

**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.

9

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

11

12

## 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**

64

### 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 ( $\alpha$ ) 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.<sup>25,26</sup> 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.<sup>27</sup> 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.

130

131

## 132 **2.9 Conceptual Framework**

133

134

135

136

137

138

139

140

141

142

143

144

145

146

147

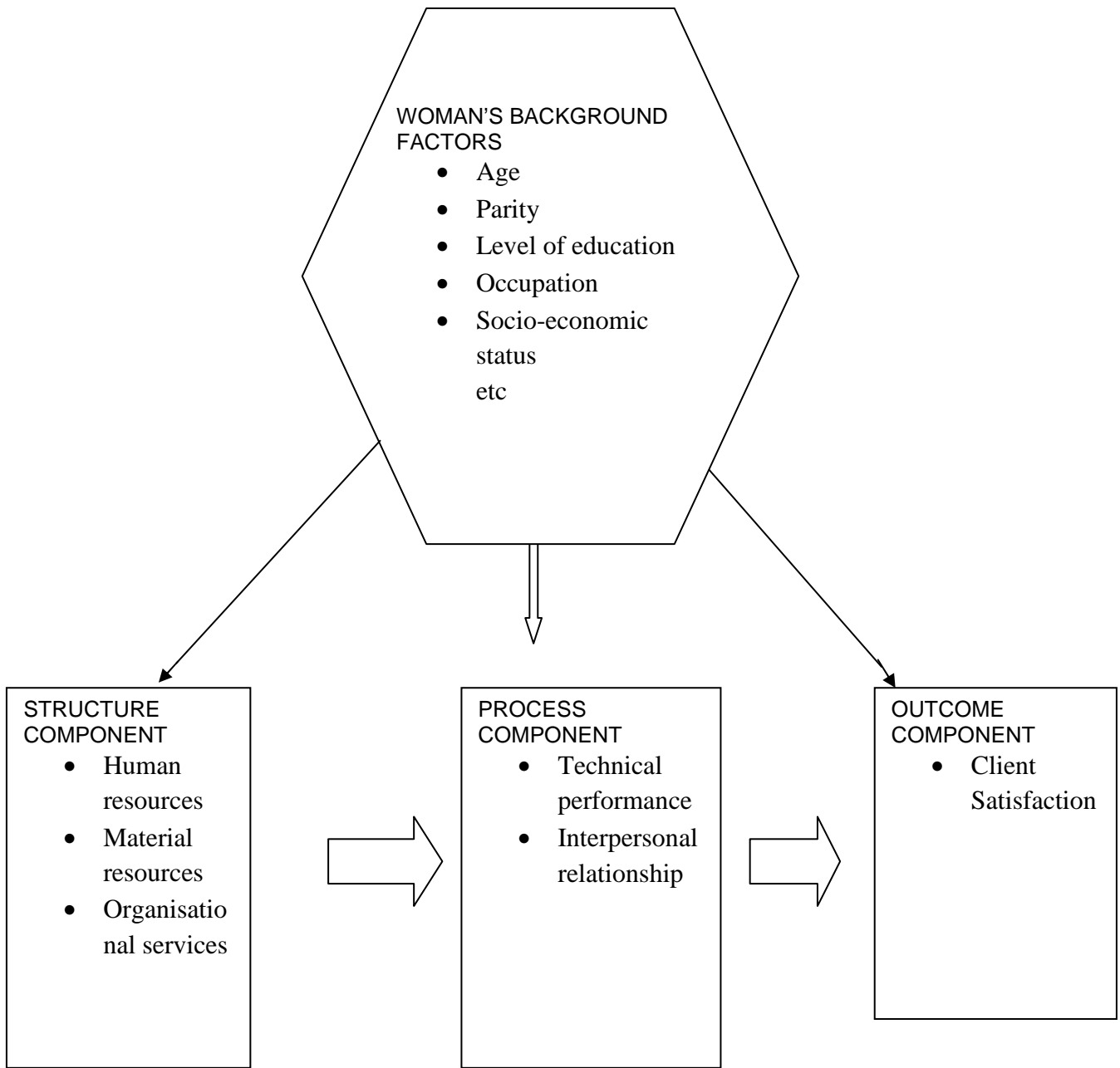


Figure 1: Conceptual framework  
 Source; Adapted using the Donabedian model of Quality of Care

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.<sup>28</sup> 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	$\chi^2$	p value
----------	-------	-------	----------	---------

	(n=270) N (%)	(n=270) N (%)		
<b>Age of clients</b>				
Mean $\pm$ SD (years)	27.9 $\pm$ 5.5	26.9 $\pm$ 5.7	2.032 <sup>a</sup>	0.043
<b>Age groups in years</b>				
< 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)		
<b>No of living children</b>				
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)		
<b>Marital status</b>				
Never married	21 (7.8)	29 (10.7)	1.411	0.235
Married	249 (92.2)	241 (89.3)		
<b>Religion</b>				
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)		
<b>Ethnic group</b>				

