

Original Research Article**Spatial Differences in Quality of Maternal Health Service in Primary Health Centers of Enugu state, Nigeria****ABSTRACT**

Aim: The aim of study was to determine how adequate were the resources, (equipment and personnel), process, (client-provider interaction), and outcome components of quality of maternal health service in urban and rural primary health centers of Enugu state, Nigeria.

Study design: Cross-sectional analytical study design.

Place and duration of study: Primary health centers in Enugu State, Nigeria, between January and March 2013.

Methodology: A three stage sampling method was used to select 540 clients in 18 of 440 health centers in the state. The clients were women who attended antenatal and postnatal care in the health centers. Outcome measure was clients true satisfaction with maternal health service also denoted as satisfaction index and was assessed by proportion of clients who were satisfied with antenatal, and postnatal care, ready to use the health centers again, and willing to recommend them to others for same services.

Results: No health center had adequate equipment, 16.7% of health centers had adequate health manpower and 16.7% had good client provider interaction. Only a minor proportion of clients, (urban 7%; rural 24.1%) delivered in the health centers. On part of clients, 64.8% in urban were truly satisfied, as compared to 75.6% in rural. Predictors of clients true satisfaction included being a client in urban, (AOR=0.6, 95% CI: 0.4- 0.9), client unmarried, (AOR=0.3, 95% CI: 0.1- 0.5), and being unemployed/housewife, (AOR=2.0, 95% CI: 1.3- 4.5).

Conclusion: The structure and process components of quality of maternal health service in primary health centers in study area were deficient. Also, utilization of health centers for delivery services was poor. The clients of maternal health service seem to focus more on providers of healthcare and their interactions with them than the health system and its deficiencies hence are easily satisfied with services received. To reduce the maternal death burden in Nigeria there is need for adequate attention on rural

areas, the primary health care system and the provision of client oriented health services at all levels of care. More health workers should be employed, and more equipment supplied in-order to improve the quality of maternal health service in the primary health centers.

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10 *Keywords:* quality, maternal health, primary health centers, Enugu state, Nigeria.

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13 **1. INTRODUCTION**

14

15 Maternal health service is composed of premarital care, antenatal care, delivery services, and postnatal
16 care and its aim is to reduce maternal morbidity and mortality [1]. Maternal health is an important
17 determinant of national and global well being. This is because every individual, family and community is
18 at various times involved in pregnancy and child delivery [2]. However, of all the human development
19 indicators, maternal mortality ratio portrays the greatest disparity between the developed and developing
20 countries. This is because maternal mortality ratio in developing countries is about fifteen times higher
21 than that in developed region [3].

22

23 Nigeria, with a maternal mortality ratio of 576 maternal deaths per 100,000 live births has the second
24 largest burden of maternal deaths globally [4]. Nigeria with an approximate two percent of the world's
25 population contributes to about fourteen percent of the world maternal deaths with an annual estimate of
26 40,000 deaths due to pregnancy, delivery and post partum complications [3]. Also, for every death that
27 occurs, about 20-30 other women suffer short and long term disabilities. United Nations Population Fund
28 estimates that 2 million women worldwide suffer from vesico-vaginal fistulae and 40% of them are in
29 Nigeria, with obstructed labour being the main cause [5]

30

31 Records show that countries that have achieved low maternal mortality rates paid much attention to good
32 quality care [6]. A good example is Sri Lanka, as quality improvements in maternal healthcare helped in
33 reducing its maternal mortality ratio from between 80 and 100 maternal deaths per 100 000 live births in
34 1975 to below 30 per 100 000 live births in the 1990s [7]. The need for quality maternal healthcare is

35 further buttressed by results of a study in Anambra State, southeast Nigeria which concluded that the
36 problem of maternal mortality may not be with utilization but with quality of services rendered [8].

37

38 There are several approaches in assessing the quality of care. A classic model was developed by Avedis
39 Donabedian for health care services as a whole [9,10]. He classified quality under three categories –
40 structure, process and outcome. According to him, the structural component includes human, material
41 and organizational resources required for provision of services, the process component refer to services
42 rendered while outcome is the result of these services on patients and their care providers. It also
43 includes patient satisfaction with care received.

44

45 In Nigeria, maternal health indices are worse in rural when compared to urban [4.11], and the rural area is
46 where majority of populace reside [12]. Also, in most rural communities in Nigeria the primary health
47 centers are the main health facilities, yet in a study in 2003 on quality of care, only 18.5% of 1500 primary
48 health care facilities covered had the capacity to provide emergency obstetric care [13]. A similar study in
49 southwest Nigeria, revealed great lack in equipment and supplies needed for provision of emergency
50 obstetric care in rural local government areas resulting in absence of these services [14]. Subsequently,
51 another study advocated the need for regular evaluation of quality in primary health care services as the
52 researchers opined that such regular assessments will promote client oriented health services [15].

