

Knowledge of Danger Signs of Pregnancy among Clients of Maternal Health Service in Urban and Rural Primary Health Centres of Southeast Nigeria

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Abstract

Objective: Aim of study was to assess knowledge of key danger signs of pregnancy among clients of maternal health service in urban and rural primary health centres of southeast Nigeria.

Methods: A cross-sectional analytical study design was used. Three stage sampling method was used to select 540 clients of maternal health service in 18 of 440 primary health centres in Enugu state, southeast Nigeria. The clients were women who attended antenatal and postnatal care in the health centres. A minimum of four antenatal care visits qualified the women for inclusion in the study.

Results: The mean age of the clients was 27.9 ± 5.5 and 26.9 ± 5.7 years in urban and rural areas respectively. The most recalled danger sign by the clients was bleeding before labour, (urban, 47.4%; rural, 62.6%), while the least recalled sign was swollen hands and feet, (urban, 16.7%; rural, 24.4%). A significantly higher proportion of clients in rural, had good knowledge of danger signs by recalling four or more signs when compared to urban. Predictors of good knowledge included being urban client, (AOR; 0.51, 95%CI=0.35-0.75), maternal age less than 30, (AOR; 2.44, 95%CI=1.65-3.58), being single, (AOR; 0.18, 95%CI=0.08-0.38), Igbo ethnic nationality, (AOR; 0.29, 95%CI=0.10-0.86), primary education and less, (AOR; 2.05, 95%CI=1.15-3.67), and low socio-economic status, (AOR; 0.63, 95%CI=0.43-0.93). Conclusion: Good delivery of health education during antenatal care, use of electronic media to disseminate health information and community enlightenment of women groups increased knowledge of women of danger signs of pregnancy. These activities should be sustained as awareness of danger signs is a step towards improving maternal health.

Keywords: Danger signs of pregnancy; Primary health centres; Urban and rural; Nigeria

Introduction

Nigeria has the second largest burden of maternal death globally [1]. The major causes of maternal death in Nigeria include haemorrhage, (23%), infection (17%), toxæmia/eclampsia (11%), unsafe abortion (11%), obstructed labour (11%), malaria (11%), and anaemia (11%) [2]. Most of these causes are preventable especially if women with such complications seek help early. Delay to access to obstetric care have been categorized into four and they include delay in recognizing the danger signs, delay in deciding to seek care, delay in reaching the health facility and delay in receiving care at the health facilities [3].

Awareness of the danger signs of pregnancy is thus the first step to seeking appropriate and timely referral to emergency obstetric care and this reduces the first and second delays [3,4]. Danger signs of pregnancy though not the actual obstetric complications, are symptoms that are easily recognized by the woman, her family and members of the community and include swelling of feet and hands, severe headache or fits, fever, smelly vaginal discharge and vaginal bleeding before labour [5]. Others include mal-presentation, heavy bleeding during or after labour and labour lasting more than one nightfall to one sun rise or vice versa [5].

In Nigeria, the components of antenatal care include amongst others the counselling of pregnant women on how to recognize the danger signs of pregnancy [6,7]. Also, the concept of Focused Antenatal Care is based on the principle that every pregnancy is at risk of complications necessitating the need that women be given information on these danger signs of pregnancy in addition to receiving basic care [6]. Knowledge of danger signs of pregnancy has been found to be associated with birth preparedness on the part of the expectant mother [8], and it has also been observed that women who were aware of these signs are more likely to deliver in a health facility when compared with those who did not [9], and this is of relevance in the quest to improve maternal health.

Awareness of the danger signs of pregnancy by the women and their families will enable them to seek care promptly with effect that maternal morbidity and mortality could be reduced and this has implications in the realization of the Millennium Development Goal number five which has as one of the target indicators, the reduction of maternal mortality by 75% by 2015 from the estimates of 1990 [10]. The aim of the study was to determine the knowledge of key danger signs of pregnancy and its associated factors among the clients of maternal health service in urban and rural primary health centres of southeast Nigeria.

Materials and Methods

Setting

The study area is Enugu State, southeast Nigeria. It is made up of 17 local government areas of which 5 are classified as urban, and covers a total area of 7,618 sq km with a population of 4,881, 500 people [11]. The inhabitants belong mainly to the Igbo ethnic nationality and are predominantly Christians. In urban areas, the major occupation of the people is trading and formal employments while in rural, it is mainly subsistence farming and animal pasturing.

