

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 primary 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, were 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 were 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.

9
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 occur, about 20-30 other women suffer short and long term disabilities. The United Nations Population
28 Fund 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, where quality improvements in maternal healthcare helped
33 in reducing its maternal mortality ratio from between 80 and 100 maternal deaths per 100 000 live births

34 in 1975 to below 30 per 100 000 live births in the 1990s [7]. The need for quality maternal healthcare was
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 64 **2. MATERIAL AND METHODS**

65 66 **2.1 Setting**

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

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

77 78 **2.2 Study Design**

79 The study employed a cross sectional analytical study design.

80 81 **2.3 Study Instrument**

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

85 86 **2.4 Study Participants**

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

91

92 **2.5 Sample size determination**

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

98

99 **2.6 Sampling Technique**

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

113

114 **2.7 Data collection methods**

115 In assessing the personnel and equipment **available at the health centers**, the minimum standards for
116 primary health care services in Nigeria by the National Primary Health Care Development Agency
117 (NPHCDA) for equipment and personnel was **used [25,26]**. This was used to assess the structural
118 component of quality of care and was utilized **in** the eighteen health centers included in the study. The

119 process component included the interpersonal and technical components and was assessed using the
120 NPHCDA guideline on primary health care facility quality assessment, schedule D [27]. This was used to
121 assess the client provider interaction during antenatal care and was utilized in one health centre in each
122 of the six selected Local Government Areas. The health center was selected by a simple random
123 sampling technique of balloting. The outcome measure of the study was assessed using a pre-tested,
124 semi-structured questionnaire which was developed by the researchers and was administered to the
125 clients by trained research assistants.

126

127 **2.8 Outcome Measure**

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

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134 **2.9 Conceptual Framework**

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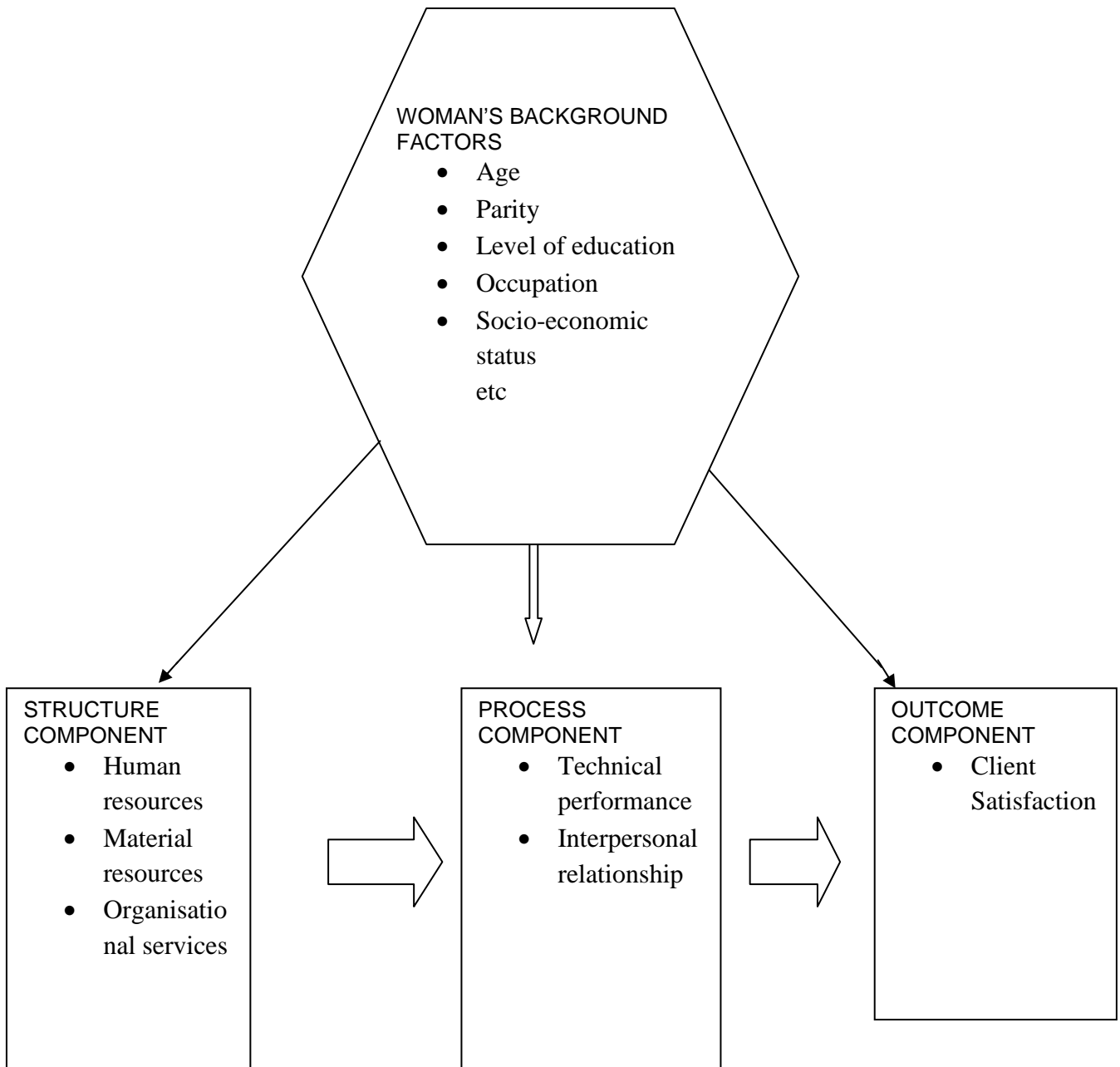