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)		
<b>Education (Respondents)</b>				
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)		
<b>Education (Husband)</b>				
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)		
<b>Occupation (Respondents)</b>				
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)		
<b>Occupation (Husband)</b>				
Self employed	124 (49.8)	158 (65.6)	18.096 <sup>b</sup>	<0.001
Salaried employment	125 (50.2)	80 (33.2)		
Unemployed	0 (0.0)	3 (1.2)		
<b>Socio-economic status</b>				

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 <sup>a</sup>Student t test

207 <sup>b</sup> 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 (%)	$\chi^2$	p value
<b>When clients booked for antenatal care</b>				
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)		
<b>Procedures performed at antenatal care</b>				
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
<b>Choice of health center for antenatal care</b>				
Proximity to health center	126 (46.7)	122 (45.2)	7.615	0.022
Health worker related factors <sup>a</sup>	92 (34.1)	71 (26.3)		
Free medical service	52 (19.3)	77 (28.5)		
<b>Client delivered in same primary health centers</b>				
Yes	19 (7.0)	65 (24.1)	29.831	<0.001
No	251 (93.0)	205 (75.9)		
<b>Timing of postnatal care after delivery.</b>				
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)		
<b>Information given during postnatal visit</b>				
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

<b>Procedures performed during postnatal visit</b>				
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
<b>Choice of health center for postnatal care</b>				
Immunization services	187 (69.3)	182 (67.4)	17.516	0.001
Health worker related factors <sup>a</sup>	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 <sup>a</sup>competence, 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**

<b>Variable</b>	<b>Urban (n=270) N (%)</b>	<b>Rural (n=270) N (%)</b>	<b><math>\chi^2</math></b>	<b>p value</b>
<b>Satisfaction with maternal</b>				

<b>health service</b>				
Satisfied	208 (77.0)	233 (86.3)	7.730	0.005
Not satisfied	62 (23.0)	37 (13.7)		
<b>Will use health center again for maternal health care</b>				
Yes	227 (84.1)	249 (92.2)	8.579	0.003
No	43 (15.9)	21 (7.8)		
<b>Reason to use health center again</b>	<b>(n= 227)</b> <b>N (%)</b>	<b>(n= 249)</b> <b>N (%)</b>		
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 <sup>a</sup>	76 (33.5)	39 (15.6)		
<b>Will recommend health center to others for maternal health care</b>	<b>( n=270)</b> <b>N (%)</b>	<b>( n=270)</b> <b>N (%)</b>		
Yes	232 (85.9)	239 (88.5)	0.814	0.367
No	38 (14.1)	31 (11.5)		
<b>Reason to recommend health center to others</b>	<b>( n=232)</b> <b>N (%)</b>	<b>(n=239)</b> <b>N (%)</b>		
Health worker related factors <sup>a</sup>	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)		

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

226 <sup>a</sup>competence, 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

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



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

<b>Occupation (Respondents)</b>				
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)		
<b>Occupation (Husband)</b>				
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)		
<b>Socio-economic status</b>				
Low socio-economic status	198 (71.5)	79 (28.5)	0.500	NA
High socio-economic status	181 (68.8)	82 (31.2)		

237 <sup>a</sup> P-value on bivariate analysis, <sup>b</sup> Adjusted odds ratio (95% confidence interval)

238 <sup>c</sup> Hausa, Yoruba <sup>d</sup> 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**

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

	<b>N (%)</b>	<b>N (%)</b>	<b>Total (%)</b>	
Facilities with score $\geq$ 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.**

<b>Variable</b>	<b>Urban n=9</b>	<b>Rural n=9</b>	<b>Student t test</b>	<b>P value</b>
Minimum health manpower list				
Mean (SD)	6.7 $\pm$ 3.8	6.1 $\pm$ 0.9	0.425	0.681
	<b>N (%)</b>	<b>N (%)</b>	<b>Total (%)</b>	
Facilities with score $\geq$ 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)**

258

<b>Variable</b>	<b>Urban n=3</b>	<b>Rural n=3</b>	<b>Student t test</b>	<b>P value</b>
Facility quality assessment				

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

259

260 **4. DISCUSSION**

261

262

263

264

265

266

267

268

269

270

271

272

273

274

275

276

277

278

279

280

281

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

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

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

384

## 385 **ETHICAL APPROVAL**

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

393

## 394 **REFERENCES**

395

- 396 1. Obionu CN. Primary Health Care for developing countries. 2<sup>nd</sup> ed. Enugu: Delta  
397 Publications. 2007.
- 398 2. World Health Organization. Mortality Country Health System Fact sheets. 2006: In an  
399 integrated Approach to Improved maternal, Newborn and Child Health in Nigeria.