The health system of Enugu State is based on the District Health System and presently the state has seven district hospitals, 440 primary health centres, two specialist hospitals, two teaching hospitals and 384 private health facilities [12]. Enugu state has eight radio stations, (five of these radio stations are privately owned while three are public establishments), and three television stations, of which one is privately owned. All these stations except one are located in Enugu, the state capital but are well received at all corners of the state.

Study design

The trial was a cross sectional analytical study design.

Study participants

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

Sample size determination

The minimum sample size for the study was determined by the formula used to compare two independent proportions [13]. From the National Demographic and Health Survey of 2008, 70.9% of urban respondents were informed of the danger signs of pregnancy during their antenatal care period [14], while from a study in rural Uganda, 52% of respondents knew at least one danger sign [8]. A total of 270 clients were estimated for each of the study groups based on a type 1 error (α) of 0.05 in a two sided test and a power of 0.8.

Sampling technique

The study employed a three stage sampling technique. A simple random sampling technique of balloting was used to select three local government areas each in urban and rural areas of the state in the first stage. In second stage, three health centres in each of the six selected local government areas were randomly selected by the balloting method. In third stage, a systematic random sampling technique was used to select the clients as they presented in the immunisation/ infant welfare clinic of the selected health centres on each day of data collection. The average attendance at the health centres for immunisation services in the last six months served as the sampling frame, (1020 in urban and 1429 in rural) and by dividing this population by the sample size of 270 in each group, one out of every four in urban and one out of every five women in rural area were selected. The index client was selected among the first four clients in urban and first five clients in rural area by a simple random sampling

method through balloting using the health facility register of the clients on each day of data collection. The research assistants had a register for all the clients that were included in the study and this was cross checked before a new client was included to ensure that no client was selected twice.

Study instrument

The study instrument was a pre-tested, semi-structured questionnaire.

Data collection method

The pre-tested questionnaire was administered to the clients by trained research assistants. Participation in the study was voluntary and participants were assured that there would be no victimisation of clients who refused to participate or who decided to withdraw from the study after giving consent. Ethical approval for the study was obtained from the Research and Ethics Committee of University of Nigeria Teaching Hospital Ituku-Ozalla, Enugu. Clients were required to sign or thumbprint on the written informed consent form before the interview and the nature of the study, its relevance, and the level of their participation were adequately explained to them. Also, no identifying information was obtained from the study participants.

Outcome measure

The outcome measure of the study was client's good knowledge of the key danger signs of pregnancy and it was assessed by the proportion of the clients in the two groups who recalled four or more of the eight key danger signs of pregnancy. The eight danger signs included swelling of feet and hands, severe headache or fits, fever, smelly vaginal discharge, vaginal bleeding before labour, mal-presentation, heavy bleeding during or after labour and labour lasting more than one nightfall to one sun rise or vice versa [5].

Data analysis

Data analysis was done using the Statistical Package for Social Sciences, (SPSS), statistical software, version 20 (SPSS Inc, Chicago, 11). Frequency tables and cross tabulations were generated, and level of significance was determined by a p-value of less than 0.05. The socio-demographic characteristics of the clients of maternal health service, their receiving information of the eight key danger signs of pregnancy during the antenatal care period and their recall of each of the eight danger signs of pregnancy was compared. Also the client's good knowledge of the danger signs of pregnancy in urban and rural primary health centres was compared. Multivariate analysis using binary logistic regression was used to determine the factors predictive of good knowledge of the clients of the danger signs of pregnancy. Variables that had a p-value of less than 0.02 in the bivariate analysis were entered into the logistic regression model to determine the predictors of clients good knowledge of the danger signs of pregnancy. A logistic regression model was fitted for both the urban and rural areas and the results were reported using Adjusted Odds Ratio, (AOR) and 95% Confidence Intervals (CI).

Results

Table 1, shows the socio-demographic characteristics of the clients of maternal health service in urban and rural primary health centres. The mean age of clients in the urban area, (27.9± 5.5 years), was

significantly higher than that of the rural which was 26.9± 5.7 years, (student t=2.032, p=0.043). Majority of the clients were in the age group, 25- 29 years. Also, majority of the respondents, and also their husbands in the two study groups had secondary education. On the

socio-economic status of the clients, while majority of clients in urban area were in the least poor quartile that of rural was in the poorest quartile.

