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Self-reported prevalence and awareness of birth defects among women in a rural community, Oyo State, south western Nigeria

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Abstract

Background: Poor awareness of risk factors for birth defects (BD) among women had been reported in most of the developed countries. However, little of such is known in developing countries like Nigeria where a significant prevalence of BD had been reported. This study assessed awareness and prevalence of BD among women in selected rural communities in Oyo State Nigeria.
Methods: This is a community based cross-sectional study. A multi-stage sampling technique was used to recruit 614 women, aged 15-49 years. Data on awareness, prevalence of BD, associated risk factors and preventive measures were collected using an interviewer-administered questionnaire. Data were analysed using descriptive and inferential statistics.
Results: Mean age of the 614 women interviewed was 34.8 ± 7.7 years. Majority were married (526, 85.7%), had formal education (531, 86.5%) and were aware of BD (530, 86.3%). About half (313, 51.0%) reported supernatural factor as a cause of BD and only four (0.8%) women reported occurrence of BD among their children. Risk factors identified included smoking during pregnancy (404, 76.2%), advanced maternal age (197, 37.2%), diabetes mellitus (176, 33.2%) and maternal obesity (104, 19.6%). Predictors of awareness of BD include regular attendance of ANC (aOR=3.38, 1.56 – 7.34), formal employment (aOR=2.38, CI=1.06 – 5.26) and being married (aOR=2.17, CI=1.12 – 4.17).
Conclusions: Despite high awareness, there was low self-reported prevalence of BD with high level of misconceptions among participants. There is need for intensification of BD awareness interventions among women resident in the study area.

Keywords: *Birth defects, pregnant women, awareness, smoking, antenatal clinic*

Abstrait

Contexte: Une mauvaise connaissance des facteurs de risque de malformations congénitales (TB) chez les femmes a été signalée dans la plupart des pays développés. Cependant, peu de choses sont connues dans les pays en développement comme le Nigeria où une prévalence significative de BD a été signalée. Cette étude a évalué la sensibilisation et la prévalence du TB chez les femmes de certaines communautés rurales de l'État d'Oyo au Nigeria.
Méthodes: Il s'agit d'une étude transversale communautaire. Une technique d'échantillonnage à plusieurs degrés a été utilisée pour recruter 614 femmes âgées de 15 à 49 ans. Les données sur la sensibilisation, la prévalence du TB, les facteurs de risque associés et les mesures préventives ont été recueillies à l'aide d'un questionnaire administré par un intervieweur. Les données ont été analysées à l'aide de statistiques descriptives et inférentielles.
Résultats: L'âge moyen des 614 femmes interrogées était de 34.8 ± 7.7 ans. La majorité était mariée (526, 85.7%), avait une éducation formelle (531, 86.5%) et était au courant du BD (530, 86.3%). Environ la moitié (313, 51.0%) ont signalé un facteur surnaturel comme cause de BD et seulement quatre (0.8%) femmes ont signalé la survenue de BD chez leurs enfants. Les facteurs de risque identifiés comprenaient le tabagisme pendant la grossesse (404, 76.2 %), l'âge maternel avancé (197, 37.2 %), le diabète sucré (176, 33.2 %) et l'obésité maternelle (104, 19.6 %). Les prédicteurs de la connaissance du BD incluent la fréquentation régulière des soins prénatals (aOR = 3.38, 1.56 - 7.34), l'emploi formel (aOR = 2.38, IC = 1.06 - 5.26) et le fait d'être marié (aOR = 2.17, IC = 1.12-4.17).
Conclusions: Malgré une sensibilisation élevée, il y avait une faible prévalence autodéclarée de TB avec un niveau élevé d'idées fausses parmi les participants. Il est nécessaire d'intensifier les interventions de sensibilisation au TB parmi les femmes résidant dans la zone d'étude.