53

54 The World Bank has severally advised developing countries to ensure that their health services are
55 client oriented [16,17], and Economists have been of the opinion that consumers of healthcare are in
56 favour of high quality care even if that will attract increased charges [18]. Furthermore, Annis in his study
57 concluded that perceived quality of care was one of the most important determinants of patient's choice of
58 provider and willingness to pay [19], and from another study came the conclusion that people were willing
59 to pay for primary health care services if there were quality improvements [20]. The aim of the study was
60 to determine how adequate were the resources (equipment and personnel), process (client-provider
61 interaction) and outcome components of quality of maternal health service in urban and rural primary
62 health centers of Enugu state, Nigeria.

63 **2. MATERIAL AND METHODS**

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65 **2.1 Setting**

66 The study area is Enugu State, one of five states in southeast geopolitical zone of Nigeria. It is made up
67 of 17 Local Government Areas of which 5 are designated as urban and covers a total area of 7,618
68 square kilometer with a population of 4,881, 500 people [21]. The inhabitants are mainly of Igbo ethnic
69 nationality and are predominantly Christians. In urban areas, the major occupation of the people are
70 trading and formal employments while in rural, it is mainly subsistence farming and animal pasturing.

71

72 The health system of Enugu State is based on District Health System and presently the state has seven
73 district hospitals, 440 primary health centers, two specialist hospitals, two teaching hospitals and 384
74 private health facilities [22]. Enugu State at the time of this study offered free maternal and child
75 healthcare in all its health facilities, including the primary health centers.

76

77 **2.2 Study Design**

78 The study employed a cross sectional analytical study design.

79

80 **2.3 Study Instrument**

81 The study instruments consisted of an inventory of personnel and equipment in use at the health centers,
82 an observation checklist for client-provider interaction during antenatal care and a semi-structured
83 questionnaire.

84

85 **2.4 Study Participants**

86 The study population consisted of women who attended both antenatal and postnatal care in the selected
87 primary health centres. A minimum of four antenatal care visits qualified the women for inclusion in the
88 study. The infant welfare/ immunization clinics of the selected health centres served as points of
89 recruitment for clients.

90

91 **2.5 Sample size determination**

92 The minimum sample size for the study was determined by formula used to compare two independent
93 proportions [23]. From a study in an urban primary health center in southwest Nigeria, 81.4% of clients
94 were satisfied with antenatal care [24], while from a rural health center in southeast Nigeria 94.3% of
95 clients were satisfied with antenatal care [20]. A total of 270 clients were estimated for each study group
96 based on type 1 error (α) of 0.05 in a two sided test and power of 0.8.

97

98 **2.6 Sampling Technique**

99 The study employed a three stage sampling technique. In first stage, a simple random sampling
100 technique of balloting was used to select three Local Government Areas each in urban and rural areas of
101 the state. In second stage, three health centres in each of the six selected Local Government Areas were
102 randomly selected by the balloting method. In third stage, a systematic random sampling technique was
103 used to select clients as they presented in the immunization/ infant welfare clinic of selected health
104 centres on each day of data collection. The average attendance at the health centres for immunization
105 services in the last six months served as sampling frame, (1021 in urban and 1429 in rural) and by
106 dividing this population by the sample size of 270 in each group, one out of every four in urban and one
107 out of every five women in rural area were selected. The index client was selected among the first four
108 clients in urban and first five clients in rural area by a simple random sampling method through balloting
109 using the health facility register of clients on each day of data collection. The research assistants had a
110 register for all clients that were included in the study and this was cross checked before a new client was
111 included to ensure that no client was selected twice.

112

113 **2.7 Data collection methods**

114 In assessing the personnel and equipment, the minimum standards for primary health care services in
115 Nigeria by the National Primary Health Care Development Agency (NPHCDA) for equipment and
116 personnel was used.^{25,26} This was used to assess the structural component of quality of care and was
117 utilized in the eighteen health centers included in the study. The process component included the
118 interpersonal and technical components and utilized the NPHCDA guideline on primary health care facility
119 quality assessment, schedule D.²⁷ This was used to assess the client provider interaction during antenatal

120 care and was utilized in one health centre in each of the six selected Local Government Areas. The
121 health center was selected by a simple random sampling technique of balloting. The outcome measure of
122 the study was assessed using a pre-tested, semi-structured questionnaire which was developed by the
123 researchers and was administered to the clients by trained research assistants.

124

125 **2.8 Outcome Measure**

126 The outcome measure of the study was clients true satisfaction with maternal health service also denoted
127 as satisfaction index and was assessed by proportion of clients in the two study groups who were
128 satisfied with antenatal, and postnatal care received at the health centers and were ready to use the
129 same health centers again and also willing to recommend them to others for same services.

