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■ Original Research Article

Prevalence And Determinants of Undernutrition Among Pregnant Women in Selected Public Hospitals in Ibadan, Nigeria.

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ABSTRACT

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Background: Undernutrition is one of the greatest public health challenges affecting pregnant women in Africa with associated adverse pregnancy outcomes. The aim of this study is to determine the prevalence and identify the associated factors for undernutrition among pregnant women accessing antenatal care in selected public hospital facilities in Ibadan. **Methodology**: A cross-sectional facility-based study was conducted among 1,162 randomly selected pregnant women who attended antenatal clinic in selected public hospitals in Ibadan, Nigeria. A structured questionnaire was used to collect the data. Left mid-upper arm circumference measurement was used to assess the nutritional status of the pregnant women by using an adult non-elastic mid upper arm circumference tape at the mid-point between the tip of the shoulder and the tip of the elbow. Individual minimum dietary diversity for women (MDDW) was determined using the Food and Nutrition Technical Assistance III project. STATA was used for analysis. **Result:** The overall prevalence of undernutrition was 20.0% and a low minimum dietary diversity score was observed in 25.2%. Undernutrition status varies across the level of health care; the primary health care (PHC) had the highest (30.8% and 26.8%), the secondary health care facility was (14.1%) and tertiary health care; (18.7% and 9.9 %). Mother's age 25years and above, Marital status of being married and Parity of para 1-5 had lower odds of being undernourished. However, there was no significant association between MDDW and nutritional status of the respondents. **Conclusion**: This study revealed a relatively high prevalence of undernutrition. Health care providers across the three level of healthcare should make nutritional assessment and counselling an active part of the routine antenatal care.

Keywords: Undernutrition, maternal nutrition, pregnant women, public hospitals

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INTRODUCTION

Undernutrition is one of the greatest global public health challenges affecting both children and adults including pregnant women. Approximately 800 million people are undernourished mostly in low and middle-income countries.[1] Pregnancy itself is an anabolic condition that requires more nutrient intake due to the growing foetus which depends solely on the mother for its growth and development.[2] The nutritional status of a woman before and during pregnancy will affect her ability to withstand the physiological, psychological and physical changes associated with pregnancy. As such, pregnant women require adequate supply of nutrients to ensure favourable pregnancy outcomes. [3,4] Globally, undernutrition is said to contribute to over 3.5 million maternal and nearly half of all under 5years childhood deaths annually.[5,6] Maternal undernutrition is a major risk factor for poor pregnancy outcomes such as obstructed labour, preterm birth and low-birth-weight (LBW) babies.[7] It can also cause long-term irreversible and detrimental cognitive-motor and health impairment in children.[8] Undernutrition during

pregnancy has also been associated with the birth of 13 million intrauterine growth restricted babies annually and 112 million children who are underweight.[9] In addition to this health-related consequences, undernutrition can limit economic growth and entrench poverty both directly, through reduced productivity from workforce and indirectly, through poor cognitive function and learning deficits.[10]

The burden of undernutrition among pregnant women in many communities remain high.[11,13] In Nigeria, the prevalence has been reported as 24.2% in Kano,[14] 17% in Imo[15] and 21.7% in a rural community in Ibadan.[16] In a bid to address this problem, there have been different national nutritional policies and partnerships with international organizations such as the U.S. Agency for international Development (USAID) through their Food and Nutrition Technical Assistance III project. These policies and partnerships aim to build capacity of health care providers and provide technical support in delivery of nutritional services to vulnerable populations such as children and pregnant women.[17]

In view of these efforts and consequences of undernutrition, there is a need to constantly review the burden of this condition among pregnant women with a view to making recommendations to mitigate the negative impact of undernutrition among pregnant women. This study therefore aims to determine the prevalence of undernutrition and its associated factors among pregnant women attending antenatal clinic in the three tiers of health care in Ibadan.

METHODS AND MATERIALS

This study was conducted in Ibadan the capital of Oyo State. It has a population of 3,552,000 and is the country's largest city by geographical area (total area of 3,080 square kilometres, 1,190 sq mi). Ibadan is located in south-western Nigeria on a coordinate of latitude 7.37756 and longitude 3.90591. The city is 128 kilometres inland northeast of Lagos (country's economic capital) and 530 kilometres southwest of Abuja, the federal capital. It is a prominent transit point between the coastal region and the areas in the hinterland of the country. There are eleven (11) Local Governments Areas in Ibadan, consisting of five urban and six semi-urban local governments in the city.

