Knowledge of birth defects among nursing mothers in a developing country

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Abstract

Background: In the absence of established guidelines, where formal screening is unavailable for birth defects, a lot of responsibility is placed on parents in the recognition of these defects.

Objectives: The aim of the study was to determine the awareness of mothers about birth effects in a developing country and assess what they know about the prevention, detection and treatment of children with birth defects.

Methods: This was a descriptive cross-sectional study of 714 mothers consecutively selected at two major hospitals in Nigeria between May and December, 2012. Data were collected with interviewer administered questionnaires. Descriptive and inferential statistics were performed using SPSS and statistical significance set at $p < 0.05$

Results: The participants were aged 17 to 42 years. Only 183 (25.6%) were aware of birth defects. Factors associated with awareness of birth defects were older age, religious belief, better education, higher socioeconomic class, early age at booking and registering at a tertiary care facility. Education, socioeconomic class as well as month and location of booking were found to be independent predictors of awareness of birth defects.

Conclusion: Mothers in Ibadan, Nigeria, a country without a formal newborn screening programme, have a poor level of awareness about birth defects.

Keywords: Awareness; Mothers; Birth defects; Developing country

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Introduction

Routine screening of newborn children for certain birth defects is well established in developed countries, but absent or rudimentary at best in many developing nations.[1] The major benefits of newborn screening are reductions in neonatal and infant morbidity and mortality through early detection of rare diseases and prompt treatment.[2-4] It has also led to saved health care costs of billions of dollars in the U.S.A. because of the reduction in the disabilities and debilities associated with delayed diagnosis.[4] The optimal utilisation of the process of screening, especially for structural anomalies, which are easily detected at little or no cost, is only possible if the parents are carried along.[5,6] In the absence of specific guidelines for screening of newborn children, parents are given a disproportionately higher degree of responsibility in the detection of babies with birth defects.

In many low-middle income countries (LMIC), where these guidelines are relatively unavailable; delay in recognition, delayed presentation to the hospital, delivery outside recognised obstetric care settings and socioeconomic challenges contribute to a higher rate of neonatal mortality.[7-9] In an attempt to improve primary prevention strategies while pressure is on to encourage the establishment of proper screening programmes, it is imperative to identify target groups for educational enlightenment. There is no information, in the literature, on the perception of parents towards early detection of birth defects or their knowledge about those defects in regions lacking formal screening programs for newborns. The study was thus conducted with the aim of determining the awareness of mothers about birth defects in an LMIC setting without a newborn screening programme.

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The study will serve to provide baseline information on the awareness of mothers about birth defects in general. It will, in addition, provide information on the awareness of mothers about the possible prevention, early detection and care of newborns with these defects.

Methods

Study location

Following ethical approval from the Institution's Ethical Review Committee, a descriptive cross- sectional study was conducted between May and December, 2012 at the two largest hospitals in Ibadan, Nigeria – the University College Hospital, Ibadan and Adeoyo Maternity Hospital, Yemetu, Ibadan. Ibadan is the largest metropolitan city in Sub-Saharan Africa, with a land mass covering 3,123 square kilometres and an estimated population of over 5 million. The University College Hospital, Ibadan, is an 800 bedded federal government funded hospital with specialists in over 50 different clinical departments and institutes, providing the major source of referral for the care of major debilitating diseases such as congenital malformations in the South-Western part of Nigeria. The Adeoyo Maternity Hospital (AMH) is one of the oldest hospitals for maternal care in Nigeria. The AMH, owned by the state government, is a general hospital with a bias towards maternal and child care. It caters for the teaming population of Ibadan city; with a large proportion from lower socioeconomic groups.

Data collection

Mothers attending the postnatal immunization clinics of the two hospitals were recruited by consecutively approaching each potential participant and those who consent to participate in the study had a structured interviewer administered questionnaire, to obtain data from them. A total of 760 mothers were approached, out of which 25 (3.3%) were excluded because they were health care workers, 21 (2.8%) declined to participate and 714 (93.9%) completed the study. The questionnaire was translated into the predominant local language (Yoruba) for ease of administration.