Figure 1: Conceptual framework
Source; Adapted using the Donabedian model of Quality of Care

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

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

170 171 **2.10 Data Analysis**

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

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

183

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

193

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

200

201 **3. RESULTS**

202

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

207

208

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

Variable	Urban (n=270) N (%)	Rural (n=270) N (%)	χ^2	p value
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)	

210 ^aStudent t test

211 ^b Likelihood Ratio

212

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

214 Majority of clients in the two study groups (urban, 72.2%; rural 72.6%) registered for antenatal care in
 215 second trimester. A minor proportion of clients, 7% in urban and 24.1% in rural delivered in the same
 216 primary health centers they obtained antenatal and postnatal care. Majority of clients in the two study
 217 groups received information on breast feeding, immunization, family planning and care of baby during
 218 postnatal visits.

219

220 **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 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 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)		

221

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

223 **FT Fishers exact test**

224

225 Table 3 shows clients perception of quality of maternal health care in primary health centers. A
226 significantly higher proportion of clients in rural area (86.3%) were satisfied with maternal health service
227 when compared with clients in urban (77%). Also, a significantly higher proportion of clients in rural,
228 (75.6%) were truly satisfied with maternal health service when compared with clients in urban (64.8%).

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

Variable	Urban (n=270) N (%)	Rural (n=270) N (%)	χ^2	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	(n=232)	(n=239)		

health center to others	N (%)	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)	

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

235

236 Table 4 shows factors associated with clients true satisfaction with maternal health service (satisfaction
 237 index). Clients in urban area were about twice less likely to be truly satisfied with maternal health service
 238 when compared with clients in rural. Also, clients who were not married were about four times less likely
 239 to be truly satisfied with maternal health service when compared with those who were married. The clients
 240 who were unemployed were twice more likely to be truly satisfied with maternal health service when
 241 compared with those who were on salaried employment.

242

243 Table 4: Factors associated with true satisfaction with maternal health service

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Variable	True satisfaction with maternal health service		^ap value	^bAOR, (95%CI)
	n=540			
	Yes	No		
	N (%)	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)		

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

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

247

248 Table 5a shows the checklist for essential equipment in primary health centers. The mean essential
 249 equipment score in rural **area** was higher than that in urban but the difference in mean was not found to
 250 be statistically significant. None of the primary health centers in urban and rural areas had adequate
 251 equipment.

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255 **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 that scored ≥50% of total score in essential equipment list	0 (0)	0 (0)	0 (0)	

256

257 Table 5b shows the checklist for minimum health manpower for primary health centers. There was no
 258 statistical significant difference in the mean score for health manpower available in urban and rural areas.