Study Design

This health facility-based cross-sectional analytical study was carried out from January 1st to 30th March, 2022. The targeted population included all pregnant women within the gestational age of 14-26weeks.

Source and Study Population

The study population included all pregnant women attending any of the selected public hospitals for their antenatal care services and whose pregnancy was in the second trimester(14-26weeks).

Eligibility Criteria

Women were invited to participate if they were accessing antenatal care in any of the selected health facilities, with singleton pregnancies, gestational age 14 to 26 weeks and with no pre-existing medical disorder. In addition, they must be permanent residents of Ibadan and not likely to relocate within six months of enrolment in the study.

Sample Size Determination

The sample size was calculated using single population proportion formula using the prevalence of undernutrition among pregnant women and considering the formular and assumptions below;

$$n = \frac{Z^2\, p\, q}{d^2}$$

where; n = the minimum sample size required. Z = the standard normal deviation
P= prevalence of under-nutrition among pregnant women was found to be 44.9% [18]
d= the precision of the estimate to be 0.03.
Adjusting the sample size for 10% non-response rate
N= 1,162

Sampling Technique and Procedure

A purposive sampling technique was used in selecting five health facilities within the city based on their ANC attendance in the preceding six months before the study. Facilities with highest ANC attendance were selected. These facilities included two primary health centres (PHC), one secondary health care (SHC) facility and two tertiary health care facilities (THC). A proportional allocation was done to distribute the sample size across the facilities. Participant recruitment was done using a systematic random sampling technique based on patient flow rate in each clinic by adding all the ANC attendees that were eligible for this study to obtain population (N) and dividing it by the sample size (n) for each clinic to get the interval K. The first participant was selected by lottery method and the subsequent participants were picked based on the interval (K) until the sample size for each clinic was obtained.

Data Collection Tools and Processes

Data were collected using an interviewer administered questionnaire which was prepared in the English language and later translated into Yoruba. The questionnaire collected information such as; socio-demographic, Individual Minimum Dietary Diversity of Women (MDDW), obstetrics and medical characteristics and health seeking behaviours of the respondents.

Minimum Dietary Diversity Tool by 24-Hour Dietary Recall

Individual minimum dietary diversity for women (MDDW) was assessed using the Food and Nutrition Technical Assistance III project (FANTA) tool as stated in the NDHS nutritional guidelines constructed based on data from a 24-hr qualitative dietary recall interview and according to the standard guide-line of Food and Agriculture Organization.[19]

This tool consists of different nutritional food items which are classified into 10 food-groups based on the nutrient they supply. They are as follows: -

1. Grains, roots or tubers
2. Plant protein sources (. Pulses/legumes)
3. Food made from nuts and seeds
4. Dairy products: Milk and milk products
5. Eggs,
6. Meat, poultry or fish.
7. Dark green leafy vegetables,
8. Any fruits and vegetables rich in vitamin A
9. Any other vegetables, like: cabbage, cucumber, fresh tomato, onion,
10. Any other fruits, like: apple, banana, watermelon, tangerine, grapes. Women who ate food made up of five and above classes of food 24hrs before the interview are regarded as normal while those who took less than five are regarded as low.

Anthropometric Measurements

Anthropometric measurement of the pregnant women was done using their Mid Upper Arm Circumference (MUAC). Using MUAC minimises the effect of changes that occur during pregnancy due to fluid accumulation, so making it a better indicator of pre-pregnancy body fat and nutrition in pregnancy.[19] This was done using an adult Mid Upper Arm Circumference tape which is non-elastic on the left arm, at the mid-point between the tip of the shoulder and the tip of the elbow. The MUAC was read to the nearest 0.1cm. Values below 23 cm was an indicator of undernutrition and values equal to or greater than 23 cm was regarded as normal nutritional status. [19,20]

Pretesting

Th questionnaire was pre-tested with five percent of the whole sample size in another primary health centre which is outside the study area for one week before the data collection process commenced. The appropriate working of instruments, and technical performance was tested using quality control samples.

Data collection

Data collection was done by five research assistants with at least a university degree with one of them acting in the supervisory role. All could communicate well in the local language. The data collectors were trained for three days on the objectives and purpose of the study and data collection tools. Simulated interviews, and role play was conducted among the data collectors and the supervisor to guarantee the quality of the field job.