Data was collected on sociodemographic variables such as mother's age, marital status, level of education, religion, number of children in the family and other related questions. The occupation was recorded and used to derive the social class based on the Economic and Social Research Council (ESRC) guidelines and categorised into: Class I – managerial and professional, Class II– intermediate and Class III – working class.[10] The participants were asked about antenatal details of the (last) pregnancy; whether they attended antenatal clinic for the pregnancy or not – recorded as Yes or No. They were also asked for the location of the antenatal clinic that they attended. The utilization of ultrasound scanning during the pregnancy was assessed by; number of scans performed, if they were told the findings and what the findings were. The mothers' awareness of birth defects was determined using a combination of open and closed ended questions. They were asked if they were aware of birth defects; if the defects could be prevented, detected, inherited or treated; and if they knew that folic acid supplementation could be used to prevent certain birth defects.

Data management

The mother's age was dichotomised according to the mean, for cross tabulation. Marital status was recorded as single, married or separated. The highest level of education was dichotomised into those with 12 years or less of formal education and those with more than 12 years of formal education. For the purpose of cross tabulation, gravidity was categorised into those who were primigravida and those with more than one previous pregnancy. Parity was dichotomised according to the mean number of children. The location of antenatal care was dichotomised into; tertiary hospital and other hospitals (to include general hospitals, primary health care centres and private clinics).

Statistical analysis

Data collected was collated, and subjected to statistical analysis using SPSS version 19 and results presented using tables. Categorical data were summarised by frequencies, percentages and proportions, while continuous data were summarised using means, standard deviations, medians and ranges. Tests for association between sociodemographic variables and awareness of birth defects were done using Chi-square statistics. Further bivariate analyses were also done between awareness of birth defects and; the number of children, number of previous pregnancies, number of months of pregnancy when the mother registered for antenatal care and location of antenatal care using Chi-square statistics.

Significant variables in the bivariate analysis, at an alpha of 0.20, were entered into a binary logistic regression model to identify likely predictors of awareness of birth defects. The outcome variables were: aware of birth defects and not aware of birth defects. All the variables were taken in a single step for the logistic regression. The p-value for statistical significance was set at 0.05.

Results

Sociodemographic and obstetric characteristics

A total of 714 mothers participated in the study. They were aged 17 to 42 years with a mean of 29.2 (± 5.1) years. Most, 695 (97.3%), were married, 364 (51.0%) participants were Christians and 350 (49.0%) were Muslims. The majority, 491 (68.8%), of the participants were in the working class and 330 (46.2%) had more than 12 years of formal education.

The participants have had between 1 and 7 pregnancies (with a median of 2 pregnancies). They had 1 to 6 children with a median number of 2 children. The majority, 481 (67.4%), were multigravida. Most, 671 (94.0%), of the participants received supervised antenatal care (ANC) for the index pregnancy. The participants registered for antenatal care between the 1st and 8th months of pregnancy with a mean gestational age at registration of 4.7 (± 1.5) months. A total of 711 participants had between one and eight obstetric ultrasound scans performed, with an average of two.

Awareness of the participants about birth defects

Only 183 (25.6%) participants were aware of birth defects. Examples of birth defects given by those who were aware of these anomalies included; Central Nervous System malformations e.g. hydrocephalus and spina bifida, limb anomalies e.g. amelia, congenital talipes equinovarus deformity, congenital heart diseases, craniofacial malformations e.g. cleft lip and palate, choanal atresia and anorectal malformations. The participants who knew about birth defects first heard about this from a doctor or nurse, 47 (25.7%), posters in the hospital, 9 (4.9%), from the mass media, 56 (30.6%), from print media, 19 (10.4%), from friends, 17 (9.2%), or other sources, 35 (19.1%).

Among the study participants; 113 (15.8%) knew that birth defects could be prevented, 70 (9.8%) knew that they could be inherited, 111 (15.5%) knew that birth defects could be treated, 68 (9.5%) knew that certain birth defects could be prevented using folic acid and 95 (13.3%) reported that certain tests could be used to assist in prenatal diagnosis of these defects.

