



## PREVALENCE OF ANAEMIA AMONG PREGNANT WOMEN IN NORTHERN NIGERIA

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Article Received on 20/06/2017

Article Revised on 10/07/2017

Article Accepted on 31/07/2017

### ABSTRACT

**Background:** Anaemia is an important public health concern in developing countries, particularly in pregnant women. It may complicate pregnancy, sometimes resulting in terrible outcomes. There is a lack of information on the magnitude of anemia among pregnant women in northern Nigeria. **Objectives:** The aim of this study is to determine the prevalence of anaemia among pregnant women attending antenatal care at health facility in northern Nigeria. **Design:** A facility-based cross-sectional study, **Setting:** The survey was conducted in four northern Nigerian states namely: Jigawa, Katsina, Zamfara and Yobe States. The state has a total of 667 health facilities with primary, secondary and tertiary levels of care. **Participant:** Involving 1536 pregnant women, was conducted from May to June 2013. Hemoglobin was measured using a HemoCue device. **Result:** Overall, prevalence of anemia was 70.9%, of which Yobe State (88.8%) followed by Jigawa State (71.1%), then Zamfara state (62.2%) and Katsina (61.4%). The degree of anaemia cases ranged from mild to severe forms. **Conclusion:** This study showed an alarming prevalence of anaemia among the pregnant women. Routine testing of pregnant women for anaemia and creating awareness on factors predisposing to anemia is recommended.

**KEYWORDS:** Prevalence, Anaemia, Pregnant, Northern Nigeria.

### INTRODUCTION

Pregnancy is a natural process, however it has been associated with numerous risks that often threaten the lives of women. Anaemia in pregnancy is a condition characterised by reduction in circulating haemoglobin mass below the critical level, and remains one of the most intractable public health problems in developing countries. It is estimated that anaemia may account for up to 20% of all maternal deaths in sub-Saharan Africa.<sup>[1]</sup>

Anaemia is associated with increased rates of maternal and perinatal mortality and preterm delivery, low birth weight, and other adverse outcomes.<sup>[2-4]</sup> The criteria for determining the presence of anaemia, as recommended by the World Health Organization (WHO), are based on haemoglobin cut-off values for age and sex.<sup>[5]</sup>

Anaemia ranges from mild, moderate to severe and the WHO pegs the haemoglobin level for each of these types of anaemia in pregnancy at 10.0 – 10.9g/dl (mild anaemia) 7 – 9.9g/dl (moderate anaemia) and < 7g/dl (severe anaemia) (Idowu, 2007). Women with mild or moderate anaemia have (substantial) reduction in work capacity and may find it difficult to cope with household chores and child-care. Moderate anaemia is more

associated with premature birth to babies with low birth weight and perinatal mortality is higher in these babies. Severe anaemia is associated with circulatory failure with raised cardiac output even at rest and maternal and foetal deaths are most common.<sup>[6]</sup>

Causes of anaemia in pregnancy have been classified as either physiological or acquired. Physiological causes of anaemia are related to disproportionate increase of plasma volume during pregnancy leading to apparent reduction of red blood cells, haemoglobin and haematocrit value. Acquired causes may be nutritional or due to bleeding. Anaemia arising from nutritional deficiency is often due to inadequacy of such nutritional elements as iron, or folic acid or both. Anaemia due to blood loss may arise due to acute blood loss or as a result of chronic bleeding which may be due to hookworm or bleeding pile. Malaria is also known to contribute to causing anaemia during pregnancy.<sup>[7]</sup>

Iron and folate deficiency is the commonest cause of anaemia in pregnancy.<sup>[8]</sup> However some risk factors are clearly identified in literature as predisposing pregnant women to anaemia globally. These include socio-

demographic factors, obstetrical factors, behavioural factors, and medical conditions.<sup>[9]</sup>

In West Africa, Iron and folate deficiency is one of the multiple causes of anaemia in pregnancy and about 90% of all anaemia cases have an iron deficiency component. Iron deficiency anaemia is the most common nutritional disorder seen all over the world<sup>[10,11]</sup> and highly prevalent in women in developing countries. According to a recent study, IFA supplements were also known to reduce the risk of neonatal mortality.<sup>[12]</sup>

In Nigeria for example, the prevalence of anaemia in women is high at 62.7% and about 6500 Nigerian mothers are estimated to die annually because they are anaemic. Despite its known effect on the population, there is very little data available in the study area. Therefore, the objective of this study is to determining the prevalence of anemia in pregnant women in the Northern Nigeria.