Data processing and analysis procedures

The data were entered with Epi-Data version 3.1 and were cleaned and analysed by STATA for window version 16. Descriptive statistics, frequency with percentages, mean and standard deviation were calculated. Inferential statistical tests such as bivariate and multivariable logistic regression analyses were conducted. Multivariable logistic regression with backward method was used to identify associated factors of undernutrition.

Before running multivariable logistic regression, multi-collinearity between independent variables was checked by Variance Inflation Factors (VIF) and no variable with VIF of > 10 was observed. Variables that had p-value of less than 0.05 in the bivariate logistic regression models were a candidate for multivariable logistic regression. The model fitness for the variables was assessed by the Hosmer-Lemeshow goodness of fit test and produced p-value of 0.983. Those variables with p-value < 0.05 was considered as statistically significantly associated factors in the multivariable analysis.

Ethical Considerations

Ethical approval number UI/EC/21/0600 was obtained from the joint University of Ibadan / University College Hospital Institutional Ethics committee and from both the Hospital Management Board (HMB) and the Primary Health care (PHC) Board Oyo state before the commencement of data collection. Study was conducted in line with the Helsinki code of Conduct. Respondents of the study were informed about the objectives and their voluntary participation was obtained. Privacy and confidentiality of the study participants were ensured and written informed consent was obtained from the study participants. Finally, all under nourished women were referred to the clinicians for further care including nutritional counselling.

RESULTS

Sociodemographic Characteristics of the Respondents

A total of one thousand one hundred and sixty-two (1,162) pregnant women participated in this study across the five health facilities that were used. The two primary health care facilities (Agbongbon PHC and Oranyan PHC) had 34.7% of the respondents, the Secondary health care facility (Jericho Specialist Hospital) had 22.0% while the two tertiary facilities (Adeoyo Maternity Teaching Hospital and University College Hospital) collectively had 43.3% of the study population. The mean age of the participants was 28.4years (±5.8). Majority of the women were between the age range of 25-29 years (33.0%) followed by 30-34years (23.6%). Most of them were of the Yoruba ethnic group (93.9%) and were mostly of Islamic faith (57.4%). Regarding the educational level, 49.9% had secondary level while 48.1% had diploma and higher diploma or Bachelor degree. Employment status

distribution reveals that majority (72.7%) were self-employed. In relation to their monthly income, 69.8% of the women earned less than the national minimum

Table 1. Sociodemographic Characteristics of the Pregnant Women.

Socio-demographics	Frequency	Percentage
Mean Age (±*SD*)	28.4 (±5.8)	
Level of health care		
Agbongbon (PHC)	224	19.3
Orayan (PHC)	179	15.4
Jericho (SHC)	256	22.0
Adeoyo (THC)	300	25.8
UCH (THC)	203	17.5
Age group (years)		
15-19	57	4.9
20-24	252	21.7
25-29	383	33.0
30-34	274	23.6
35-39	152	13.1
40 and above	42	3.6
Ethnicity		
Yoruba	1091	93.9
Non-Yoruba	71	6.1
Religion		
Christianity	491	42.3
Islam	667	57.4
Traditional	4	0.3
Marital status		
Single	46	4.0
Married	1091	93.9
Divorced/ Separated	24	2.1
Highest Educational Level		
< = Primary	23	2.0
Secondary	580	49.9
Diploma	187	16.1
Higher diploma/Degree	372	32.0
Maternal occupation		
Not employed	50	4.3
Self-employed	844	72.7
Cooperate employment	267	23
Maternal monthly income		
<1000	96	8.5
1000-10,000	220	19.4
11,000 – 20,000	260	23.0
21,000 – 30,000	214	18.9
31, 000 – 40, 000	159	14.1
41, 000 – 50, 000	120	10.6
>51, 000	63	5.6
Husband's monthly income		
<1000	84	7.5
1000-10,000	69	6.1
11,000 – 20,000	161	14.3
21,000 – 30,000	197	17.5
31, 000 – 40, 000	231	20.5
41, 000 – 50, 000	199	17.7
>51, 000	186	16.5

wage of thirty thousand naira ($21.4) while (45.4%) of the spouses earned less than the minimum wage (Table 1)