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132 **2.9 Conceptual Framework**

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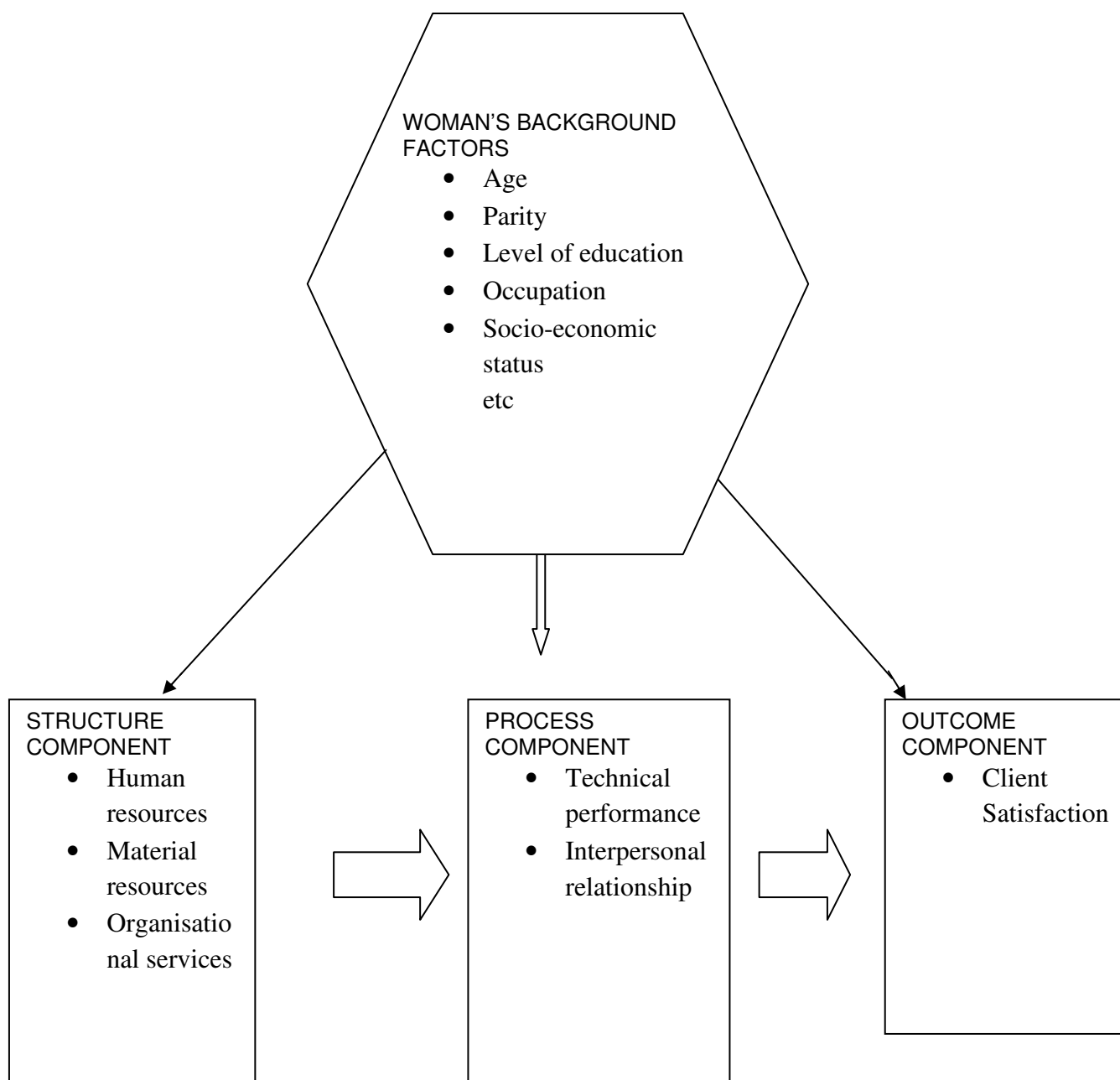


Figure 1: Conceptual framework
 Source; Adapted using the Donabedian model of Quality of Care

149 The study adopted the “structures- processes- outcomes’ framework as suggested by Avedis Donabedian
150 in 1981. Donabedian, utilized the three concepts in defining and assessing the quality of care [9,10]. The
151 aspect of structure, comprises the human, material and organizational resources that are used to provide
152 care. The process component refer to the set of activities that take place between the provider and client.
153 Specifically, the provider makes use of available structural elements to manage the technical and
154 personal aspects of the health of the woman. The outcome component measures the consequences of
155 these services on the clients. There are two elements of this concept of outcome, the direct impact of
156 treatment on the current and future health of the woman or her newborn and the direct impact of
157 treatment on her satisfaction with services offered and on her health seeking behaviour.