Antenatal care visits and counselling about birth defects

Each of the participants had between 0 and 6 ultrasound scans performed during the last pregnancy (with a median of 2). The majority, 630 (88.2%), was informed of the findings by the sonographer who performed the ultrasound scan examination. A total of 563 (78.9%) were, in addition, informed by their obstetrician/midwife of the details of the ultrasound scan while 151 (21.1%) were not informed by their health care giver on presentation of the result to him/her. Thirty-six participants received information about birth defects during the antenatal care visits in the last pregnancy; with a nurse/midwife being the source of the information to 22 (61.1%) mothers, a doctor to 10 (27.8%) and another health care worker to 4 (11.1%).

Socio-demographic variables and awareness of birth defects

The proportion of participants who were older than 30 years and were aware of birth defects was significantly higher than those who were 30 years of age or younger (32.7% vs. 21.3%, p =0.001). A higher proportion of Christian participants were aware of birth defects than Muslim participants (34.3% vs. 16.6%, p < 0.001). Awareness of birth defects was significantly higher among those with over 12yrs of education compared with those who had less than 12yrs of education (45.8% vs. 8.3%, p < 0.001). Majority of participants in the managerial and professional class were aware of birth defects compared to those in the intermediate or working class (77.3% vs. 35.8% vs. 13.4%, p < 0.001). Table 1 shows the associations between awareness of birth defects and sociodemographic variables.

Table 1 – Socio-demographic variables of the participants and awareness of birth defects

Socio-demographic variable	Awareness of birth defects: Aware No (%)	Not aware No (%)	Total No (%)	χ^2	p value
Age (years)					
≤ 30	95 (21.3)	350 (78.7)	445 (100.0)	11.362	0.001*
> 30	88 (32.7)	181 (67.3)	269 (100.0)		
Total	183 (25.6)	531 (74.4)	714 (100.0)		
Marital status					
Single	3 (15.8)	16 (84.2)	19 (100.0)	0.992	0.319
Married	180 (25.9)	515 (74.1)	695 (100.0)		
Total	183 (25.6)	531 (74.4)	714 (100.0)		
Religion					
Christianity	125 (34.3)	239 (65.7)	364 (100.0)	29.557	<0.001*
Islam	58 (16.6)	292 (83.4)	350 (100.0)		
Total	183 (25.6)	531 (74.4)	714 (100.0)		
Education					
12 years or less	32 (8.3)	352 (91.7)	384 (100.0)	130.000	<0.001*
Over 12 years	151 (45.8)	179 (54.2)	330 (100.0)		
Total	183 (25.6)	531 (74.4)	714 (100.0)		
Social class					
1 – Managerial	68 (77.3)	20 (22.7)	88 (100.0)	169.100	<0.001*
2 – Intermediate	48 (35.8)	86 (64.2)	134 (100.0)		
3 – Working class	66 (13.4)	425 (86.6)	491 (100.0)		
Total	183 (25.6)	531 (74.4)	714 (100.0)		

* - Statistically significant

Maternal obstetric variables and awareness of birth defects

Awareness of birth defects was significantly higher among participants who booked at tertiary hospitals compared with those who booked at other hospitals (57.3% vs. 14.7%, p < 0.001). In addition, birth defect awareness was significantly higher among those who booked before the 5th month compared with those who booked at 5months or later (36.2% vs. 17.5%, p < 0.001). There were no associations between awareness of birth defects and the number of pregnancies or birth to date (Table 2).