Table 2: Antenatal, Health care and Environmental Characteristics

Characteristics	Frequency	Percentage
Mean (±sd)	22.0 (±4.2)	
Parity		
Para 0	542	46.9
Para 1-5	615	53.2
Experienced any illness during pregnancy?		
No	654	56.4
Yes	505	43.6
Possession of Health insurance		
No	997	86.1
Yes	161	13.9
Use of ITNS		
No	665	57.3
Yes	495	42.7
Use of dewormer		
No	1128	97.4
Yes	30	2.59
Prenatal dietary advice		
No	636	55.16
Yes	517	44.84
Iron and Folic acid supplementation		
No	471	41.1
Yes	675	58.9
Types of latrines in use		
Unimproved	148	12.7
Improved	1011	87.0
Source of water		
Unimproved	7	0.6
Improved	1150	99.4
Hand washing Habits		
Not Frequently	387	33.4
Frequently	772	66.6

Antenatal, Health Care, Environmental Characteristics of the Respondents

The mean gestational age of the respondents was 22.0 (±4.2) weeks. Less than half (43.6%) have experienced one form of illness in this current pregnancy while 53.2% had given birth to at least one child before this current pregnancy. Majority (86.1%) of the respondents had no health insurance coverage, less than half (42.7%) of the women used insecticide treated nets (ITNS) and almost all (97.4%) of the respondents had never used an anthelmintic drug in this current pregnancy. In addition, over half (55.2%) had never received any form of prenatal dietary advice or counselling and 2 in 5 (41.1%) had not taken any iron

and folic acid supplementation. In terms of their hygiene, most (87.0%) had an improved type of latrine and majority (99.1%) drank water from improved sources. On hand washing habit, (66.6%) washed their hands frequently (Table 2).

Table 3: Minimum Dietary Diversity of Women

Food groups	Overall	MUAC ≥23cm	MUAC <23cm
Grains			
No	68(6.0)	55 (5.9)	13(5.7)
Yes	1092(94.0)	877(94.1)	215(94.2)
White roots and tubers			
No	489(41.9)	393(42.3)	96(42.1)
Yes	668(57.5)	537(57.7)	132(57.9)
Plant protein			
No	487(41.9)	398(42.9)	89(8.1)
Yes	668(57.5)	530(57.1)	138(91.9)
Nuts and Seeds			
No	751(64.6)	607(65.4)	144(63.7)
Yes	403(34.7)	321(34.5)	82(36.3)
Dairy products			
No	584(50.3)	463(50.0)	121(53.3)
Yes	569(49.0)	463(50.0)	106(46.7)
Meat			
No	149(12.8)	114(12.2)	35(13.3)
Yes	1011(87.0)	817(87.8)	229(86.7)
Eggs			
No	496(42.7)	392(42.1)	104(44.8)
Yes	660(56.8)	537(57.8)	123(55.2)
Dark green leafy Vegetables			
No	497(42.8)	389(41.8)	108(47.4)
Yes	661(56.9)	541(58.2)	120(52.6)
Fruits			
No	371(31.9)	285(30.6)	86(37.9)
Yes	786(67.6)	645(69.4)	141(62.1)
Oil and Fat			
No	48(4.1)	31(3.3)	17(7.5)
Yes	1112(95.7)	901(96.7)	211(92.5)
MDDW			
<5 (Low)	293(25.2)	229(24.5)	64(27.9)
≥5 (Normal)	869(74.8)	704(75.5)	165(72.1)