### MATERIALS AND METHODS

The survey was conducted in four northern Nigerian states namely: Jigawa, Katsina, Zamfara and Yobe States. Jigawa state has an estimated population of 5,162,340 spread across 287 wards in 27 LGAs. The state has a total of 667 health facilities with primary, secondary and tertiary levels of care. About 5% of its total estimated population is pregnant women. Healthcare in Jigawa state receives tremendous support from the government and development partners. Katsina state is the most populated of the four selected states (estimated at 6,916,641 in 2012). There are 365 wards and 34 LGAs in the state. Healthcare in Katsina states requires significant attention as it has suffered severe infrastructural decay due to neglect. The adult populations are mostly farmers. Yobe is a relatively small state with an estimated 2012 population of 2,853,828 spread across 178 wards in 17 LGAs. Zamfara has a population of 3,937,996. Zamfara state has very low ANC attendance rate.

A cross-sectional study was conducted to determine the prevalence of anaemia in the selected northern state. The target populations involved in this study were pregnant women attending ANC in health facilities.

The target populations involved in this study were multiple. The primary target group was (post-partum) women who gave birth in the preceding year of the survey. Other populations included in the survey were pregnant women attending ANC in health facilities, health service providers who care for children, Local Government and state health personnel (mainly MNCH coordinators) and influential community members and opinion leaders.

In determining the sample size for the Study, the computation was made with the following parameters: 95% confidence interval ( $Z=1.96$ ), 80% power ( $Z=0.85$ ),

2.0g/dl expected standard deviation ( $s$ ) for haemoglobin, 0.3 g/dl expected improvement ( $d$ ) in hemoglobin after iron supplementation and 10% non-response rate.

$$n = \left[ \left( \frac{\sigma}{d} \right)^2 (Z + Z_{\beta})^2 \right] + 0.25 [Z]^2$$

$$n = \left[ \left( \frac{2.0}{0.30} \right)^2 (1.96 + 0.84)^2 \right] + 0.25 [1.96]^2 = 384$$

For each state therefore, 384 respondents were calculated making a sample size of 1536 across the five states.

A list of all the public primary health facilities in the respective state was retrieved from the state primary health care board. The facilities were grouped according to their LGAs.

A multi-stage sampling method was employed in selecting Local Government Areas for the study. First, all Local Government Areas in the states were grouped on the basis of the senatorial districts. Local Government Areas were further categorized into urban and rural. The final stage involved a random selection of urban and rural Local Government Area from each of the senatorial districts. The total numbers of Local Government Areas selected were determined on state-by-state bases.

In order to select health facilities for the survey, sampling frames, which consisted of all Health facilities providing ANC services ordered by location status (urban and rural) were developed for each state. In developing the frames, priority was given to Primary Health Care (PHC) facilities. Facilities that did not report ANC services statistics in 2012 were excluded from the sampling frame. A systematic sampling of Facilities was done from the list.

Blood hemoglobin concentration was measured using a HemoCue device, a precalibrated instrument designed for the measurement of hemoglobin concentration. Venous blood was drawn, through microcuvettes, and inserted into the Hemo Cue and the result was recorded.

**Survey tool:** The quantitative component of the survey employed a modular questionnaire for data collection from the target respondents. Separate modules were developed for post-partum women in households, pregnant women presenting at facilities for ANC, facility based health care providers as well as State and Local Government Area MNCH Coordinators. All questionnaires were first drafted in English and then translated into Hausa languages using back-to-back translation before careful pretesting. Changes were made to all questionnaires following the pre-testing exercise as necessary. This was to improve understanding of interpretation of the data items. Pretesting of survey tools was done in sites not selected for the survey.