158
159 The outcome indicator that was used in this study was the satisfaction of the women with the services
160 rendered. Even though this indicator is influenced by womens’ expectation and their previous
161 experiences, it is considered adequate for use as it is noted that changes in quality of care rendered can
162 be detected in the woman long before the physical changes in the health status can be seen.²⁸ There is
163 also the assumption that a satisfied woman would benefit more from the care provided than one who is
164 not satisfied. The three levels do follow a logical sequence, available resources put into action by the
165 providers of healthcare, lead to activities that produce results. The socio-demographic characteristics of
166 the woman however remain a very important background factor in determining how satisfied the woman
167 will be with the services she has received.

168 169 **2.10 Data Analysis**

170 Data analysis was done using Statistical Package for Social Sciences, (SPSS) statistical software version
171 20. Frequency tables and cross tabulations were generated and level of significance was determined by a
172 p-value of less than 0.05. The socio-demographic characteristics of clients, activities and procedures
173 performed for clients during antenatal and postnatal care and clients perception of these services in urban
174 and rural primary health centers were compared. Also clients true satisfaction with maternal health
175 service was compared. Multivariate analysis using binary logistic regression was used to determine the
176 factors predictive of clients true satisfaction with maternal health service. Variables that had a p-value of
177 less than 0.2 in bivariate analysis were entered into the logistic regression model to determine the

178 predictors of clients true satisfaction with maternal health service. A logistic regression model was fitted
 179 for both the urban and rural areas and results were reported using Adjusted Odds Ratio, (AOR) and 95%
 180 Confidence Intervals (CI).

181
 182 In assessing the personnel and equipment in the health centers, the minimum standards for primary
 183 health care services in Nigeria by the NPHCDA was used. A score of zero was recorded when the item in
 184 the list was not available or personnel not in the employment of health center, a score of one was
 185 recorded if the item was present but not functioning or not in use, or it was incomplete in number and a
 186 score of two if present, in adequate number and also functional. For individual health facilities, a score of
 187 fifty percent and above of items listed on equipment list and the minimum health manpower need was
 188 considered adequate while any score that was less than fifty percent was considered inadequate. For
 189 comparison, the mean scores of various health centers for equipment and health manpower in urban and
 190 rural areas were compared using the Student t test.

191
 192 The process aspect was assessed using a client-provider interaction checklist for antenatal care as
 193 adopted from the NPHCDA guideline. The scoring system used was as indicated in the guideline. For
 194 individual health facilities, a score of fifty percent and above of total scores was considered adequate
 195 while any score that was less than fifty percent was inadequate. For comparison, the mean scores of
 196 various health centers for facility quality assessment schedule in urban and rural areas were compared
 197 using the Student t test.

198

199 3. RESULTS

200
 201 Table 1 shows the socio-demographic characteristics of clients of maternal health service. The mean age
 202 of clients in urban was significantly higher than that in rural. Majority of clients in the two study groups
 203 were in age group 25-29 years. Also, majority of clients in the two study groups were married and had
 204 secondary education.

205 **Table 1: Socio-demographic characteristics of clients of maternal health service**

Variable	Urban	Rural	χ^2	p value
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	(n=270) N (%)	(n=270) N (%)		
Age of clients				
Mean \pm SD (years)	27.9 \pm 5.5	26.9 \pm 5.7	2.032 ^a	0.043
Age groups in years				
< 20	19 (7.0)	21 (7.8)	6.588	0.159
20 – 24	58 (21.5)	73 (27.0)		
25 – 29	82 (30.4)	91 (33.7)		
30 – 34	80 (29.6)	56 (20.7)		
\geq 35	31 (11.5)	29 (10.7)		
No of living children				
1 child	94 (34.8)	99 (36.7)	0.250	0.882
2 – 4 children	153 (56.7)	150 (55.6)		
\geq 5 children	23 (8.5)	21 (7.8)		
Marital status				
Never married	21 (7.8)	29 (10.7)	1.411	0.235
Married	249 (92.2)	241 (89.3)		
Religion				
Christianity	259 (95.9)	249 (92.2)	4.325	0.113
Traditional religion	4 (1.5)	4 (1.5)		
Islam	7 (2.6)	17 (6.3)		
Ethnic group				

Igbo	263 (97.4)	253 (93.7)	4.638	0.098
Hausa	5 (1.9)	10 (3.7)		
Yoruba	2 (0.7)	7 (2.6)		
Education (Respondents)				
No formal education	11 (4.1)	11 (4.1)	35.883	<0.001
Primary education	11 (4.1)	35 (13.0)		
Secondary education	208 (77.0)	217 (80.4)		
Post secondary education	40 (14.8)	7 (2.6)		
Education (Husband)				
No formal education	18 (7.2)	35 (14.5)	40.118	< 0.001
Primary education	14 (5.6)	20 (8.3)		
Secondary education	162 (65.1)	177 (73.4)		
Post secondary education	55 (22.1)	9 (3.7)		
Occupation (Respondents)				
Housewife/unemployed	148 (54.8)	198 (73.3)	30.359	<0.001
Self employed	76 (28.1)	61 (22.6)		
Salaried employment	46 (17.0)	11 (4.1)		
Occupation (Husband)				
Self employed	124 (49.8)	158 (65.6)	18.096 ^b	<0.001
Salaried employment	125 (50.2)	80 (33.2)		
Unemployed	0 (0.0)	3 (1.2)		
Socio-economic status				