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Introduction

An estimated 7.9 million babies are born with birth defects, which represent 6% of total annual births worldwide [1]. In addition, the prevalence of all genetic birth defects combined ranges from 39.7 to 82 per 1,000 live births worldwide [2]. The prevalence of birth defects in Nigeria is estimated at 73.5 per 1000 live births while the incidence of major birth defects in South Western Nigeria is reported to be 3.7% [3].

Birth defects are a group of diseases that are costly to manage, contributing to high infant mortality [4][5]. In recent times, however, use of preventive strategies is proving effective with the identification of important modifiable risk factors for some birth defects [4]. Some of the risk factors that had been documented among others are obesity, diabetes mellitus, use of certain drugs during pregnancy, alcohol intake, maternal infections and cigarette smoking [4][6][7].

In another study conducted among women in Ghana, it was reported that women had low to moderate knowledge of risk factors and that of specific causes of birth defects [8]. Similarly, different studies conducted in the Middle East, North America and Western Europe have reported low to moderate level of awareness and knowledge of risk factors for birth defects [6-10]. Knowledge about birth defects is important as studies have shown that treatment of birth defects and other disabilities is influenced by an interplay of cultural and religious beliefs, which in turn influence knowledge and practice [9].

Prevention remains the most cost- effective and affordable strategy for managing birth defects [10], therefore, education of women to increase their knowledge about risk factors for birth defects is vital. However, this can only be done effectively if knowledge of women about birth defect is known.

This study was conducted to assess the level of awareness and self-reported prevalence of birth defects among women of reproductive age in selected rural communities in Oyo State, Nigeria.

Methods

Study sites, design and settings:

This is a community based cross-sectional study carried out among women of reproductive age in Itesiwaju Local Government Area (LGA) in Oyo State of Nigeria. The LGA is a rural community with a population of 162,268. It is a multi- ethnic community majorly populated by Yoruba speaking tribe. The community is agrarian with a minority of the population engaged in the civil service. The LGA has 10 wards with 15 public primary health facilities, one private health care facility and one secondary health care facility. The secondary and private health facilities had a physician each, while only one physician was in charge of the 15 primary health centres in the LGA.

Study population, sample size and sampling technique:

All the women of reproductive age (15-49 years) who have ever given birth were enrolled to the study. Sample size of 269 was calculated using Leslie Kish formula, [$n=(Z^2pq)/e^2$], in which P is the prevalence of awareness of birth defects (26%), based on the report of Lawal et al[11]; Z is the level of significance set at1.96 and e is the precision of the study (5%).

Multi-stage sampling method was used to select respondents for the study. In the first stage, six wards from the list of 10 wards in the LGA were selected by balloting. In the second stage, one community each was selected by balloting from the list of all the communities in each of the selected wards. Proportionate allocation of the minimum sample size was done to allocate sample size to each of the communities. In the third stage, in each of the community selected, the first house was selected by following the direction of a spun bottle. One (1) household was selected in each house by balloting. In each of the households selected, one eligible woman was selected by balloting, and that woman was recruited into the study.

Data collection and management

An adapted and validated semi-structured questionnaire[8][11] was used to collect data on respondents' demographic characteristics, causes of birth defects and risk factors for birth defects such as smoking during, and before pregnancy, diabetes mellitus, obesity, self-medication, advanced maternal age (>40 years). Information on the use of traditional medications during pregnancy, maternal infection, cigarette smoking and alcohol consumption during pregnancy, data on the knowledge of preventive measures such as use of iodized salt, regular routine medical check-up, prevention of infection and use of folic acid were collected. In addition to these, data on likely preventive/early diagnostic measures such as regular intake of folic acid, attendance of ANC, and conduct of laboratory investigations were also collected.

Frequencies distribution of demographic variables and the proportion of the respondents who were aware of birth defects were constructed. Knowledge of risk factors was assessed, with the aid of ten questions, on the scale of ten points, in which correct answer was awarded one point and incorrect answer was awarded zero point. A score of 0 - 4 was categorized as poor and 5 - 10 as good

knowledge based on previous studies [8]. Prevalence of birth defects was estimated by self-report of birth defects among the participants. Age was categorised into 15 - 24 years and 25 - 49 years; educational status into formal (quranic, primary, secondary and tertiary) and informal (none); parity into low (1-4) and high (5-9); occupation into formal (civil servants) and informal (traders, farmers, artisan workers, stay-home/home-makers);and marital status into married and not married (single, divorced, separated, cohabitation).The relationship between awareness of birth defects, and socio-demographic characteristics was determined with Chi square and logistic regression at 5% level of significance.