Variable	Urban (n=270) N (%)	Rural (n=270) N (%)	χ ²	p value
Age of Clients				
Mean ±SD (years)	27.9 ±5.5	26.9 ±5.7	2.032**	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)		
≥ 35	31 (11.5)	29 (10.7)		
No of living children				
1 child	94 (34.8)	99 (36.7)	0.25	0.882
2 – 4 children	153 (56.7)	150 (55.6)		
≥ 5 children	23 (8.5)	21 (7.8)		
Marital Status				
Single	21 (7.8)	29 (10.7)	1.411	0.235
Married	249 (92.2)	241 (89.3)		
Religion				
Christian	259 (95.9)	249 (92.2)	3.322	0.068
Others ***	11 (4.1)	21 (7.8)		
Ethnic Group				
Igbo	263 (97.4)	253 (93.7)	4.36	0.037
Others ****	7 (2.6)	17 (6.3)		
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*	<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)		
*Likelihood ratio; **student t test;***Islam, Traditional African religion;****Hausa, Yoruba, minority tribes				

Table 1: Socio-demographic characteristics of clients of maternal health services.

Table 2, shows the knowledge of danger signs of pregnancy by clients of maternal health service. High and comparable proportions of clients in the two study groups were informed about the danger signs of pregnancy during the antenatal care visits. However, higher proportions of clients in rural health centres recalled each of the eight key danger signs of pregnancy when compared to their urban counterparts, and the difference in proportions were significant for fever, ($p < 0.001$); severe headache/or fits, ($p = 0.041$); bleeding before labour, ($p < 0.001$); mal-presentation, ($p = 0.048$); and swollen hands and feet, ($p = 0.025$). A significantly higher proportion of clients in rural recalled four or more of the danger signs of pregnancy when compared with those in urban, ($p < 0.001$).

Variables	Urban (n=270) N (%)	Rural (n=270) N (%)	χ^2	p value
Health talks given during antenatal care				
Yes	252 (93.3)	257 (95.2)	0.856	0.355
No	18 (6.7)	13(4.8)		
Health talks received considered adequate				
	n=252	n=257		
	N (%)	N (%)		
Adequate	248 (98.4)	254 (98.8)	FT	0.722
Inadequate	4(1.6)	3 (1.2)		
Informed about the danger signs of pregnancy				
	n=270	n=270		
	N (%)	N (%)		
Yes	232 (85.9)	238 (88.1)	0.591	0.442
No	38 (14.1)	32 (11.9)		
Recall the danger signs**				
Bleeding before labour	128 (47.4)	169 (62.6)	12.578	<0.001
Heavy bleeding during or after labour	122 (45.2)	138 (51.1)	1.899	0.168
Unduly long labour	111 (41.1)	132 (48.9)	3.3	0.069
Fever	63 (23.3)	139 (51.5)	45.683	<0.001
Smelly vaginal discharge	114 (42.2)	130 (48.1)	1.914	0.167

Mal-presentation	59 (21.9)	79 (29.3)	3.894	0.048
Severe headache/ fits	52 (19.3)	72 (26.7)	4.187	0.041
Swollen hands and feet	45 (16.7)	66 (24.4)	5.001	0.025
Danger sign recall score				
No danger sign recalled	46 (17.0)	23 (8.5)	8.79	0.003
At least one danger sign recalled	224 (83.0)	247 (91.5)	8.79	0.003
Good knowledge of danger signs	104 (38.5)	145 (53.7)	12.528	<0.001
Poor knowledge	166 (61.5)	125 (46.3)		
Told what to do when there are danger signs				
Yes	219 (81.1)	242 (89.6)	7.844	0.005
No	51(18.9)	28 10.4)		
**Multiple responses encouraged				

Table 2: Knowledge of the danger signs of pregnancy by clients of maternal health services.

Table 3, shows the factors that affect clients good knowledge of danger signs of pregnancy. Among all the clients of maternal health service, their location, age group, marital status, ethnic nationality, socio-economic status and their educational attainment were significant factors that affected client's good knowledge of the danger sign of pregnancy.