- 400 Federal Ministry of Health with support from ENHANCE Project/USAID and  
401 implementing partners. WHO. 2007.
- 402 3. World Health Organization. Trends in Maternal mortality: 1990 to 2010. WHO,  
403 UNICEF, UNFPA and the World Bank estimates. Geneva: WHO. 2012.
- 404 4. National Population Commission [Nigeria] and ORC Macro. National Demographic and  
405 Health Survey 2013. Calverton, Maryland; National Population Commission and ORC  
406 Macro: 2014.
- 407 5. United Nations Population Fund (UNFPA). Maternal morbidity,  
408 <http://www.untpa.org/mothers/morbidity.htm>. Accessed June 18<sup>th</sup> 2015.
- 409 6. De Brouwere V, Tonglet R, Van Lerberghe W. Strategies for reducing maternal  
410 mortality in developing countries: What can we learn from the history of the  
411 Industrialized West? Trop Med. Int Health. 1998; 3: 771-82.
- 412 7. Pathmanathan I, Liljestrand J, Martins JM, Rajapaksa LC, Lissner C, de Silva A et al.  
413 Investing in maternal health: learning from Malaysia and Sri Lanka. Washington DC,  
414 World Bank, 2003.
- 415 8. Ibeh C. Is poor maternal mortality index in Nigeria a problem of care utilization? A case  
416 study of Anambra State. Afr J Reprod Health. 2008; 12 (2):132-140.
- 417 9. Donabedian A. The quality of care how can it be assessed? JAMA. 1988; 260:1743 –  
418 1748
- 419 10. Donabedian A. Defining and measuring the quality of health care. In: Wenzel R.  
420 Assessing quality health care – perspectives for clinicians. Baltimore: Williams and  
421 Wilkins, 1992.
- 422 11. Federal Ministry of Health. Integrated Material Newborn and Child Health strategy.  
423 FMOH. Abuja. Nigeria. 2007.
- 424 12. The World Bank, Working for a world free of poverty. Rural population (% of total  
425 population) Data.. Available [www.data.worldbank.org/indicators](http://www.data.worldbank.org/indicators). Assessed 10th June  
426 2015.
- 427 13. Federal Ministry of Health. Technical Report on National study on Essential obstetric  
428 care facilities in Nigeria. Federal Ministry of Health. Abuja. Nigeria.2003.
- 429 14. Ijadunola KT, Fatusi AO, Orji EO, Adeyemi AB, Owolabi OO, Ojofeitimi EO et al.  
430 Unavailability of Health care services in a Local Government Area of Southwest  
431 Nigeria. J Health Popul Nutr. 2007;25(1):94-100.

- 432 15. Ige OK, Nwachukwu CC. Areas of dissatisfaction with primary health care services in  
433 Government owned health facilities in a semi-urban community in Nigeria. *Journal of*  
434 *Rural and Tropical Public Health*. 2010;9:19-23.
- 435 16. De Geydnt W. *Managing the quality of health care services in developing countries*.  
436 1995. Washinton DC, World Bank.
- 437 17. Kwan M. When the client is the king. *Planned Parenthood Challenges*. 1994; 2: 37-39.
- 438 18. Gibson L, Alilio M, Heggenhougen K. Community satisfaction with primary health care  
439 services, an evaluation undertaken in the Morogoro region of Tanzania.  
440 *Soc. Sci Med*. 1994; 39:767 – 80.
- 441 19. Annis S. Physical Access and utilization of health services in rural Guatemala. *Soc.*  
442 *Med*. 1981; 15D: 515-523.
- 443 20. Uzochukwu BSC, Onwujekwe OE, Akpala CO. Community satisfaction with the quality  
444 of maternal and child health services in Southeast Nigeria. *East African Medical*  
445 *Journal*. 2004; 81: 293-299.
- 446 21. Federal Republic of Nigeria Official Gazette 2007. Lagos. Nigeria.
- 447 22. Enugu State Ministry of Health Enugu. Nigeria: Planning, Research and Statistics  
448 Department. 2013. Enugu State Ministry of Health.
- 449 23. Onwasigwe C. *Principles and Method of Epidemiology*. 2nd ed. Enugu: El Damak  
450 Publications. 2010.
- 451 24. Oladapo OT, Iyaniwura CA, Sule-Odu AO. Quality of Antenatal services at the Primary  
452 Care Level in Southwest Nigeria. *Afri J Reprod Health*. 2008;12(3):71-92.
- 453 25. Essential equipment list for Primary Health Care Center: Ward Minimum Health Care  
454 Package; National Primary Health Care Development Agency. August 2007. Abuja,  
455 Nigeria.
- 456 26. Minimum health Manpower requirement for Primary Health Care: Operational  
457 guidelines for PHC; National Primary Health Care Development Agency. 2004. Abuja,  
458 Nigeria.
- 459 27. Primary Health Care Facility Quality Assessment Schedule D. National Primary Health  
460 Care Development Agency, 2010.
- 461 28. Mawajdeh S, Al-Qutob R, Raad F. The assessment of quality of care in prenatal  
462 services in Iribid, North Jordan: Women`s perspectives` *Journal of the International*  
463 *Development Research Centre*.1995;1-18.
- 464 29. Fatusi A. Maternal mortality situation and determinants in Nigeria: A review  
465 commissioned by Federal Ministry of Health.(2004)pp1-41.