Ethical consideration: Ethical approval was obtained from ethical review committee of Oyo State Ministry of Health, Ibadan, Nigeria, with approval number AD/13/479/375. Confidentiality of respondents was assured and written informed consent received from all women that participated before the interview.

Results

Six hundred and fourteen women participated in the study out of the 657 recruited giving a response rate of 93.5%. The age of the respondents was 34.8 ±7.7years. Majority (531, 86.5%) had primary education and were married (526, 85.7) while 248(40.4%) were traders and 442 (72.0%) had parity that ranged between 2 and 4 (Table 1).

Majority, (530, 86.3%), of the women were aware of birth defects. Some of the sources of awareness were friends (236, 44.5%); the mass media (136, 25.7%); health workers (180, 37.7%) and internet (64, 12.1%) [Figure 1].

Majority of respondents have seen children with birth defects before. However, about half of such children seen were children of neighbours (305, 49.7%); family members (49, 8.0%); friends (39, 6.4%); and respondents (4, 0.8%).

Respondents ascribed reported incidence of birth defects to self-medication during pregnancy (439, 71.5%); supernatural factors (313, 51.0%); eating of inappropriate food during pregnancy (299, 48.7%); contact with cases of birth defects (180, 29.3%); in born error (160, 25.1%); sexual promiscuity (147, 23.9%); and multiple deliveries (104, 16.9%).

Although over three quarter (477, 80.6%) of respondents had good knowledge score on risk factors for birth defects, only 92 (15.6%) knew all of the risk factors while 21 (3.6%) did not know any. Some risk factors were assessed and the proportion of respondents who answered correctly is as follows: use of unprescribed teratogenic drugs during pregnancy (507, 82.6%); smoking during pregnancy (423, 74.1%); and alcohol consumption (415, 72.7%) [Table 2].

Respondents believed that birth defects are preventable with the following strategies; use of iodized salt (242, 57.5%); regular check-up (383, 91.0%); folic acid supplementation (67, 16.5%); prevention of HIV (30, 8.5%); and prevention of syphilis (3, 0.8%).

Respondents that have ever smoked and smoked during pregnancy were 34 (5.5%) and 7 (1.1%) respectively; 1 - 3 sticks were smoked during last pregnancy. Consumption of alcohol before and during pregnancy was reported in 86 (14.0%) and 33 (5.4%) respectively. Exposure to other risk factors is as shown below in Table 3. Respondents also engaged in some preventive measures such as intake of folic acid before pregnancy (362, 66.2%) and daily during pregnancy (437, 82.9%). About 546 (88.9%) attended ANC regularly, although only 79 (12.9%) received counselling before pregnancy and 11 (1.8%) commenced ANC during third trimester (Table 3).

Respondents receiving counselling was significantly associated with good knowledge of risk factors for BD (X^2=9.99, p=0.01). Regular attendance of ANC was significantly associated with awareness of BD (X^2=48.95, p=0.01) and good knowledge of risk factors (X^2=112.49, p=0.001). Use of folic acid before pregnancy was significantly associated with awareness of BD (X^2=10.36, p=0.01) and good knowledge of BD (X^2=26.99, p=0.01). Intake of alcohol during pregnancy was statistically significantly associated with low knowledge of risk factors for BD (X^2=3.96, p=0.04). However, smoking during pregnancy was not statistically significantly associated with knowledge of risk factors of birth defects.