Variable	Good knowledge of danger signs N (%)	Poor knowledge N (%)	p value on bivariate analysis	Adjusted Odds Ratio 95% Confidence Interval on multivariate analysis
Location				
Urban	104 (38.5)	166 (61.5)	<0.001	0.5 (0.3 - 0.7)
Rural	145 (53.7)	125 (46.3)		1
Age groups in years				
<30 years	181 (52.6)	163 (47.4)	<0.001	2.5 (1.7 – 3.6)
≥ 30 years	68 (34.7)	128 (65.3)		1
No of living children				
≤ 2 children	154 (45.2)	187 (54.8)	0.562	NA
>2 children	95 (47.7)	104 (52.3)		
Marital status				
Single	10 (20.0)	40 (80.0)	<0.001	0.2 (0. 1 – 0.4)
Married	239 (48.8)	251 (51.2)		1
Religion				
Christianity	232 (45.7)	276 (54.3)	0.412	NA
Others**	17 (53.1)	15 (46.9)		
Ethnic group				
Igbo	232 (45.0)	284 (55.0)	0.013	0.3 (0. 1 – 0.9)
Others***	17 (70.8)	7 (29.2)		1

Education (Respondents)				
Primary education and less	44 (64.7)	24 (35.3)	0.001	2.1 (1.2 – 3.8)
Secondary education and above	205 (43.4)	267 (56.6)		1
Education (Husband)				
Primary education and less	68 (78.2)	19 (21.8)	<0.001	NA
Secondary education and above	171 (42.4)	232 (57.6)		
Occupation (Respondents)				
Housewife/unemployed	171 (49.4)	175 (50.6)	0.113	1.0 (0.5 – 1.9)
Self employed	54 (39.4)	83 (60.6)		0.7 (0.3 – 1.3)
Salaried employment	24 (42.1)	33 (57.9)		1
Occupation (Husband)				
Self employed	149 (52.8)	133 (47.2)	0.036*	NA
Salaried employment	90 (43.9)	115 (56.1)		
Unemployed	0 (0.0)	3 (100.0)		
Socio-economic status				
Low socio-economic status	116 (41.9)	161 (58.1)	0.043	0.6 (0.4 – 0.9)
High socio-economic status	133 (50.6)	130 (49.4)		1
*Likelihood ratio; **Islam, Traditional African religion; ***Hausa, Yoruba, minority tribes; NA Not available				

Table 3: Factors affecting good knowledge of the danger signs of pregnancy by clients of maternal health services.

Discussion

Majority of the clients in the two study groups, (85.9% in urban and 88.1% in rural), were informed of the danger signs of pregnancy. These proportions are greater than the finding from the National Demographic and Health Survey, where 75.5% of the respondents in urban, and 59.2% in rural were informed of the danger signs of pregnancy [6]. However, from a study in Ibadan, Nigeria, 90% of the respondents received information on the danger signs of pregnancy [15], and in a study in Mekelle city, Ethiopia, 79.6% of respondents were informed of the danger signs [16].

A very high proportion of clients in the two study groups, (91.8% in urban, and 94.1% in rural), perceived the health talks received during antenatal care as adequate. Both proportions are higher than what was obtained in a study, on client's perception of antenatal care services at primary health centres in an urban area of Lagos, Nigeria, where 84.3% of the respondents perceived the health talks given to them during antenatal care as adequate [17].

A minor proportion of the respondents in this study, (urban 17% and rural 8.5%), did not recall any of the danger signs. These proportions are lower than what were obtained from other studies [18-21]. The most recalled danger sign among the respondents in both study groups was vaginal bleeding, and this was similar to the findings from rural Tanzania [19], and Ethiopia [16,21]. Vaginal bleeding was also the most counselled danger sign in a study that focused on counselling on and women's awareness of pregnancy danger signs in selected rural health facilities in three West African countries [22].

However, in a study in northern Nigeria, severe headache was the most recalled key danger sign [23]. Also the least recalled danger sign in both study groups in this study was swollen hands and feet, but in a study in rural Tanzania, fever was the least informed and also least recalled key danger sign [19].

A significantly higher proportion of clients in rural health centres, (53.7%), had good knowledge of the key danger signs of pregnancy by recalling four or more of the eight key danger signs when compared with those in urban, (38.5%). These proportions are however higher than those in a study that involved three states in Northern Nigeria, in which less than one third of the respondents recalled three or more of the danger signs of pregnancy [23]. In a study on the knowledge of obstetric danger signs and birth preparedness practices among women in rural Uganda, 19% of the respondents were aware of three or more of the danger signs [8], and in a community based study in Kaduna, Nigeria, 18.3% of the respondents were aware of four or more of the danger signs of pregnancy [24].