259 Three health centers in urban area had adequate health manpower.

260

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

Variable	Urban n=9	Rural n=9	Student t test	P value
Health manpower available				
Mean (SD)	6.7±3.8	6.1±0.9	0.425	0.681
	N (%)	N (%)	Total (%)	
Facilities that scored ≥50% of total score for health manpower	3 (33.3)	0 (0)	3 (16.7)	

262

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

266

267 **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 that scored ≥50% of total score in facility quality assessment	0 (0)	1 (33.3)	1 (16.7)	

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270

271 **4. DISCUSSION**

272

273 From results of this study, none of the primary health centers in study area had adequate equipment for
 274 provision of maternal health service. This could be a pointer to the neglect of primary health centers in
 275 Nigeria over a period of years. This is because similar results were obtained in 2001, when NPHCDA
 276 surveyed 676 primary health care facilities, and 5.6% of the health centers did not have any of the 26
 277 essential equipment listed as minimum equipment package for use in a generic primary health care
 278 facility [29]. A study in southwest Nigeria, revealed that 44.4% of health centers lacked basic equipment
 279 for the provision of services [30]. Also, in southwest Nigeria another study revealed a great lack in
 280 equipment and supplies needed for provision of emergency obstetric care in rural Local Government
 281 Areas resulting in absence of these services in these areas [14].

282

283 Only three health centres (16.7%), all in urban had adequate manpower for provision of maternal health
 284 service. In a study in 2003 on quality of care in Nigeria, only 18.5% of 1500 primary health care facilities
 285 surveyed had the capacity to provide emergency obstetric care [13]. Similarly, a case study on Local
 286 Government Areas and healthcare delivery in Nigeria identified shortage of qualified health workers as

287 one of the factors that limit the implementation of Primary Health Care [31]. Also, in an assessment of
288 healthcare facilities in Nigeria for the availability and use of obstetric care, 60% of primary health centers
289 lacked essential clinical staff needed for provision of basic emergency obstetric care services [32].
290 Furthermore, a World Bank assessment of primary health care that included private and public facilities in
291 four states in Nigeria, showed that most of the facilities did not have the personnel and equipment needed
292 to offer services effectively. The study concluded that the state of infrastructure in public primary health
293 facilities was generally poor [33]. Only one health centre, (16.7%), in rural area had adequate client
294 provider interaction during antenatal care.

295
296 The proportion of clients that had urine and blood tests during antenatal care in urban and rural areas
297 was higher than those that had similar procedures in the National Demographic and Health Survey
298 (NDHS) [4]. This difference in proportions could be explained by the fact that this was a facility based
299 study as opposed to the NDHS which was community based. However, it could also be a reflection of the
300 good work attitude of providers of healthcare in primary health centers in the study area. The major
301 reason clients preferred the health centers for antenatal care in the two study groups was nearness of
302 health centers to their homes, (urban 46.7%; rural 46.2%). This is similar to a finding from a study in
303 Lagos, Nigeria, where majority utilized primary health centers for antenatal care based on proximity to
304 their homes [34], and this is in line with the principles of Primary Health Care system [1].

305
306 Among the 540 respondents included in this study, only a minor proportion (urban 7.0%; rural 24.1%),
307 delivered in the health centers. This reveals that utilization of primary health centers for delivery services
308 is poor in urban and rural areas. From results of the NDHS, the major place of delivery in both urban and
309 rural areas in Nigeria is the home [4]. This has led to the conclusion that the use of health services in
310 Nigeria for delivery services is poor [35], and on the part of Primary Health Care system, this could be
311 attributed to inadequate service delivery [36], as most of these health centers do not offer round the clock
312 services [37].

313
314 The higher proportion of deliveries in rural health centres may be because in most rural communities in
315 Nigeria, primary health centers are the predominant health facilities and may in some instances be the

316 only option for health facility delivery. It could be assumed that this tendency for home deliveries may be
317 the major factor contributing to **the** high maternal mortality ratio in Nigeria. With the burden being more in
318 rural area, a good focus on the Primary Health Care system with strong emphasis on quality of care may
319 help in improving maternal health. In line with this, there has been **a** suggestion for regular evaluation of
320 quality in primary healthcare services based on the assumption that it will promote client oriented health
321 services [15].

322
323 Majority of clients in study area received information on breast feeding, immunization, family planning and
324 care of baby during postnatal care. This could be explained by the fact that health education in form of
325 health talks have become an essential part of service delivery in primary health centers in the study area
326 and the various providers of healthcare are skilled in **the** delivery of this service [38], and this is
327 commendable. On procedures performed during postnatal care, a reduced proportion of **the clients** in the
328 two study groups had vaginal examination and blood pressure measurement when compared **with those**
329 **that had their abdomen and babies examined**. This is because the various health centers do not have
330 specified days for postnatal care but do have it combined with immunization services. This to an extent
331 favour the mothers as it reduces the number of visits to the health centers.