Level of awareness was significantly higher among respondents aged 25 - 49 years (X^2 =48.95, p=0.01), those who had formal education (X^2 =5.31, p=0.02), engaged in formal employment (X^2 =17.75, p=0.01), those who attended ANC regularly (X^2 =50.17, p=0.01) and were in a marriage union (X^2 =5.78, p=0.02). However, logistic regression analysis revealed that regular attendance of ANC (aOR=3.38, 1.56 – 7.34, p=0.01), occupation (aOR=2.38, CI=1.06 – 5.26, p=0.03) and marital status (aOR=2.17, CI=1.12 – 4.17, p=0.02) were the predictors of awareness of birth defects (Table 4).

Table 1: Demographic Characteristics of Respondents (n=614)

Variable	Frequency (%)
Age (Years)	
15 - 24	171 (27.9)
30 - 44	363 (59.1)
45 - 49	80 (13.0)
Education	
No formal education	55 (9.0)
Quranic/Primary	163 (26.5)
Secondary	243 (39.6)
Tertiary	153 (24.9)
Religion	
Christianity	216 (35.2)
Islam	389 (63.3)
Traditional religion	9 (1.5)
Marital Status	
Single	48 (7.8)
Married	526 (85.7)
Others	40 (6.5)
Occupation	
Artisan	71 (11.6)
Civil servants	179 (29.2)
Farmers	50 (8.1)
Homemakers	61 (9.9)
Traders	246 (40.1)
Unemployed	7 (1.1)
Parity	
1	63 (10.3)
2 - 4	442 (72.0)
≥5	109 (17.7)

Table 2: Knowledge of respondents on risk factors of birth defects (n=571)*

*Variable	Frequency (%)
Smoking during pregnancy	423 (74.1)
Alcohol consumption	415 (72.7)
Lack of certain vitamin during pregnancy	412 (72.2)
Some infection in a pregnant woman	398 (69.7)
Contact with toxic materials	368 (64.5)
Concoction use during pregnancy	347 (60.8)
Smoking before pregnancy	325 (56.9)
Advanced age of mother (>40 years)	207 (36.3)
Diabetes mellitus	183 (32.0)
Obesity	104 (18.2)

* Multiple responses reported

Table 3: Exposure to some risk factors to BD and Preventive practices

Variable	Frequency (%)
Number of cigarette sticks taken per day during pregnancy	
1	2 (28.6)
2	4 (57.1)
3	1 (14.3)
Quantity of alcohol consumption (in bottles of 33cl) per day during pregnancy	
1	17 (47.2)
2	9 (25.0)
3 - 5	10 (27.8)
Number of times ultrasound scanning was done during pregnancy	
1	208 (38.7)
2	163 (30.3)
3	95 (17.7)
≥4	72 (13.3)
Gestational age at 1st ANC visit	
First Trimester	165 (30.2)
Second Trimester	370 (67.8)
Third Trimester	11 (2.0)

Table 4: Factors associated with awareness of birth defects (n=614)

Variable	Aware (%)	Not aware (%)	OR (95% CI)	aOR (95% CI)
Age				
15 - 24 years	50 (74.6)	17 (25.4)	2.31 (1.22 - 4.31)	1.67(0.88 - 3.61)
25 - 49 years	480 (87.7)	67 (12.3)		
Educational Status				
Formal	470 (88.5)	61 (11.5)	2.11 (1.10 - 4.22)	1.24 (0.48 - 2.77)
Informal	60 (72.3)	23 (27.7)		
Occupation*				
Formal	171 (95.5)	8 (4.5)	4.48 (2.08 - 9.51)	2.38 (1.06 - 5.26)
Informal	354 (82.7)	74(17.3)		
Marital status				
Married	462 (87.8)	64 (12.2)	2.09 (1.22 - 3.79)	2.2 (1.1 - 4.2)
Not married	68 (77.3)	20 (22.7)		
Regular attendance of ANC				
Yes	490 (89.7)	56 (10.3	2.29 (1.42 - 3.81)	3.38 (1.56 - 7.34)
No	40 (58.8)	28 (42.2)		

*(N=607)