- **Household survey (Main survey):** This was done among women who gave birth to children in the preceding year of the survey. This component determined the utilization, barrier and adherence to IFAS.
- **Biomedical survey:** This was carried out among pregnant women attending ANC to determine their hemoglobin concentration using Hemo Cue device.
- **Facility-based survey:** This component of the survey assessed knowledge and competences (including training received) of healthcare workers in the management of anemia using.
- **State and LGA health personnel survey:** This component of the survey assessed the availability and the distribution IFA supplementation in the state and Local Government areas.

#### Survey team selection and training

The survey team for the quantitative component of the survey consisted of two categories of personnel - supervisors and enumerators; selected from the states where the survey was carried out. This was based on the assumption that using personnel who are already conversant with the states in terms of understanding of the geography and culture of the respective states would help to minimize barriers due to language, and other state specific peculiarities. This was hoped to improve the process of data collection and quality of data. Up to 80% of enumerators who conducted household survey were women. This was also an attempt to improve access to women. National and state level consultants were engaged in the development of the protocol and tools for the survey. State level consultants were involved in coordinating data collection in all the Local Government Areas involved in the survey.

#### Data collection process

Household survey questionnaires were interviewer administered. Trained interviewers (enumerators) were directly involved in administering questions to eligible respondents in local languages. The major languages of administration were Hausa, Fulani and Kanuri.

#### Measuring anaemia in pregnant women

In this survey, a standardized method of measuring anaemia using Heamocue301, certified laboratory technicians (one per state) were employed by the investigators to test blood samples collected from pregnant women presenting at the health facilities after their consents were given. A total of 2054 pregnant women were tested for anaemia while taking into consideration and assuring the quality of information collected from the respondents. Results of tests were recorded in the portion provided in the questionnaire immediately after the test.

#### Qualitative Study

The qualitative component of the survey comprised of Focus Group Discussions (FGDs). It assessed the barriers and other factors affecting utilization of IFA supplementation in iron deficiency anaemia management from health care providers and community perspectives. Female focus group discussion facilitators and note-takers were trained to conduct a total of 19 FGD sessions that involved different categories of informants. FGD guides were developed and pre-tested for the different categories. Pretesting was conducted in sites other than those selected for the survey. The guides were further refined and improved upon, as necessary. FGD sessions were held for post partum women attending ANC, women not attending ANC, health workers, including Local Government MNCH coordinators and influential community members and opinion leaders. All questionnaires were checked by supervisors prior to leaving each community, to ensure that they were completed correctly, completed questionnaire data were then entered into SPSS version 16 and was used to carry out the analysis of the data.

Data entry was decentralized to three locations (Markurdi, Dutse and Katsina) and commenced as soon as data collection commenced. A total of 10 data entry clerks were trained to enter the survey data at the respective data entry centres. State consultants supervised data entry with the survey statistician providing overall guidance for the entire data management process. Data entered at the three locations were subsequently merged, cleaned and analysed. Descriptive data analysis focused on generating frequencies and proportions that provided answers to populate the baseline data for the M&E framework of the ZIFAS Project. Tables and charts are used to present quantitative findings of the survey.

#### Qualitative Analysis

Qualitative results of the survey served the primary purpose of complimenting the findings of the quantitative component by providing the context and explanations for the quantitative results. It dwells mainly on the subjective experiences of participants and views the phenomena of interest from the perspective of the participants. Using FGD, information on the barriers and facilitating factors that affect utilization of prenatal iron supplementation were collected. FGD sessions were conducted for 5 groups of participants. These included; post partum women (woman who gave birth to a child below one year ago), pregnant women attending ANC, pregnant women not attending ANC, MNCH coordinators and health care providers as well as influential community members and opinion leaders. The number of FGD sessions conducted per state is presented in table 2. Katsina and Yobe states conducted 4 sessions of FGD each. Highest number of FGD sessions was conducted by Jigawa state. Zamfara State conducted 5 FGD sessions.

