how questions were answered by the radiographers/staff, making an appointment, choice of appointment time, explanation of the billing process, explanation of what to expect after the exam, level of attention by the radiographers/nurses, and the physical appearance of the facility and quality of equipment's.

Data Analysis

The data was captured and analyzed with SPSS version 20. Results were presented in frequencies and percentages. Also cross tabulations were done to ascertain the relationship between type of facility and the satisfaction of the clients at radiological centers, to establish the relationship, chi-square test statistics was used. The alpha was set at 95%CI and what this meant was that at any point that the significant value was below 0.05, the researcher concluded that a relationship exists and vice versa. Also a multinomial regression analysis was used to determine possible predictors to the differences that exist between satisfaction of clients at radiological centers in the public and that of the private health facilities.

Results and discussion
Tables

Table 1: Socio- demographic characteristics of the respondents

Demographic Characteristics	Options	Frequency	Percent
Age	under 30	142	47.3
	31-40	61	20.3
	41-50	42	14.0
	over 50	55	18.3
Type of Centre	Public	145	48.3
	Private	155	51.7
Gender	Male	92	30.7
	Female	208	69.3

Highest level of education	no school	17	5.7
	Elementary	37	12.3
	high school	110	36.7
	college/university	115	38.3
	higher education (professional or post-graduate)	20	6.7
	literacy classes only	1	.3
Marital status	Married	63	21.0
	Separated	2	.7
	Divorced	2	.7
	married with children	122	40.7
	married without children	32	10.7
	Single	79	26.3
Length of time as radiological service patient	one month	154	51.3
	two months	11	3.7
	three to six months	27	9.0
	seven months to two years	25	8.3
	three years to 5 years	23	7.7
	five years and above	24	8.0
	can't say	36	12.0
Occupation	Student	56	18.7
	government employee	54	18.0
	private employee	41	13.7
	Unemployed	41	13.7
	self employed	39	13.0
	Retired	5	1.7
	Teaching	3	1.0
	Trader	49	16.3
	Applicant	2	.7
	Farming	8	2.7
	Rev. sister	1	.3
	Priest	1	.3
Average monthly income	no income	92	30.7
	#5,000 and below	36	12.0
	#5,000 and #20,000	51	17.0
	#21,000 and #50,000	67	22.3
	#51,000 - #100,000	39	13.0
	#101,000 - 200,000	9	3.0
	#201,000 - 400,000	3	1.0
	#401,000 - #600,000	3	1.0

Main source of payment for radiological services	Insurance	16	5.3
	self pay	261	87.0
	free medical care	12	4.0
	Children	1	.3
	Parents	6	2.0
	Pension	1	.3
	Allowance	1	.3
	NHIS	2	.7
First experience with centre	Yes	200	66.7
	No	100	33.3

As noted in Table 1; there were three (300) hundred respondents and those under thirty (30) years of age constituted the majority 142 (47.3%). One hundred and forty five 145(48.3%) questionnaires were administered in the public hospital and one hundred and fifty five 155(51.7%) questionnaires in the private hospital. There were 92 (30.7%) males and 208(69.3%) female respondents. Those with college/university education 115 (38.3%) constituted the majority. Majority 92 (30.7%) have no income presumably because they are unemployed and the means of payment for services received was self-pay as the majority 261 (87.0%) did just that. Majority of the respondents 112 (21.0%) were married with children and about half of them 154 (51.3%) indicated that they have had radiological services within the last one month. Those that indicated that the radiological services they received were their first experience with their centre were in the majority 200 (66.7%)

Table 2: showing the assessed services and satisfaction level at both facilities

Assessed service elements of satisfaction	Type of facility		Chi-square (p-value)
	Public n=145	Private n=155	
Making an appointment Very dissatisfied			
Dissatisfied	14(9.7)	5(3.2)	22.887(0.000)
Neutral	15(10.3)	3(1.9)	
Satisfied	59(40.7)	84(54.2)	
Very satisfied	31(21.4)	20(12.9)	
	26(17.9)	43(27.7)	
Choice of appointment times Very dissatisfied			
Dissatisfied	17(11.7)	3(1.9)	46.334(0.000)
Neutral	15(10.3)	4(2.6)	
Satisfied	46(31.7)	47(30.3)	
Very satisfied	39(26.9)	21(13.5)	
	28(19.3)	80(51.6)	
The preparation for your specific test/exam were adequately explained			
Very dissatisfied	11(7.6)	1(0.6)	30.040(0.000)
Dissatisfied	14(9.7)	1(0.6)	
Neutral	47(32.4)	55(35.5)	