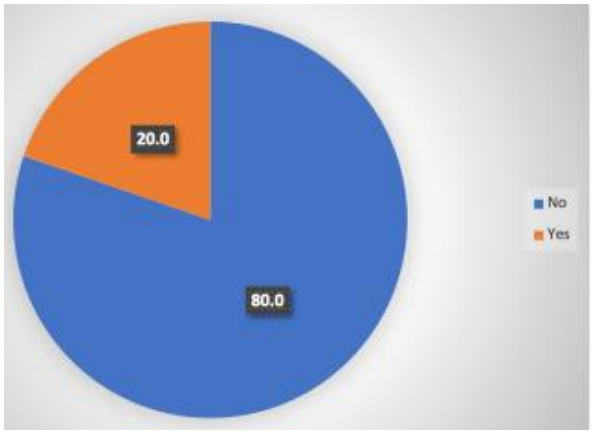

Figure 1. Prevalence of Undernutrition

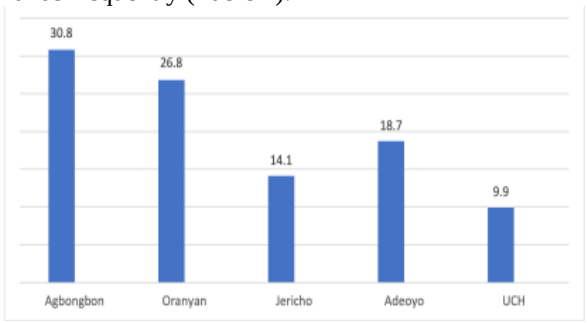

Figure 2. Prevalence of Undernutrition and Level of Health Care

Table 4: Bivariate Analysis

Socio-demographics	Under-Nutrition No (n = 911, 80.0%)	Yes (n=228, 20.0%)	Chi-square	p-value
Level of health care				
Agbongbon	155 (69.2)	69 (30.8)	40.97	**<0.001**
Orayan	131 (73.2)	48 (26.8)		
Jericho	220 (85.9)	36 (14.1)		
Adeoyo	244 (81.3)	56 (18.7)		
UCH	183 (90.2)	20 (9.9)		
Age group (years)				
15-19	27 (47.4)	30 (52.6)	101.72	**<0.001**
20-24	166 (65.9)	86 (34.1)		
25-29	317 (82.8)	66 (17.2)		
30-34	248 (90.6)	26 (9.5)		
35-39	134 (88.2)	18 (11.8)		
40 and above	39 (92.9)	3 (7.1)		
Marital status				
Single	21 (45.7)	25 (54.4)	39.77	**<0.001**
Married	895 (82.0)	196 (18.0)		
Divorced/ Separated	16 (66.7)	8 (13.3)		
Highest Educational Level				
< = Primary	15 (65.2)	8 (34.8)	34.79	**<0.001**
Secondary	430 (74.1)	150 (25.9)		
Diploma	161 (86.1)	26 (13.9)		
Higher diploma/Degree	327 (87.9)	45 (12.2)		
Maternal Occupation				
Unemployed	40(80.0)	10(20.0)	4.22	0.122
Self-employed	666(78.9)	178(21.1)		
Public/Private Employment	226(84.6)	41(15.4)		
Maternal monthly income				
<1000	72 (75.0)	24 (25.0)	31.88	**<0.001**
1000-10,000	162 (73.6)	58 (26.4)		
11,000 – 20,000	192 (73.9)	68 (26.2)		
21,000 – 30,000	173 (80.8)	41 (19.2)		
31, 000 – 40, 000	142 (89.3)	17 (10.7)		
41, 000 – 50, 000	109 (90.8)	11 (9.2)		
>51, 000	56 (88.9)	7 (11.1)		
Husband's monthly income				
<1000	65 (77.4)	19 (22.6)	49.21	**<0.001**
1000-10,000	43 (62.3)	26 (37.7)		
11,000 – 20,000	106 (65.8)	55 (34.2)		
21,000 – 30,000	157 (79.7)	40 (20.3)		
31, 000 – 40, 000	197 (85.3)	34 (14.7)		
41, 000 – 50, 000	168 (84.4)	31 (15.6)		
>51, 000	165 (88.7)	21 (11.3)		
Parity				
Para 0	393 (72.5)	149(27.5)	38.06	**<0.001**
Para 1-5	535 (87.0)	80 (13.0)		
Ever received prenatal dietary advice				
No	514 (80.8)	122(19.2)	0.31	0.576
Yes	411 (79.5)	106(20.5)		
MDDW				
1-5	229 (78.2)	64 (21.8)	1.12	**0.288**
6-10	704 (81.0)	65 (19.0)		