Poorest	43 (15.9)	93 (34.4)	76.303	<0.001
Very poor	58 (21.5)	83 (30.7)		
The poor	77 (28.5)	78 (28.9)		
Least poor	92 (34.1)	16 (5.9)		

206 ^aStudent t test

207 ^b Likelihood Ratio

208

209 Table 2 shows activities and procedures carried out for clients during antenatal and postnatal care.

210 Majority of clients in the two study groups (urban, 72.2%; rural 72.6%) registered for antenatal care in

211 second trimester. A minor proportion of clients, 7% in urban and 24.1% in rural delivered in the same

212 primary health centers they obtained antenatal and postnatal care. Majority of clients in the two study

213 groups received information on breast feeding, immunization, family planning and care of the baby during

214 postnatal visits.

215

216 **Table 2: Activities and procedures carried out during antenatal and postnatal care**

Variable	Urban (n=270) N (%)	Rural (n=270) N (%)	χ^2	p value
When clients booked for antenatal care				
First trimester	69 (25.6)	55 (20.4)	8.343	0.015
Second trimester	195 (72.2)	196 (72.6)		
Third trimester	6 (2.2)	19 (7.0)		
Procedures performed at antenatal care				
Weighing	254 (94.1)	258 (95.6)	0.603	0.438

Blood pressure check	256 (94.8)	251 (93.0)	0.807	0.369
Blood test	255 (94.4)	241 (89.3)	4.850	0.028
Urine test	255 (94.4)	255 (94.4)	FT	1.00
Choice of health center for antenatal care				
Proximity to health center	126 (46.7)	122 (45.2)	7.615	0.022
Health worker related factors ^a	92 (34.1)	71 (26.3)		
Free medical service	52 (19.3)	77 (28.5)		
Client delivered in same primary health centers				
Yes	19 (7.0)	65 (24.1)	29.831	<0.001
No	251 (93.0)	205 (75.9)		
Timing of postnatal care after delivery.				
1-3 days	76 (28.1)	31 (11.5)	29.540	<0.001
6 days	53 (19.6)	92 (34.1)		
≥ 10 days	141 (52.2)	147 (54.4)		
Information given during postnatal visit				
Breast feeding	265 (98.1)	260 (96.3)	1.714	0.190
Immunization	266 (98.5)	262 (97.0)	1.364	0.243
Family planning	262 (97.0)	257 (95.2)	1.239	0.266
Care of the baby	265 (98.1)	263 (97.4)	0.341	0.559

Procedures performed during postnatal visit				
Abdominal examination	249 (92.2)	258 (95.6)	2.614	0.106
Vaginal examination	170 (63.0)	202 (74.8)	8.848	0.003
Blood pressure check	188 (69.6)	230 (85.6)	18.679	<0.001
Examination of the baby	266 (98.5)	255 (94.4)	6.601	0.010
Choice of health center for postnatal care				
Immunization services	187 (69.3)	182 (67.4)	17.516	0.001
Health worker related factors ^a	50 (18.5)	31 (11.5)		
Proximity to health centers	22 (8.1)	51 (18.9)		
Free medical service	11 (4.1)	6 (2.2)		

217

218 ^acompetence, friendless, good service, and previous experience with the health worker

219

220 Table 3 shows clients perception of quality of maternal health care in primary health centers. A
 221 significantly higher proportion of clients in rural area (86.3%) were satisfied with maternal health service
 222 when compared with clients in urban (77%). Also, a significantly higher proportion of clients in rural,
 223 (75.6%) were truly satisfied with maternal health service when compared with clients in urban (64.8%).