**Table 1: FGD sessions per state.**

S/No	State	Number of FGD sessions
1	Jigawa	6
2	Katsina	4
3	Yobe	4
4	Zamfara	5
	Total	19

Relevant information was synthesized from the qualitative data collected using thematic analysis. This was done based on facilitator notes, transcripts of audio-recordings, and recalls. Transcribed verbatim data were coded by two analysts to identify emerging patterns or themes according to the following process: close reading and interpretation of participants' narratives, reflecting on the study purpose, and using memos to keep track of ideas. Subsequently, significant statements were assigned codes and re-coded iteratively into categories. Emerging themes from the perspective of participants were integrated into respective domains. The concurrence and frequency of themes were noted, and illustrative quotes

were extracted to capture the essential comments (words, phrases, quotes).

### Ethical Considerations and Approvals

Ethical approval for the study was obtained from the relevant research ethical committee in the respective states. Investigators were also granted permission to carry out the survey by the state and Local Government Areas Head of health department/Chief Medical Officers of health facilities. Signed informed consents were obtained from all respondents and participation was voluntary. Data collections were done with considerations for protecting the privacy and confidentiality of survey participants.

### RESULTS

In all the states surveyed recorded high prevalence of anaemia, the highest prevalence of anaemia in pregnant women was reported in Yobe State (88.8%) followed by Jigawa State (71.1%), then Zamfara state (62.2%) and Katsina (61.4%). Table 1 also shows that degree of anaemia cases ranged from mild to severe forms.

**Table 2: Prevalence of Anaemia in pregnancy in focus states**

Indicator	States (%)			
	Jigawa	Katsina	Yobe	Zamfara
Proportion of pregnant women who are anaemic	71.1	61.4	88.8	62.2
Mild	53.8	49.2	50.4	50.3
Moderate	15.5	11.2	36.3	10.7
Severe	1.8	1.0	1.8	1.2

Pregnant women who participated in the FGD sessions were asked about their understanding of what anaemia is, the symptoms and the possible causes as well as implication for the mother and her baby. Most participants agreed that anaemia in pregnancy is a condition that is associated with insufficient blood in the body of a pregnant woman. Participants generally considered anaemia to be a common problem of pregnant women in their environments. The understanding of the symptoms however differs among pregnant women. Some participants believe that anaemia is the cause of leg swelling (oedema) that some pregnant women experience in the course of their pregnancy. A pregnant woman described symptoms of anaemia by saying: *"Someone who has anaemia shows by having oedema of the legs/feet in-fact her whole body swells with water. The face is also swollen with the eyes also (oedema of the eyes). Oedema of the feet and face."*

Other women associated such symptoms as weakness, excessive sweating, fever and loss of appetite with anaemia.

Women also have divergent views about the causes of anaemia. However there was a general agreement among majority of the participants that nutrition plays important roles in the causation of anaemia. A participant stated:

*"anaemia results from lack of taking balance diet, you know when you are pregnant, vomiting prevents women from taking food..."* another participant added: *"Like at the early stage of the pregnancy because she cannot take sufficient food due to vomiting and weakness of the body"*.

Another participant gave further explanation:

*"Lack of appropriate foods that give blood in the body. When pregnant women do not take the drugs that support the production of blood in the body, this can lead to anaemia"*.

Participants also alluded to economic impact on women's ability to feed well during pregnancy. They believe that even when women have sufficient appetite, eating the right food that could support their blood system might still be elusive as they might not be able to afford them. A participant captured this view succinctly by stating, *"Some women don't eat balanced diet because of insufficient funds to buy leaves, fruits and food that build up the body to make a pregnant woman strong"*.

Other participants identified malaria in pregnancy due to mosquito bite as cause of anaemia in pregnancy. This was the view of a participant when she explained:

“When mosquitoes bite a pregnant woman, this leads to fever and this can cause anaemia because this can reduce blood in the body.”