Table 5. Multivariate Logistic Regression

	n (%)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Sites			
Agbongbon	69 (30.8)	2.72 (1.73, 4.28) *	1.08 (0.59, 1.96)
Oranyan	48 (26.8)	2.24 (1.38, 3.63) *	0.78 (0.40, 1.54)
Jericho	36 (14.1)	1.00	1.00
Adeoyo	56 (18.7)	1.40 (0.89, 2.21)	0.98 (0.59, 1.64)
UCH	20 (9.9)	0.67 (0.37, 1.19)	0.65 (0.31, 1.33)
Age group (years)			
15-19	30 (52.6)	1.00	1.00
20-24	86 (34.1)	0.47 (**0.26, 0.83**)	0.62 (0.32, 1.18)
25-29	66 (17.2)	0.19 (**0.10, 0.34**)	0.41 (0.20, 0.84) *
30-34	26 (9.5)	0.09 (**0.05, 0.18**)	0.26 (0.12, 0.60) *
35-39	18 (11.8)	0.12 (**0.06, 0.25**)	0.35 (0.15, 0.86) *
40 and above	3 (7.1)	0.07 (**0.02, 0.25**)	0.16 (0.03, .80) *
Marital status			
Single	25 (54.4)	1.00	1.00
Married	196 (18.0)	0.18 (0.10, 0.34) *	0.47(0.23, 0.94) *
Divorced/ Separated	8 (13.3)	0.42 (0.15, 1.17)	0.42 (0.13, 1.33)
Highest Educational Level			
< = Primary	8 (34.8)	1.00	1.00
Secondary	150 (25.9)	0.65 (0.27, 1.57)	0.53 (0.20, 1.40)
Diploma	26 (13.9)	0.30 (0.12, 0.79) *	0.46 (0.16, 1.34)
Higher diploma/Degree	45 (12.2)	0.26 (0.10, 0.64) *	0.58 (0.20, 1.67)
Maternal monthly income			
<1000	24 (25.0)	1.00	1.00
1000-10,000	58 (26.4)	1.07 (0.62, 1.86)	0.85 (0.41, 1.76)
11,000 – 20,000	68 (26.2)	1.06 (0.62, 1.82)	1.39 (0.68, 2.90)
21,000 – 30,000	41 (19.2)	0.71 (0.40, 1.26)	1.32 (0.62, 2.82)
31, 000 – 40, 000	17 (10.7)	0.36 (0.18, 0.71) *	0.70 (0.29, 1.68)
41, 000 – 50, 000	11 (9.2)	0.30 (0.14, 0.66) *	0.76 (0.29, 1.97)
>51, 000	7 (11.1)	0.38 (0.15, 0.93) *	1.27 (0.38, 4.22)
Husband's monthly income			
<1000	19 (22.6)	1.00	1.00
1000-10,000	26 (37.7)	2.07 (1.02, 4.19) *	2.04 (0.84, 4.96)
11,000 – 20,000	55 (34.2)	1.78 (0.97, 3.25)	1.98 (0.88, 4.45)
21,000 – 30,000	40 (20.3)	0.87 (0.47, 1.62)	1.04 (0.44, 2.43)
31, 000 – 40, 000	34 (14.7)	0.59 (0.32, 1.11)	0.86 (0.36, 2.06)
41, 000 – 50, 000	31 (15.6)	0.63 (0.33, 1.19)	1.17 (0.47, 2.87)
>51, 000	21 (11.3)	0.44 (0.22, 0.86) *	0.93 (0.35, 2.47)
Parity			
Para 0	149 (27.5)	1.00	1.00
Para 1-5	80 (13.0)	0.39 (0.29, 0.53) *	0.58 (0.40, 0.86) *

*Significant (p<0.0050)

Minimum Dietary Diversity of the Respondents

The most commonly consumed meals contained grains (93.4%), meat (87.0%) and oil and fat (95.7%). Two in three of the women reported meals made with or containing fruits (67.7%), white tubers (57.0%), and plant proteins (57.5%). The least reported food groups were dairy products (49.0%) and nuts and seeds (34.7%). Minimum dietary diversity of women revealed that 25.2% of the pregnant women had low dietary diversity and one in four of all the women with low MDDW were seen to be undernourished (Table 3).

Prevalence of Undernutrition

The overall prevalence of undernutrition among this study population was found to be 20.0% (Figure 1) with varying prevalence across the three levels of health facilities. The primary health centres (Agbongbon) had higher rates of undernutrition (30.8%) while the lowest was seen in one of the tertiary institutions (UCH, 9.9%). (Figure 2.)

Factors Associated with Undernutrition

On the bivariable analysis (table 4), some variables such as; Level of health care facility, Age, Marital status, educational status, Mother's monthly income, Husband monthly income and Parity were all found to be significantly associated with undernutrition. On multivariate logistic regression analysis, age range 24-29years (AOR=0.41 95% CI 0.20, 0.84), 30-34years (AOR= 0.26, 95% CI 0.12 - 0.60), 35-39years (AOR=0.35 95%CI 0.15-0.86) and 40 and above (AOR = 0.16, 95% CI 0.03 - 0.80) were found to be significant. The odd of being undernourished decreases as the age increases with 10percent. Also, the odds of undernutrition decrease by 53percent for married women (AOR=0.47, 95% CI 0.23 -0.94) and lastly, women who were para (1-5) (AOR=0.58, 95%CI 0.40-0.86) had 42percent lower odds of undernutrition when compared to para 0 group. (Table 5).