224

225 **Table 3: Clients perception of quality of maternal health care**

Variable	Urban (n=270) N (%)	Rural (n=270) N (%)	χ²	p value
Satisfaction with maternal				

health service				
Satisfied	208 (77.0)	233 (86.3)	7.730	0.005
Not satisfied	62 (23.0)	37 (13.7)		
Will use health center again for maternal health care				
Yes	227 (84.1)	249 (92.2)	8.579	0.003
No	43 (15.9)	21 (7.8)		
Reason to use health center again	(n= 227) N (%)	(n= 249) N (%)		
Proximity to health center	94 (41.4)	111(44.4)	24.038	<0.001
Free medical service	57 (25.1)	100 (40.0)		
Health worker related factors ^a	76 (33.5)	39 (15.6)		
Will recommend health center to others for maternal health care	(n=270) N (%)	(n=270) N (%)		
Yes	232 (85.9)	239 (88.5)	0.814	0.367
No	38 (14.1)	31 (11.5)		
Reason to recommend health center to others	(n=232) N (%)	(n=239) N (%)		
Health worker related factors ^a	94 (40.5)	52 (21.8)	20.773	<0.001
Free medical service	66 (28.4)	102 (42.7)		
Proximity to health center	72 (31.0)	85 (35.6)		

True satisfaction with maternal health service (Satisfaction index)	(n=270) N (%)	(n=270) N (%)		
True satisfaction	175 (64.8)	204 (75.6)	7.443	0.006
Not satisfied	95 (35.2)	66 (24.4)		

226 ^acompetence, friendless, good service, and previous experience with the health worker

227

228 Table 4 shows factors associated with clients true satisfaction with maternal health service (satisfaction
 229 index). Clients in urban area were about twice less likely to be truly satisfied with maternal health service
 230 when compared with clients in rural. Also, clients who were not married were about four times less likely
 231 to be truly satisfied with maternal health service when compared with those who were married. The clients
 232 who were unemployed were twice more likely to be truly satisfied with maternal health service when
 233 compared with those who were on salaried employment.

234

235 Table 4: Factors associated with true satisfaction with maternal health services

236

Variable	True satisfaction with maternal health service		^ap value	^bAOR, (95%CI)
	n=540			
	Yes N (%)	No N (%)		
Location				
Urban	175 (64.8)	95 (35.2)	0.006	0.4- 0.9
Rural	204 (75.6)	66 (24.4)		
Age groups in years				
< 30 years	237 (68.9)	107 (31.1)	0.385	NA
≥ 30 years	42 (72.4)	54 (27.6)		

No of living children				
1-2 children	236 (69.2)	105 (30.8)	0.516	NA
>2 children	143 (71.9)	56 (28.1)		
Marital status				
Never married	23 (46.0)	27 (54.0)	<0.001	0.1- 0.5
Married	356 (72.7)	134 (27.3)		
Religion				
Christianity	357 (70.3)	151 (29.7)	0.855	NA
Others ^c	22 (68.8)	10 (31.3)		
Ethnic group				
Igbo	360 (69.8)	156 (30.2)	0.325	NA
Others ^d	19 (79.2)	5 (20.8)		
Education (Respondents)				
Primary education and less	48 (70.6)	20 (29.4)	0.938	NA
Secondary education and more	331 (70.1)	141 (29.9)		
Education (Husband)				
Primary education and less	66 (75.9)	21 (24.1)	0.459	NA
Secondary education and more	290 (72.0)	113 (28.0)		

Occupation (Respondents)				
Housewife/unemployed	260 (75.1)	86 (24.9)	0.001	1.3- 4.5
Self employed	89 (65.0)	48 (35.0)		0.7- 2.6
Salaried employment	30 (52.6)	27 (47.4)		
Occupation (Husband)				
Self employed	212 (75.2)	70 (24.8)	0.151	NA
Salaried employment	143 (69.8)	62 (30.2)		
Unemployed	1 (33.3)	2 (66.7)		
Socio-economic status				
Low socio-economic status	198 (71.5)	79 (28.5)	0.500	NA
High socio-economic status	181 (68.8)	82 (31.2)		

237 ^a P-value on bivariate analysis, ^b Adjusted odds ratio (95% confidence interval)

238 ^c Hausa, Yoruba ^d Traditional religion, Islam

239

240 Table 5a shows the checklist for essential equipment in primary health centers. The mean essential
 241 equipment score in rural health centers was higher than that in urban but the difference in mean was not
 242 found to be statistically significant. None of the primary health centers in urban and rural areas had
 243 adequate equipment.

244

245 **Table 5a: Checklist for essential equipment in primary health centers**

Variable	Urban n=9	Rural n=9	Student t test	P value
Essential equipment list				
Mean (SD)	51.4±36.3	73.6±21.2	1.571	0.140

	N (%)	N (%)	Total (%)	
Facilities with score ≥50% in essential equipment list	0 (0)	0 (0)	0 (0)	

246

247 Table 5b shows the checklist for minimum health manpower for primary health centers. There was no
 248 statistical significant difference in the mean health manpower list in urban and rural primary health
 249 centers. Three health centers in urban area had adequate health manpower.

250

251 **Table 5b: Checklist for minimum health manpower for primary health centers.**

Variable	Urban n=9	Rural n=9	Student t test	P value
Minimum health manpower list				
Mean (SD)	6.7±3.8	6.1±0.9	0.425	0.681
	N (%)	N (%)	Total (%)	
Facilities with score ≥50% in health manpower list	3 (33.3)	0 (0)	3 (16.7)	

252

253 Table 5c shows the checklist for facility quality assessment in primary health centers. The mean facility
 254 quality assessment score in urban and rural health centers was comparable and only one health center in
 255 rural area had adequate client provider interaction.