Participants also expressed some misconceptions about the cause of anaemia. A participant believed that: “Because the pregnant woman shares here blood with her unborn child, this leads to anaemia because the two of them are sharing the same quantity of blood of the mother/pregnant woman “

However, all participants agreed that anaemia poses great dangers to both the mother and the unborn baby. Participants expressed this view in various ways.

A participant said: “the baby in the womb will not be well/ok because it will not have enough blood for its own development”. Another participant was more explicit in explaining that: “it is the blood that gives strength to any body to function, so if the mother suffers from insufficient blood, she cannot be well, she cannot feed well and the baby will not be well. She could even die from lack of blood.”

**Table 3: Number of times postpartum women attended ANC during their last Pregnancy**

Indicator	Jigawa (N: 326)	Katsina (N: 309)	Yobe (N: 322)	Zamfara (N: 401)	MI States Average
Did not Attend	1 (0.3%)	2 (0.3%)	16 (5%)	1 (0.3%)	1.5
Once	8 (2.5%)	27 (8.7%)	25 (7.8%)	138 (34.5%)	13.4
Twice	20 (6.1%)	11 (3.6%)	29 (9%)	28 (7%)	6.4
Thrice	44 (13.5%)	47 (15.2%)	50 (15.5%)	39 (9.8%)	13.5
Four or more times	253 (77.6%)	222 (71.8%)	202 (62.7%)	194 (48.5%)	65.2

Table 5 illustrates the number of ANC visit that was made by postpartum women who gave birth in the preceding year of the survey. The highest proportional average (65.2%) was reported among women who made four or more antenatal visit to health facilities followed

by those who made at least three visits (13.5%). Very low proportion (1.5%) did not attend ANC at all while 13.4% made only one visit throughout their last pregnancy.

**Table 4: Proportion of Pregnant women attending ANC within the first three months of Pregnancy**

Indicator	States n (%)				MI State Average (%)
	Jigawa (N: 325)	Katsina (N: 307)	Yobe (N: 306)	Zamfara (N: 384)	
Proportion of pregnant visited in their first trimester	316 (96.9%)	288 (93.2%)	296 (91.9%)	298 (74.5%)	89.1

Among the post partum women who were interviewed during this survey in the MI targeted states and comparison state respectively, 89.1% and 91.9% started attending ANC in their first trimester of pregnancy.

Pregnant women were generally aware of the importance of iron and folic acid supplementation in preventing anaemia. This awareness was not limited to pregnant women who attend ANC alone, as participants who attend FGD sessions for pregnant women who do not attend ANC were also able to explain the benefits of IFA supplementation. Participants believed that IFAS in pregnancy help women to build their blood level which they believe is necessary to maintain healthy pregnancy and delivery experience.

Participants stated that IFAS:

“gives more blood and you will be healthy” and “is good for safe delivery”. They added, “pregnant women will no longer suffer from insufficient blood”. Benefits of IFAS in pregnancy was described in a more colloquial way by a participant who said:

“it helps both the pregnant woman and her unborn child. It helps you to retain your health, your body remains

supple and fresh, and when you give birth, the baby is also healthy and its body looks “fresh”.

Participants agreed that every pregnant woman need to take IFAS each time they are pregnant even if they feed well.

It was particularly interesting to observe that despite the high levels of awareness about the benefit of attending ANC and indeed that of taking IFA during pregnancy, utilization of IFAS was not as high. It does appear that neither ANC attendance nor awareness about IFA translates to IFA utilization.

#### Knowledge and Skills of Health Personnel on IFAS

Figure 1 shows the proportion of front line workers who know how to check on IFAS utilization. Katsina had the highest percentage (80%), followed by (43%) in Jigawa of frontline workers reported being knowledgeable on how to check on IFA utilization by pregnant women. Very low proportion in Yobe and Zamfara (13% and 0%) respectively and 2.5% in the comparison state know how to check for IFA utilization.