Satisfied	34(23.4)	27(17.4)	
Very satisfied	39(26.9)	71(45.8)	
Registration process at the front desk/Courtesy of staff			
Very dissatisfied	13(9.0)	1(0.6)	68.221(0.000)
Dissatisfied	19(13.1)	3(1.9)	
Neutral	42(29.0)	14(9.0)	
Satisfied	40(27.6)	42(27.1)	
Very satisfied	31(21.4)	95(61.3)	
Explanation of the billing process and procedure	11(7.6)	4(2.6)	67.643(0.000)
Very dissatisfied	21(14.5)	6(3.9)	
Dissatisfied	52(35.9)	17(11.0)	
Neutral	35(24.1)	34(21.9)	
Satisfied	26(17.9)	94(60.6)	
Very satisfied			
Waiting time before procedure	15(10.3)	5(3.2)	20.881(0.000)
Very dissatisfied	26(17.9)	55(35.5)	
Dissatisfied	50(34.5)	33(21.3)	
Neutral	31(24.4)	43(27.7)	
Satisfied	23(15.9)	19(12.3)	
Very satisfied			
Courtesy of the nurse/radiographer	7(4.8)	1(0.6)	38.342(0.000)
Very dissatisfied	12(8.3)	4(2.6)	
Dissatisfied	46(31.7)	19(12.3)	
Neutral	32(22.1)	30(19.4)	
Satisfied	48(33.1)	101(65.2)	
Very satisfied			
Explanation of what to expect during the exam	10(6.9)	2(1.3)	34.448(0.000)
Very dissatisfied	22(15.2)	3(1.9)	
Dissatisfied	56(38.6)	103(66.5)	
Neutral	37(25.5)	32(20.6)	
Satisfied	20(13.8)	15(9.7)	
Very satisfied			
	7(4.8)	1(0.6)	11.192(0.024)
How question were answered by staff	5(3.4)	4(2.6)	
Very dissatisfied	69(47.6)	58(37.4)	
Dissatisfied	35(24.1)	43(27.7)	
Neutral	29(20.0)	49(31.6)	
Satisfied			
Very satisfied			

	16(11.0)	2(1.3)	45.066(0.000)
Explanation of what to expect after exam	20(13.8)	3(1.9)	
Very dissatisfied	66(45.5)	121(78.1)	
Dissatisfied	31(21.4)	121(78.1)	
Neutral	12(8.3)	15(9.7)	
Satisfied			
Very satisfied			
	7(4.8)	1(0.6)	54.301(0.000)
Level of attention provided by the nurse/radiographer	10(6.9)	1(0.6)	
Very dissatisfied	50(34.5)	13(8.4)	
Dissatisfied	37(25.5)	48(31.0)	
Neutral	41(28.3)	92(59.4)	
Satisfied			
Very satisfied			
	7(4.8)	1(0.6)	13.896(0.008)
The physical appearance of the facilities and the quality of the equipments	11(7.6)	7(4.5)	
Very dissatisfied	56(38.6)	42()27.1	
Dissatisfied	40(27.6)	55(35.5)	
Neutral	31(21.4)	50(32.3)	
Satisfied			
Very satisfied	9(6.2)	0(0.0)	42.945(0.000)
	10(6.9)	3(1.9)	
Overall satisfaction	39(26.9)	12(7.7)	
Very dissatisfied	46(31.7)	55(35.5)	
Dissatisfied	41(28.3)	85(54.8)	
Neutral			
Satisfied			
Very satisfied			

The result in table 2 shows that patients in the private hospital were more satisfied with making an appointment (27.7%), choice of appointments times (51.6%), the preparation for specific test/exam adequately explained (45.8%), registration process at the front desk/courtesy of staff (61.3%) and explanation of the billing process and procedure (60.6%). This is because the chi-square test statistics gave statistically significant result thus; 22.887, $p<0.001$, 46.334, $p<0.001$, 30.040, $p<0.001$, 68.211, $p<0.001$ and 67.643, $p<0.001$ respectively. This result is very similar to (Chingarande et al; 2013) where patients in a private hospital viewed their professional interaction with radiographers more favourable than those from a public hospital which was a source of satisfaction for patients in the private hospital. The satisfying areas according to that study were adequate time allocation for examination, communication with patients and the overall patient satisfaction with the radiological examination was also rated well by the patients. The radiographers/nurses in the public hospital of our study need orientation in customer relations and improved provider/patient interactions to improve instances of customer satisfaction. In addition respondents in the public hospital in our study were more satisfied with the waiting time before examination as the chi-square test statistics gave a statistically significant result 20.881, $p<0.001$. Unlike our study however, (Eze and Okaro, 2006) reports large number of the women waited for a long time (1-4 hours) before their scan in a public hospital. Continuing, patients in the private hospital of our work were also more satisfied with the