256

257 **Table 5c: Checklist for facility quality assessment (Client –provider interaction)**

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Variable	Urban n=3	Rural n=3	Student t test	P value
Facility quality assessment				

Mean (SD)	75.2±7.9	86.8±25.5	0.759	0.490
	N (%)	N (%)	Total (%)	
Facilities with score ≥50% in facility quality assessment	0 (0)	1 (33.3)	1 (16.7)	

259

260 **4. DISCUSSION**

261 From results of this study, none of the primary health centers in study area had adequate equipment for
 262 provision of maternal health service. This could be a pointer to the neglect of primary health centers in
 263 Nigeria over a period of years. This is because similar results were obtained in 2001, when NPHCDA
 264 surveyed 676 primary health care facilities, and 5.6% of them did not have any of the 26 essential
 265 equipment listed as minimum equipment package for use in a generic primary health care facility [29]. A
 266 study in southwest Nigeria, revealed that 44.4% of health centers lacked basic equipment for the
 267 provision of services [30]. Also, in southwest Nigeria another study revealed a great lack in equipment
 268 and supplies needed for provision of emergency obstetric care in rural local governments resulting in
 269 absence of these services in these areas [14].

271 Only three health centres (16.7%), all in urban had adequate manpower for provision of maternal health
 272 service. In a study in 2003 on quality of care in Nigeria, only 18.5% of 1500 primary health care facilities
 273 surveyed had the capacity to provide emergency obstetric care [13]. Similarly, a case study on local
 274 government and healthcare delivery in Nigeria identified shortage of qualified health workers as one of
 275 the factors that limit the implementation of primary health care [31]. Also, an assessment of healthcare
 276 facilities in Nigeria for the availability and use of obstetric care, 60% of primary health centers lacked
 277 essential clinical staff needed for provision of basic emergency obstetric care services [32]. Furthermore,
 278 a World Bank assessment of primary health care that included private and public facilities in four states in
 279 Nigeria, showed that most of the facilities did not have the personnel and equipment needed to offer
 280 services effectively. The study concluded that the state of infrastructure in public primary health facilities
 281

282 was generally poor [33]. Only one health centre, (16.7%), in rural area had adequate client provider
283 interaction during antenatal care.

284

285 The proportion of clients that had urine and blood tests performed during antenatal care in urban and
286 rural areas were higher than those that had similar procedures performed in the National Demographic
287 and Health Survey (NDHS) [4]. This difference could be explained by the fact that this is a facility based
288 study as opposed to the NDHS which is community based. However, it could also be a reflection of the
289 good work attitude of providers of healthcare in study area. The major reason clients preferred the health
290 centers for antenatal care in the two study groups was nearness of health centers to their homes, (urban
291 46.7%; rural 46.2%). This is similar to that from a study in Lagos, Nigeria, where majority utilized primary
292 health centers for antenatal care based on proximity [34], and this is in line with the principles of Primary
293 Health Care system [1].

294

295 Among the 540 respondents, only a minor proportion (urban 7.0%; rural 24.1%) delivered in the health
296 centers. This reveals that utilization of primary health centers for delivery services is poor in urban and
297 rural areas. From NDHS, the major place of delivery in both urban and rural areas is the home [4]. This
298 has led to the conclusion that use of health services in Nigeria for delivery services is generally poor [35],
299 and on the part of primary health care system, this could be attributed to inadequate service delivery [36],
300 as most of these centers do not offer round the clock services [37].

301

302 The higher proportion of deliveries in rural health centres may be because in most rural communities in
303 Nigeria, primary health centers are the predominant health facilities and may in some instances be the
304 only option for health facility delivery. It could be assumed that this tendency for home deliveries may be
305 the major factor contributing to high maternal mortality ratio in Nigeria. With the burden being more in
306 rural area, a good focus on the primary health care system with strong emphasis on quality of care may
307 help in improving maternal health. In line with this, there has been suggestion for regular evaluation of
308 quality in primary healthcare services based on the assumption that it will promote client oriented health
309 services [15].

310

311 Majority of clients in study area received information on breast feeding, immunization, family planning and
312 care of baby during postnatal care. This could be explained by the fact that health education in form of
313 health talks have become an essential part of service delivery in primary health centers in the study area
314 and the various providers of healthcare are skilled in delivery of this service [38], and this is
315 commendable. On procedures performed during postnatal care, a reduced proportion of women in the
316 two study groups had vaginal examination and blood pressure measurement when compared with
317 examination of baby and abdominal examination of mother. This is because the various health centers do
318 not have specified days for postnatal care services but do have it combined with immunization services.
319 This to an extent favour the mothers as it reduces the number of visits to the health facilities.