## DISCUSSION

The findings of this survey, while providing a firm reference for process and performance measurement benchmark, they also provide good information for intervention planning and design. First, the survey findings agree with existing data that suggest that anaemia is challenge among pregnant women in Nigeria. This survey showed that on the average over 70% of pregnant women from all the states surveyed were anaemic with degree of anaemia ranging from mild to severe, a prevalence slightly lower (62.7%) was reported by MI Nigeria. It is important to observe that the majority of pregnant women who were found to be anaemic in this survey had mild to moderate anaemia. These degrees of anaemia are very amenable to iron and folic acid supplementation and good nutrition. This underscores the importance of interventions that focus on strengthening Iron and Folic Acid Supplementation (IFAS) in the surveyed states.

Currently, awareness is high among most pregnant women about the benefits of attending ANC and that of taking IFAS during pregnancy in all the states. This potentially serves as springboard for interventions to strengthening iron and folic acid supplementation in the target states. However, there is still adequate room for improvement on the percentage (43.5%) of pregnant women making at least four ANC visits to health facilities when compared with NDHS (2008) with 44.8% and MICS (2011) where 35.7% and 32.9% in northeastern and northwestern part of Nigeria was reported. The high awareness of the benefits of ANC therefore has little or no impact on the number of ANC visit made in these regions of Nigeria. Reports from MICS Nigeria further stressed that lowest ANC is found in the North West followed by North East.

However, this survey shows a somewhat different finding on percentage of frontline workers who know how to check on IFA utilization. This proportion is low and indeed extremely low for such states as Zamfara. Even in Katsina and Jigawa where about 42.9% of frontline health workers are able to check on IFA utilization, these proportions does not portray any positive progress toward addressing the high burden of anaemia among pregnant women and it associated risks.

Although the proportion of women who consumed adequate amount of IFAS during their last pregnancy cannot be regarded as high enough (Jigawa 46%, Katsina 3%, Yobe 33% and Zamfara 11%), nonetheless, the value for Yobe and Zamfara are comparable to the findings of the 2008 NDHS report (Yobe 37.4% and Zamfara 10.1%). The findings from Jigawa and Katsina are higher and lower (Jigawa 21.8%, Katsina 15.4%) respectively than the 2008 NDHS.

Although the proportion of women who received any number of IFAS across the states was much higher, what is most important is achieving adequate consumption of

the supplements. Gaps exist between awareness about IFAS, ANC attendance and actual utilization (consuming adequate amount of IFA supplement). Barriers to utilization of prenatal iron and folic acid supplementation as identified by respondents and participants in the survey have significant implication for behavior change interventions.

Quality of antenatal care can improve considerably if service providers make reference to approve guidelines. This survey depict that health care providers were either not aware of existing guidelines or they do not have access to them. The implication of this finding is that health care's rely solely on their own experiences, which are prone to obsolescence, thus their care decisions may not be evidence based.

Policy support for healthcare service delivery is one of the strongest sustainability factors in any healthcare system. Appropriate policy can only be put in place when decision makers are aware and educated about pressing health needs of the population. Findings from this survey showed that policy support for antenatal care and indeed IFAS is not strong. It will be important to consider system strengthening interventions that will ensure that policy/decision makers are adequately informed to enable them perform their roles.

## CONCLUSION

Awareness of anaemia among postpartum and pregnant women is high in most of the communities surveyed. Women were observed to know the benefits of utilizing ANC and indeed IFAS during pregnancy, but this did not translate to high utilization of IFAS. The barriers responsible for low IFAS utilization included distance to health facility and preference of local herbs.

## Recommendations

Government should target multi-modal ways of improving iron and folic acid supplementation including the use of nutritional counseling activities, encouraging women to use low cost iron-rich food materials that improve their blood levels.

It is necessary to collaborate with interventions targeted at improving ANC services uptake in the focus state. Improving ANC services utilization is likely to positively affect uptake of IFAS since respondent already identified health facilities as the preferred source of IFA. Targeted BCC should also provide messages that alert pregnant women and community members to the causes, symptoms, risk factors and dangers associated with anaemia in pregnancy. In addition, ZIFAS project should explore the use of existing social system in targeted state such as youth clubs and association, social development activities to reach women and the communities, which can effectively increase awareness among women and community members at large.

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