332
333 Considering the relatively high level of immunization coverage in southeast Nigeria when compared with
334 other zones [4], and the reliance on primary health centers for delivery of such services [1], it could be
335 explained that the health centers which in most cases do not have adequate staff strength [37], may not
336 be able to perform such services as vaginal examination and blood pressure check for all the women that
337 came for postnatal care. The combination of postnatal care with immunization services in the health
338 centers could be explained by the fact that majority of **the clients** (69.3% urban, 67.4% rural), chose the
339 health centers for postnatal care because of immunization services. This synergy between postnatal care
340 and immunization will be of assistance in revealing the relevance of postnatal care as it has been
341 identified as the most neglected of the components of maternal health **service** [39].

342
343 A significantly higher proportion of clients in rural (86.3%), were satisfied with maternal health service
344 when compared with clients in urban (77%). This result is closely related to that from Anambra state,

345 Nigeria, where 89.7% of respondents were satisfied with maternal healthcare service at primary health
346 centers [40]. The major reason why clients **in urban were willing** to recommend the health centers to
347 others were factors that were related to health workers which included their perceived technical
348 competence, friendliness, good service and also previous good experience with their services. In rural, it
349 was because of free medical service of the State Government which was in operation during the period of
350 the study. In a study on clients satisfaction with immunization services, same health worker related factors
351 were the major reasons clients wanted to use health centers again and also willing to recommend them to
352 others for immunization services [41]. This could serve as **a** pass mark for the health workers and
353 bearing in mind the inadequacies in the structure and process components of quality of care as obtained
354 in this study, the opinion of health workers in attributing societal and health system factors as constraints
355 to delivery of quality maternal health service in primary health centers could be justified [37].

356
357 In **the** urban, 64.8% of clients were truly satisfied with maternal health service while 75.6% in rural were
358 also truly satisfied. Bearing in mind the deficiencies of structure and process components of quality of
359 care it **could** be that clients of maternal health service focus more on providers of healthcare and their
360 interactions with them than on the health system and its deficiencies, hence **were** easily satisfied with
361 services received. **This places the responsibility of ensuring good utilization of services at primary health
362 centers and satisfaction of clients with services received on the providers of healthcare in these facilities.**

363 Generally, it has been noted that pregnant women in developing countries are uncritical of healthcare
364 **services** they receive preferring to accept whatever care **that are rendered during this period** as being
365 appropriate [42].

366
367 From results of this study, clients in urban **area** were about twice less likely to be truly satisfied with
368 maternal health service when compared with those in rural. In most rural areas in Nigeria, the health
369 centers are the prominent health facilities. This may positively affect the perception of services from these
370 centers by the women unlike inhabitants of urban areas where there are alternatives for such service
371 provision including private health facilities. Some studies have revealed that women perceive quality care
372 in private facilities to be better than that from public but are discouraged from using them by reason of

373 cost [43,44]. There maybe the tendency for clients in urban **area** to feel disadvantaged in using primary
374 health centers for maternal health service hence less satisfied with services received **when compared**
375 **with their counterparts in the rural area.**

376
377 Also clients who were unmarried were about four times less likely to be truly satisfied with maternal health
378 service when compared with those who were married. This may be attributed to the positive influence and
379 support from their spouses which may make them more prepared for pregnancy, delivery and child
380 rearing. Based on this, they may avail themselves of services in the health centers hence more satisfied
381 than clients who were unmarried. In a study in Anambra state, Nigeria, being married was significantly
382 associated with overall satisfaction with maternal health services [40].

383
384 Clients who were unemployed were twice more likely to be truly satisfied with maternal health service
385 when compared with those who were on salaried employment. It could be that women who were
386 housewives and unemployed were less distracted and paid more attention to their pregnancies and
387 expected babies and so derived more pleasure with antenatal and postnatal care services hence more
388 satisfied than those who were employed.

389

390 **5. CONCLUSION**

391 The structure and process components of quality of maternal health service in primary health centers in
392 study area were deficient. Also, utilization of health centers for delivery services **was** poor. The clients of
393 maternal health service seem to focus more on providers of healthcare and their interactions with them
394 than the health system and its deficiencies hence **were** easily satisfied with services received. To reduce
395 the maternal death burden in Nigeria there is need for adequate attention on rural areas, the primary
396 health care system and the provision of client oriented health services at all levels of care. More health
397 workers should be employed, and more equipment supplied in-order to improve the quality of maternal
398 health service in the primary health centers.
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ETHICAL APPROVAL

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

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