- 466 30. Mohammed AS, Idowu IE, Kuyimu YA. Structure of Primary Health Care: Lessons  
467 from a rural area in Southwest Nigeria. *Nigerian Journal of Clinical Medicine*.  
468 2010;3(1):
- 469 31. Adeyemo DO. Local Government and health care delivery in Nigeria.: A case study. *J.*  
470 *Hum. Ecol.* 2005; 18(2):149-160.
- 471 32. Erim DO, Kolapo UM, Resch SC. A rapid assessment of the availability and use of  
472 obstetric care in Nigerian healthcare facilities. *PLoS One*. 2012;7(6):e39555.
- 473 33. The World Bank. Improving Primary Health Care delivery in Nigeria: Evidence from  
474 four states. World Bank Working paper No. 187, Washinton, D.C. World Bank. 2010.
- 475 34. Sholeye OO, Abosedo OA, Jeminusi OA. Client perception of Antenatal care services  
476 at Primary Health Centres in an Urban area of Lagos, Nigeria. *World Journal of*  
477 *Agricultural Sciences*. 2013;9(2): 137 – 142.
- 478 35. Moore BM, Alex-Hart BA, George IO. Utilization of health care services by pregnant  
479 Mothers during delivery: A community based study in Nigeria. *Journal of Medicine and*  
480 *Medical Science*. 2011;2(5):864-867.
- 481 36. Sule SS, Ijadunola KT, Onayade AA, Fatusi AO, Soetan RO, Connell FA. Utilization of  
482 primary health care facilities: Lessons from a rural community in Southwest Nigeria.  
483 *Niger J Med*. 2008; 17(1):98-106.
- 484 37. Ossai EN, Uzochukwu BSC. Providers' perception of quality of care and constraints to  
485 delivery of quality maternal health services in primary health centers of Enugu State,  
486 Nigeria. *International Journal of Tropical Disease and Health*. 2015;8(1):13-24.
- 487 38. Ossai EN, Uzochukwu BSC. Knowledge of danger signs among clients of maternal  
488 health service in urban and rural primary health centers in southeast Nigeria. *Journal*  
489 *of Community Medicine and Health Education*. 2015;5(2):337-344.
- 490 39. World Health Organization. The World Health Report 2005: Make Every Mother and  
491 Child count. 2005. Geneva, World Health Organization.
- 492 40. Emelumadu OF, Onyeonoro UU, Ukegbu AU, Ezeama NN, Ifeadike CO, Okezie OK.  
493 Perception of quality of maternal healthcare services among women utilizing antenatal  
494 services in selected primary health facilities in Anambra State, southeast Nigeria.  
495 *Nigeria Medical Journal*. 2014;56(2):148-155.
- 496 41. Fatiregun AA, Ossai EN. Clients satisfaction with Immunization services in the urban  
497 and rural primary health centers of a south-Eastern state in Nigeria. *Niger J Paed*.  
498 2014;41(4):375-382.

- 499 42. Potter M, Macintyre S. What is, must be best: a research note on conservative or  
500 deferential response to antenatal care provision. Soc Sci Med. 1984;19:1197-1200.
- 501 43. Mrisho M, Schellenberg JA, Mushi AK, Obrist B, Mshinda H, Tanner M, Schellenberg  
502 D. Factors affecting home delivery in rural Tanzania. Trop Med Int Health.  
503 2007;12(7):862-872.
- 504 44. Amooti-Kaguna B, Nuwaha F. Factors influencing choice of delivery sites in Raki  
505 district of Uganda. Soc Sci Med. 2000;50(2):203-213

506

507 **Disclaimer: -**

508 This manuscript was presented in the conference "Society for Epidemiologic Research"  
509 available link is [http://epiresearch.org/poster/view\\_abstract.php?id=26811](http://epiresearch.org/poster/view_abstract.php?id=26811) held at  
510 Denver, Colorado, United States of America from 16th to 19th June, 2015.