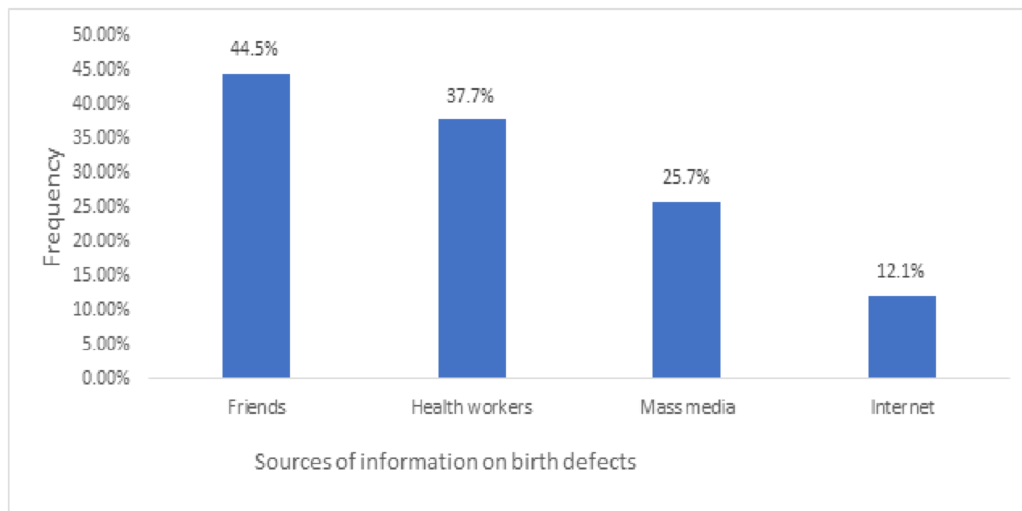

Figure 1: Sources of Information on Birth Defects

Discussion

Self-reported prevalence rate of birth defects among respondents is an indirect way of estimating the burden of birth defects in the population. Findings in this study suggest that the prevalence of birth defects was low among women in the community. Our finding is similar to 0.7% reported in a study conducted in the North-western Nigeria [12] but less than 6.3% in another hospital-based study conducted in University College Hospital (UCH), Ibadan Nigeria [13]. The difference in the reported prevalence of birth defects of our study and that of Ibadan may be due to prenatal screening conducted to include early abortion in their study and UCH being a referral centre. The prevalence may also be low in this study because of low reportage in the community due to stigmatization of birth defects. This observation was reported by Oginni and colleagues in an earlier study. The reported causes of BD in this study are also in agreement with that reported in other studies among pregnant women in Ghana by Bello et al [8]. However, while in this study majority that were aware of BD also had good knowledge of BD risk factors, Lawal et al in Ibadan had a contrary finding. The higher level of knowledge of BD in this study can be explained by availability of more information about BD and other health related conditions at the time this study was conducted, compared to the previous study [11]. Knowledge of respondents on specific risk factors was explored in this study and majority identified the following as risk factors for BD: use of alcohol, cigarette, concoction, and unprescribed drugs during pregnancy. Moreover, use of unprescribed drugs during pregnancy is the most common risk

factor identified. These were in agreement with previous studies [8, 14]. For instance, alcohol consumption and smoking during pregnancy had been shown to be significantly associated with BD [15–17]. However, majority of the sampled population did not use alcohol or smoked cigarette during pregnancy. This is consistent with 5.5% reported among pregnant women in a study conducted in Sweden [18] and at variance to 53% report in another study in United Kingdom [19]. The low prevalence we got may be because our participants had good knowledge of dangers involved or our culture that proscribe such habit for women. Although, prevalence of smoking and alcohol intake among women was low in our society in Nigeria, however, adoption of Western lifestyles is changing the pattern. The current prevalence of alcohol consumption and cigarette smoking among women in Nigeria is said to be around 9.5% and 7.1% respectively [20, 21]. In this study, 5.5% and 1.1% of women smoked before and during pregnancy respectively while 14.0% and 5.4% of women consumed alcohol before and during pregnancy respectively. These are high enough to stimulate intervention by Government, community and individuals to reverse the trend since alcohol had been proven to cause harm to foetus in the earliest weeks of gestation, that is, before some women discover they are pregnant and stop taking alcohol [22].