DISCUSSION

The purpose of this study was to assess the prevalence and associated factors for undernutrition among pregnant women attending the antenatal clinics in selected public hospitals in Ibadan, Nigeria. The overall prevalence of undernutrition in pregnancy in this study was 20.0%. Maternal age range 25years and above, being married and having at least one parous experience were the factors found to protective for undernutrition among the pregnant women. Minimum dietary diversity of the women was found not to be significantly related with nutritional status of the women. In addition, women in primary health and one tertiary facilities (Adeoyo teaching hospital) had higher prevalence of undernutrition although not significant at logistic regression due to the fact that PHCs in Nigeria tend low socioeconomic clientele and Adeoyo hospital because of its location at the heart of Ibadan where more people of low socioeconomic status dwell.

The prevalence of 20.0% in this study is similar to the reported prevalence of undernutrition of 22.4% in Kaduna,[14] 21.7% in a rural community in Oyo state[16] and 22.3% in Northern Ethiopia.[21] The prevalence is however higher than the findings of 9.2% in Gondo Genet District, Southern Ethiopia, 12.5% in Sudan, 16.3% in Limpopo, 15.0% in Sri lanka and 14.7% in China.[12, 22-26] Our findings of 20.0% was lower when compared to some other studies that reported a much higher prevalence such as; 52.6% in Birra District, Southern Ethiopia,[27] 43.8% in Eastern Ethiopia[28] and 33.3% in Eastern rural Maharashtra, India.[29] These disparities can be attributed to different sociodemographic and socioeconomic characteristics, cultural differences and food taboos, different level of nutritional interventions, probably seasonal differences and the use of different MUAC cut off points.

In this current study, the age of the pregnant women had a significant association with undernutrition which is consistent with a study carried out in North-eastern Ethiopia.[30] Similar to our findings, as the age increases, the chances of being undernourished decreases. Women within the age group 40years and above (AOR = 0.16, 95% CI 0.03 - 0.80) were 84percent less likely to be undernourished when compared with those within the age group 15-19 years. Compared with the older women, adolescents maybe more likely to be undernourished as a result of their low socioeconomic status and poor nutrient store prior to pregnancy.[31]

Marital status of being married was also found to be significantly associated with undernutrition. Married women were 54 percent less likely to be undernourished compared to women who were not married. This is consistent with the findings of studies done in Tanzania.[32] in Kenya [33] and Ethiopia.[24] While married women may have financial support from their spouse, women who were not married maybe economically disadvantaged thus not being able to maintain the best state of health leading to undernutrition. [32, 34]

Lastly, parity was also found to be significantly associated with undernutrition. Women who had had at least one previous parous experience were 42percent less likely to be undernourished when compared with the nulliparous women. This finding is consistent with a study done in southern Ethiopia[35] and in contrast to a systematic review study done in Africa.[36] A possible explanation is that most women with no parous experiences are usually of younger ages with no experience of what changes in pregnancy can bring to their body especially those affecting their feeding habits and subsequently their nutritional status.[37] It is also possible that multiparous women have been exposed to previous nutritional education thus knowing how to avert undernutrition in pregnancy.[38]

Minimum dietary diversity of women (MDDW) at bivariate analysis in this study was found not to be associated with undernutrition of pregnant women which is in contrast with the findings of a study done in Eastern Ethiopia.[28] In addition, the pattern of food groups consumed among the well-nourished is slightly higher when compared to undernourished women with exception of plant protein.

CONCLUSION

This study revealed a relatively high prevalence of undernutrition among pregnant women attending the selected public health facilities in Ibadan, Nigeria. Maternal age, marital status and parity were found to be associated with undernutrition among the respondents. Therefore, interventions to address undernutrition among pregnant women is urgently needed to forestall both the short and long-term consequences of the condition by adopting healthy nutritional lifestyle. Strategies should also be put in place to assist poor single or divorced pregnant women to avert the consequences of poverty on their pregnancy. Finally, regular nutritional level check-ups and counselling on nutrition should be adopted as part of ANC routine check-ups for all pregnant women across the three level of healthcare in Nigeria for early detection and correction of the condition.

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