This difference in proportion of respondents that were aware of, and also recalled the danger signs of pregnancy in this study when compared to that from others, could be attributed to the fact that health education in form of health talks during antenatal care has become an integral part of services being rendered at the primary health centres in the study area, and these health messages are mostly delivered in form of songs and demonstrations, and hence readily understood. The providers of antenatal care were also trained specially for this purpose. The clients proved that they understood the danger

signs of pregnancy by the quality of the recalls they made as compared with other findings above.

Also, in recent times, there has been a series of jingles on the electronic media, sponsored by Enugu State Ministry of Health, in conjunction with some Non-Governmental Organizations, and transmitted both in English and the local language, Igbo, and most times as musical tunes informing the populace of the various danger signs of pregnancy and urging the people for a collective action by ensuring that such women seek medical help immediately. Within the same period, there was a community based enlightenment of women groups on the danger signs of pregnancy co-sponsored by the State Ministry of Health and Non-Governmental Organizations.

There is evidence that exposure to radio education intervention is associated with a significant increase in the knowledge of pregnancy danger signs [21,25], and this has prompted suggestion on use of radio in the dissemination of information on the pregnancy danger sign as a way of increasing the knowledge of the women [24]. Same results are also associated with safe motherhood interventions like community based enlightenment of women groups [26]. These results could be based on the fact that pregnant women because of their desire to have healthy children are more attentive and receptive to health education [5].

From the results of this study, being a client in rural area increased the probability of having good knowledge of the pregnancy danger signs. This could be explained by the fact that in most rural areas of Nigeria, the primary health centres are the predominant health institutions and this may have encouraged the clients to fully participate in the activities of antenatal care and maximize the benefits thereof which included the well delivered health instructions. Perhaps also, the community enlightenment programme of women groups on the pregnancy danger signs by the State Ministry of Health in collaboration with Non-Governmental Organizations may have been more pronounced in the rural area, since in Nigeria, maternal mortality is higher in rural when compared with urban [2,6]. This result is however different from that of a study in Aleta Wondo district of Southern Ethiopia in which being an urban resident increased the likelihood of having good knowledge of the danger signs of pregnancy [27].

Also, being in the younger age group increased the probability of having good knowledge of the danger signs of pregnancy and this could be attributed to the fact that most of clients in the younger age group could be of lower parity when compared with those in the older age group and as such could be more open to health instructions as they are yet to have their own impressions of pregnancy. This result is in disagreement with that of a study in rural Tanzania where increasing age of the woman was associated with increased awareness of the danger signs [28].

The clients who were single were from the logistic regression result about six times less likely to have good knowledge of the danger signs of pregnancy when compared with those who were married. This could be because those that are married may be more stable based on the support from their spouses and families hence more motivated to all matters that concern their pregnancy and its outcome including the necessary precautions to be taken when compared to those who are not married.

Clients who had primary and no formal education had increased likelihood of having good knowledge of the danger signs of pregnancy when compared with those who had secondary education and above.

This could be because those with less formal education paid more attention to the health instruction activities at the primary health centres. Moreover, use of songs in the local language supported by simple demonstrations made the messages easier to understand by the clients. This result is also at variance with that from a rural area of Tanzania in which those who had secondary education were more likely to have good knowledge of the danger signs [28].

The clients who were of low socio-economic status also had a lower probability of having good knowledge of the danger signs of pregnancy. This corresponds with the finding from the study in Northern Nigeria in which higher socio-economic status was associated with good knowledge of the danger signs [23]. In Nigeria, access to mass media is higher in the high socio-economic group [6], and the media was one of the means by which the health messages were disseminated and could explain why those in the higher socio-economic status had good knowledge of the pregnancy danger signs.

Conclusion

A good delivery of health education during antenatal care, use of electronic media to disseminate health information and community enlightenment of women groups increased the knowledge of the women of the danger signs of pregnancy. These activities should be sustained as awareness of the danger signs of pregnancy is a step towards improving maternal health. This is important if the fifth Millennium Development Goal of improving maternal health is to be realized.

Authors Contributions

Author BSCU conceptualized the study while author ENO designed the study, supervised the field work and performed the statistical analysis. Both authors were involved in the literature searches. ENO wrote the initial draft of manuscript. All authors read and approved the final manuscript.

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