Majority of the respondents knew maternal infection as a risk factor for BD. This is higher than 42.1% reported in a study in Kenya among mothers [23]. Many studies have shown maternal infections could be injurious to foetuses. For instance, Rubella, Syphilis, Zika and Cytomegalovirus had been demonstrated to be responsible for various forms of malformations in USA [24–27]. Although majority of participants in this study identified maternal infection as a risk factor, most of them did not know specific infections responsible for BD. This is of concern because they might not be able to prevent themselves from contracting these diseases, some of which are preventable and treatable [28–30].

Less than half of the respondents knew advanced maternal age as a risk factor. This is in consistence with 42.3% reported in a study conducted in Brazil among women [31]. However, it is in contrast to the findings of Masoumeh and colleagues [14] in their study among Iranian women who visited prenatal clinic in Rasht, northern Iran, where all participants identified advanced maternal age as a risk factor. Advanced maternal age had been well documented to be a risk factor for Down syndrome and other structural birth defects [32]. Attention is currently being focused on paternal age as studies have shown that it is associated with BD [33, 34]. These findings indicate a need for establishment of pre-conceptional counselling at our health care facilities through which women and men can be properly guided in order to reduce the incidence of BD. This is substantiated by the fact that the practice of receiving pre-pregnancy counselling was poor among the study participants; only about 10% received such service before pregnancy.

Only a third of the sampled population identified diabetes mellitus as a risk factor. This demonstrated a knowledge gap among respondents in this study as many studies have shown that maternal diabetes mellitus is significantly associated with BD [35, 36]. Malformations due to diabetes mellitus occur before 7th week of the pregnancy and incidence of BD among children of diabetic mothers could be reduced if the disease is controlled before and through pregnancy [37]. These emphasise the need for pre-conceptional counselling and screening for diabetes mellitus among women who wish to get pregnant. Obesity was recognised as a risk factor by only a few of the participants. This is comparable to 23.3% reported by Masoumeh and colleagues [14] and in contrast to 66.1% found in a study conducted in Italy [38]. This is another knowledge gap that should be dealt with because obesity is a known predictor of birth defects and is on the increase in Nigeria and other countries of the world [39, 40].

More than half of respondents identified iodized salt as a means of preventing BD. Intake of iodized salt during pregnancy had been shown to reduce incidence of congenital hypothyroidism and birth defects [2, 41]. Majority of the respondents indicated regular check-ups as a means of preventing BD, which is similar to findings in a study conducted among pregnant women in Ethiopia[23]. Most women in this study attended ANC regularly, which is good as regular check-up aids early diagnosis and prompt treatment of complication during pregnancy. The importance of regular check-up is elucidated by the findings in this study, which show that regular attendance of ANC was found to be significantly associated with awareness of BD, daily use of folic acid and good knowledge of risk factors. Although majority attended ANC regularly, only about a third (30.2%) attended ANC for the first time during first trimester, which is less than 53.1% reported among mothers of neonates admitted in a teaching hospital in Pakistan[42]. This is a window during which early detection of complication could be missed.

Intake of alcohol during pregnancy was significantly associated with lower knowledge of risk factors of BD while smoking was not. This is may be due to relatively lower number of participants that smoked during pregnancy, which is similar to findings reported in another study [43].

Limitation of Study

As events of birth defects is associated with stigma in the communities, the reported low level of prevalence of birth defects in this study may not be a correct reflection of the magnitude of the condition in the study community. Although leading questions were avoided, however, it was impossible to ascertain or disapprove claims made by respondents. We adhered to ethical rule of anonymity and confidentiality.

Conclusion

Most of the women were aware of birth defects and its risk factors. Although prevalence of birth defects we got was small, persistence of misconceptions about causes could encourage discrimination and stigmatization. These call for awareness efforts of health workers and government targeted at women.

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