courtesy of the nurses/radiographers as the tests statistics gave 38.342, p=<0.001, more satisfied with how questions were answered, 11.192, p=0.024, explanation of what to expect after exam, 45.066, p<0.001, level of attention provided by the nurse/radiographer 54.301, p<0.001, physical appearance of the facilities/the quality of the equipments 13.896, p=0.008 and the overall satisfaction stood at 42.945, p<0.001. Our result is very similar to (Yesilada and Direktor, 2010), (Boulding et al; 1993), (Kara et al; 2995), (Reichheld, Sasser, 1990), (Boshoff, Gray, 2004), (Zeithaml, Parasuraman, Berry, 1990) and (Cong, and Mai, 2014) where patient satisfaction was reportedly not influenced by facility tangibles in the public hospital, while it was found to exert satisfaction in the private hospital. Providers' reliability of service, confidence, empathy and tangibles as reported by (Yesilada and Direktor, 2010), (Boulding et al; 1993), (Kara et al; 1995), (Reichheld, Sasser, 1990), (Boshoff, Gray, 2004), (Zeithaml, Parasuraman, Berry, 1990), were also significant influences on patient satisfaction with health care services as reported by our study as well.

Table 3: A Logistic regression to predict how the type of facility influenced satisfaction of services rendered at the facility

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.782	.131		5.947	.000
	Making an appointment	-.097	.030	-.213	-3.209	.001
	Choice of appointment times	.078	.028	.188	2.792	.006
	The preparation for your specific test/exam were adequately explained	-.027	.028	-.060	-.968	.334
	Registration process at the front desk/courtesy of staff	.126	.034	.290	3.722	.000
	Explanation of the billing process and procedure	.070	.031	.167	2.247	.025
	Waiting time before procedure	-.070	.024	-.160	-2.959	.003
	Courtesy of the nurse/radiographer	-.001	.035	-.003	-.039	.969
	Explanation of what to expect during the exam	-.047	.034	-.087	-1.380	.169
	How questions were answered by the staff	-.010	.031	-.019	-.320	.750
	Explanation of what to expect after the exam	-.017	.035	-.031	-.489	.625
	The level of attention provided by the nurse/radiographer	.085	.042	.173	2.006	.046
	The physical appearance of the facilities and the quality of the equipments	-.042	.035	-.085	-1.205	.229
	What is your overall satisfaction of care received	.096	.043	.195	2.217	.027
a. Dependent Variable: is this a private or public radiology service center						

The result of the logistic regression [table 3] shows that patients in the public hospital center were 0.097 times less likely to be very satisfied with making an appointment, 0.027 times less likely to be very satisfied with the preparation of their specific test/examination adequately

explained, 0.070 times less likely to be very satisfied with waiting time, 0.001 times less likely to be satisfied with courtesy of the nurses/radiographers, 0.047 times less likely to be satisfied with explanation of what to expect during examination, 0.010 times less likely to be very satisfied with how questions were answered by radiographers/nurses, 0.017 times less likely to be satisfied with the explanation of what to expect after examination and 0.042 less likely to be very satisfied with the physical appearance of the facilities and the quality of the equipment's compared to their counterparts in the private hospital. However, patients in the public radiology center were 0.078 times more likely to be very satisfied with choice of appointment, 0.126 times more likely to be satisfied with the registration process at the front desk, 0.070 times more likely to be satisfied with the explanation of the billing process, 0.085 times more likely to be very satisfied with the level of attention provided by the nurses/radiographers and 0.096 times more likely to be very satisfied with overall care and services rendered at the radiology centre.

Conclusions

Patient satisfaction with radiological services was found to be influenced by the activities and services of radiographers/nurses including facility tangibles and equipment's. This influence is more exerted in the private hospital of our study than in the public hospital. In the present day of improved customer awareness, hospitals are not expected to fall short in customer relations that will eventually influence their overall return on investment as lowly satisfied customers are not likely to continue to patronize the hospital resulting in low bottom line for the hospital. Efforts should be put in place to improve customer satisfaction in the public hospital of our study by addressing all the deficiencies that have negatively influenced patient satisfaction. Seminars and conferences on patient satisfaction/relations for radiographers/nurses could be the immediate solution to this problem, while attempt should be made in the long term to include patient satisfaction and relations in the curricula of radiographers and nurses while still in the university as that is presently lacking in Nigeria.

Authors' Contributions

OGO thought and initiated the study; OCN, JCA and EOD supervised and provided the technical support needed for the completion of the project while IOM and PO supervised the analysis. All the authors read and approved the final manuscript.

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