320
321 Considering the relatively high level of immunization coverage in southeast Nigeria when compared with
322 other zones [4], and the reliance on primary health centers for delivery of such services [1], it could be
323 explained that the health centers which in most cases do not have adequate staff strength [37], may not
324 be able to perform such services as vaginal examination and blood pressure check for all the women that
325 came for postnatal care. The combination of postnatal care with immunization services in the health
326 centers could be explained by the fact that majority of them (69.3% urban, 67.4% rural), chose the health
327 centers for postnatal care because of immunization services. This synergy between postnatal care and
328 immunization will be of assistance in revealing the relevance of postnatal care as it has been identified as
329 the most neglected of the components of maternal health [39].

330
331 A significantly higher proportion of clients in rural (86.3%), were satisfied with maternal health service
332 when compared with clients in urban (77%). This result is closely related to that from Anambra state,
333 Nigeria, where 89.7% of respondents were satisfied with maternal healthcare service at primary health
334 centers [40]. The major reason why clients in urban werewilling to recommend the health centers to
335 others were factors that were related to health workers which included their perceived technical
336 competence, friendliness, good service and also previous good experience with their services. In rural, it
337 was because of free medical service of the State Government which was in operation during the period of
338 the study. In a study on clients satisfaction with immunization services, same health worker related factors
339 were the major reasons clients wanted to use health centers again and also willing to recommend them to

340 others for immunization services [41]. This could serve as pass mark for the health workers and bearing
341 in mind the inadequacies in the structure and process components of quality of care as obtained in this
342 study, the opinion of health workers in attributing societal and health system factors as constraints to
343 delivery of quality maternal health service in primary health centers could be justified [37].

344
345 In urban, 64.8% of clients were truly satisfied with maternal health service while 75.6% in rural were also
346 truly satisfied. Bearing in mind the deficiencies of structure and process components of quality of care it
347 may be that clients of maternal health service focus more on providers of healthcare and their interactions
348 with them than on the health system and its deficiencies, hence are easily satisfied with services
349 received. Generally, it has been noted that pregnant women in developing countries are uncritical of
350 healthcare they receive preferring to accept whatever care they receive as being appropriate [42].

351
352 From results of this study, clients in urban were about twice less likely to be truly satisfied with maternal
353 health service when compared with those in rural. In most rural areas in Nigeria, the health centers are
354 the prominent health facilities. This may positively affect the perception of services from these centers by
355 the women unlike inhabitants of urban areas where there are alternatives for such service provision
356 including private health facilities. Some studies have revealed that women perceive quality care in private
357 facilities to be better than that from public but are discouraged from using them by reason of cost [43,44].
358 There maybe the tendency for clients in urban areas to feel disadvantaged in using health centers for
359 maternal health service hence less satisfied with services received.

360
361 Also clients who were unmarried were about four times less likely to be truly satisfied with maternal health
362 service when compared with those who were married. This may be attributed to the positive influence and
363 support from their spouses which may make them more prepared for pregnancy, delivery and child
364 rearing. Based on this, they may avail themselves of services in the health centers hence more satisfied
365 than the clients who were unmarried. In a study in Anambra state, Nigeria, being married was significantly
366 associated with overall satisfaction with maternal health services [40].

367

368 Clients who were unemployed were twice more likely to be truly satisfied with maternal health service
369 when compared with those who were on salaried employment. It could be that women who were
370 housewives and unemployed were less distracted and paid more attention to their pregnancies and
371 expected babies and so derived more pleasure with antenatal and postnatal care services hence more
372 satisfied than those who were employed.

373

374 **5. CONCLUSION**

375
376 The structure and process components of quality of maternal health service in primary health centers in
377 study area were deficient. Also, utilization of health centers for delivery services is poor. The clients of
378 maternal health service seem to focus more on providers of healthcare and their interactions with them
379 than the health system and its deficiencies hence are easily satisfied with services received. To reduce
380 the maternal death burden in Nigeria there is need for adequate attention on rural areas, the primary
381 health care system and the provision of client oriented health services at all levels of care. More health
382 workers should be employed, and more equipment supplied in-order to improve the quality of maternal
383 health service in the primary health centers.

384

385 **ETHICAL APPROVAL**

386
387 Ethical approval for the study was obtained from Health Research and Ethics Committee of University of
388 Nigeria Teaching Hospital Ituku-Ozalla, Enugu. Clients were required to sign or thumbprint on written
389 informed consent form before the interview and the nature of the study, its relevance and level of their
390 participation were adequately explained to them. Participation in the study was voluntary and participants
391 were assured that all information as would be provided in the questionnaire will be treated confidentially
392 and anonymously. Also, no identifying information was obtained from the study participants

393

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