Table 2 – Maternal obstetric variables of the participants and awareness of birth defects

Variable	Awareness of birth defects: Aware No (%)	Not aware No (%)	Total No (%)	χ^2	p value
Gravidity					
Primigravida	61 (26.2)	172 (73.8)	233 (100.0)	0.055	0.855
Multigravida	122 (25.4)	359 (74.6)	481 (100.0)		
Total	183 (25.6)	531 (74.4)	714 (100.0)		
Number of children					
≤ 2	129 (27.7)	336 (72.3)	465 (100.0)	3.119	0.077
≥ 3	54 (21.7)	195 (78.3)	249 (100.0)		
Total	183 (25.6)	531 (74.4)	714 (100.0)		
Location of ANC					
Tertiary hospital	106 (57.3)	79 (42.7)	185 (100.0)	131.400	<0.001*
Other hospital	77 (14.7)	447 (85.3)	524 (100.0)		
Total	183 (25.8)	526 (74.2)	709 (100.0) **		
GA at booking					
< 5 months	114 (36.2)	201 (63.8)	315 (100.0)	31.891	<0.001*
≥ 5 months	69 (17.5)	325 (82.5)	394 (100.0)		
Total	183 (25.8)	526 (74.2)	709 (100.0) **		

* - Statistically significant, ** - five participants did not book at all for ANC either at supervised or unsupervised centres, ANC – Antenatal care, GA – Gestational age

Predictors of awareness of birth defects amongst sociodemographic/obstetric variables

Participants with more than 12 years of formal education were three times more likely to be aware of birth defects than those with less education (OR = 3.38, 95% CI: 1.98, 5.79, p < 0.001). Awareness of birth defects was nearly six times higher in the managerial and professional social class than in the working class (OR = 5.75, 95% CI: 2.98, 11.11, p < 0.001).

Participants who booked for antenatal care at a tertiary hospital were three times more likely to be aware of birth defects compared to those who booked at other facilities (OR = 3.25, 95% CI: 2.07, 5.10, p < 0.001). Those who booked for ANC earlier than the fifth month of gestation were nearly twice as likely to be aware of birth defects as those who booked later in pregnancy (OR = 1.59, 95% CI: 1.04, 2.42, p = 0.031). The model was assessed using the Hosmer-Lemeshow test and found to be a good fit; $\chi 2 = 6.553$, DF = 8 and p = 0.586. Age and religious beliefs were not found to be significant predictors of awareness of birth defects (Table 3).

Table 3 – Logistic regression analysis of relationship between sociodemographic/obstetric variables and awareness of birth defects

Variable	Categories of variable	OR	95% CI	p value
Age group	> 30 years	1.056	0.659 – 1.694	0.820
	≤ 30 years			
Religion	Christianity	1.004	0.644 – 1.565	0.987
	Islam			
Education received	More than 12 years	3.383	1.978 – 5.788	<0.001*
	12 years or less			
Social class	1 – Managerial	5.747	2.976 – 11.111	<0.001*
	2 – Intermediate	1.319	0.779 – 2.237	0.302
	3 – Working class			
Location of ANC	Tertiary hospital	3.247	2.070 – 5.102	<0.001*
	Other hospitals			
GA at booking	< 5 months	1.590	1.044 – 2.421	0.031*
	≥ 5 months			

*Statistically significant, ANC – Antenatal care, GA – Gestational age

Discussion

The early detection of birth defects, through screening, is associated with prompt treatment, reduction in morbidity and mortality and better survival based on improvement in the quality of life of affected children.[2,4] In the absence of well established guidelines for screening of birth defects, such as in Nigeria, a great responsibility is placed on parents who, in addition to the efforts of health care workers, will have to be partners in ensuring early detection of birth defects if present in any newborn child. There is no better person that is qualified to detect any of these anomalies that are missed in the immediate newborn period before the child is sent home than a mother who spends the most time with a child at this phase of life. Awareness of birth defects as well as their causes and prevention may also encourage mothers to adopt more positive preventive behaviours.

The present study revealed poor awareness of mothers in the LMIC studied about birth defects as only 25.6% of the participants were aware of these defects. This proportion is lower than that reported from a focus group discussion conducted on 111 women in the United States concerning knowledge of women (mothers and those planning to be) about Down's syndrome.[11] In that study all the women had some degree of knowledge about the birth defect that was studied, in a setting where routine screening is periodically conducted for Down's syndrome. This would suggest that awareness about birth defects may be related to the availability of routine screening programmes.

The predominant sources of information about birth defects for participants who were aware were the mass media and doctors/nurses. This finding is similar to what was reported among Greek mothers in which doctors and the mass media were the major sources of information about birth defects.[12] Bener et al.[13] also found that doctors and the print media were the predominant sources of information about the prevention of birth defects in a survey of 1480 Qatari women. The

importance of the mass media as a leading source of information about birth defects is probably attributable to the coverage enjoyed by television, radio and the print media as sources of enlightenment and education for the populace with most homes having one form or the other of these. The mass media is also a veritable tool for advertisement of positive behavioural practices such as folic acid intake and discouragement of negative ones that have been implicated in the occurrence of birth defects such as smoking.

An overwhelming majority (94%) of the participants in the present study registered for antenatal care during the index pregnancy with an obstetrician/midwife in attendance and performed an average of two ultrasound scans each. This suggests a high level of awareness of the populace about the place of ultrasound scanning in pregnancy. Enakpene et al.[14] in a survey of 222 women in Ibadan, Nigeria found that women readily of their own volition request for antenatal ultrasound scanning. The major reasons given by the women for presenting for the ultrasound scan in that study were to check for foetal viability (64.7%) and to determine the baby's gender (22.6%). However, none of the women in that study requested for ultrasound scanning to screen for birth defects in their babies.

The findings on routine obstetric ultrasound scan were explained to 88.2%% of the participants by the sonographer in the present study. Furthermore, 78.9% received explanation about the result of the ultrasound scan from their doctor or midwife. These suggest that the interaction between the women and the sonographer or doctor/midwife is a good source of information about the state of the foetus, i.e. viability, estimating date of delivery and determination of sex. On the other hand, only 4.9% of the participants in the study received information about birth defects during the antenatal care. Not only does this demonstrate inadequacy of information received from health care workers about screening for birth defects, it also shows the lack of guidelines on information to be made available to expectant mothers. Where those guidelines are in place, parental education by health care workers has been found to be instrumental to the success of newborn screening for birth defects[15]

Participants in the present study were more likely to be aware of birth defects if they; were older than 30 years of age, were Christians, had more than 12 years of formal education or were in the managerial/professional social class. Furthermore, education and social class were found to be significant predictors of awareness of birth defects. Mavrou et al.[12] in a study conducted in Greece reported that better awareness of birth defects was noted in older women, those with better education, higher family income and residents of cosmopolitan areas. Lang et al.[16] similarly found older age and having a college degree to be among predictors of a higher knowledge score of sickle cell disease or cystic fibrosis in a survey of American women. Other predictors of higher scores in that study were having private health insurance and race. Older age is presumably associated with greater experience of life and the interactions women have with their friends and neighbours may lead to having heard about birth defects in conversations or through other sources. Better educational achievements and being in the upper/middle social classes are likely to expose the women to greater access to the media or internet. The mass media, corroboratively, was found to be the leading source of information about birth defects in the present study.

In this study, participants who booked early (less than five months of gestation) for antenatal care and those that registered at a tertiary hospital were more likely to be aware of birth defects. Additionally, both variables were found to be predictors of awareness of birth defects. These observations and inferences may be linked to the socioeconomic factors responsible for the choice of facility and time to book for antenatal care. Women of the upper/middle socioeconomic classes are more likely to book at a tertiary hospital or a facility where the quality of care available is above and beyond what obtains in a poorly funded and not so well maintained secondary health care facility.[17] Oladokun et al.[18] reported from a cross sectional study of 796 antenatal clinic attendees that early booking in pregnancy is likely to be associated with women who are more educated, professionals and those with fewer previous pregnancies.

Conclusion

The present study has shown that mothers in Ibadan, Nigeria, an LMIC without a formal newborn screening programme, have a poor level of awareness about birth defects. There is a gap in the counselling given to pregnant women attending antenatal care facilities in the setting. Health promotion aimed at prevention, early detection and prompt treatment of birth defects can be achieved by improving the transmission of information to mothers at antenatal clinics and educating the populace through mass media and health care workers. The high degree of awareness and participation in routine obstetric ultrasonography may be utilized as an advantage in early referral for formal mid-trimester foetal anomaly scan, which hitherto had not been available in the region but could now be done at a few centres.

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