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Socio-Demographic Determinants of Malnutrition among Pregnant Women Accessing Antenatal Care Services in Enugu State, Nigeria

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Abstract

This study focused on the socio-demographic determinants of malnutrition among pregnant women accessing antenatal care services in Enugu State. Specially, it determined the characteristics of pregnant women accessing antenatal care services and determinants of malnutrition based on their body mass index. Two research questions and one null hypothesis guided the study. Survey research design was used. The population comprised all registered pregnant women in Enugu State. Multi-stage sampling involving other various sampling techniques was employed to select 400 registered pregnant women attending antenatal services at health facilities in Enugu State. Questionnaire was the instrument for data collection. Five experts validated the instrument. Cronbach alpha formula was used to determine the internal consistency of the instrument. A reliability coefficient of .79 was obtained. Frequencies, percentages and logistic regression were used for data analysis. Findings revealed, among others, that income level, family size, and child spacing were significant socio-demographic determinants of malnutrition among pregnant women in Enugu State. Based on these findings, the study recommended, among others, that: nutrition education programmes of the ante-natal clinics should be revised to accentuate malnutrition and its attendant consequences among the pregnant women, family planning should be encouraged to reduce the significant impact of family size on nutrition of pregnant women and their families, adequate child spacing should be encouraged in order to improve maternal health.

Keywords: Malnutrition, Socio-demographic, Determinants, Pregnant, Women, Antenatal Care.

Introduction

Malnutrition is a significant public health problem, most notably in developing countries where majority of the world's undernourished pregnant women live. More troubling is the co-existence of both under-nutrition and over-nutrition in pregnant women, which is currently becoming a significant health problem globally (World Health Organization-WHO, 2016). This trend appears more challenging in developing countries that are still tackling endemic under-

nutrition and over-nutrition causes and effects. Malnutrition has been identified as a key underlying cause for maternal deaths in Africa. Malnutrition has led to serious health complications for the pregnant mothers, adversely affected fetal development as well as the entire family health (Osuorah, Ndu, Ifediora, Asinobi, & Eke, 2016). Malnutrition predisposes women, particularly pregnant and lactating women, to various forms of health conditions such as increased risk of infection, anaemia, visual impairment, goiter, among others (Oluwole, Agboola, Adeyogu, Onyibe & Adeyoju, 2016). Desyibelew and Dadi (2019) reported that the global estimate of maternal malnutrition during pregnancy appears to be decreasing in almost all regions of the globe except in Africa where the number of pregnant mothers with malnutrition has been increasing steadily over time. National Nutrition and Health Survey (2018) report estimated that seven per cent of women of childbearing age are suffering acute malnutrition. Thus, the gravest single threat to global public health which affects all age groups but is more common in developing countries such as Nigeria, among pregnant and lactating women is malnutrition.

Malnutrition is a condition where nutrition is defective in quantity or quality. Malnutrition is mentioned as one of the Sustainable Development Goals (SDGs) categorised as SDG2 target. It is possible that Covid-19 could double the number of people affected by malnutrition, resulting to an increased number of people at risk by the end of 2021. Malnutrition is caused by eating a diet in which nutrients are not adequate such that health problems results (Katsilambros, 2011). World Health Organization (2018) defined malnutrition as deficiencies, excesses, or imbalances in a person's intake of energy and/or nutrients. These definitions highlight the triple threats of malnutrition which presents as deficiencies, excesses or imbalance in some nutrients. Deficiencies are anaemia, protein deficiencies, and under nutrition, which includes wasting (low weight-for-height), stunting (low height-for-age) and underweight (low weight-for-age); excesses are overweight, obesity and diet-related non-communicable diseases (such as heart disease, stroke, diabetes and some cancers); while micronutrient-related malnutrition, which includes micronutrient deficiencies (a lack of important vitamins and minerals). From the foregoing, malnutrition refers to a dietary deficiency related health condition resulting from insufficient, excessive, or one-sided nutrient intake during pregnancy.

Pregnancy is a critical period during which maternal nutrition has a major effect on mother and fetal health. Lack of adequate nutrition of good quality and quantity during pregnancy can cause health problems for both the mother and her fetus. Poor maternal nutrition prior to and during pregnancy is strongly linked with increased risk of maternal anemia,

mortality, and adverse birth outcomes such as low birth weight and preterm birth (WHO, 2016). Malnutrition is known to increase the risk of poor pregnancy outcomes, including obstructed labour, premature or low-birth-weight babies, and postpartum hemorrhage. It can lead to severe anemia during pregnancy which is linked with increased maternal mortality (Zewde, Biadgilign, Taddese, Legesse & Letebo, 2018). The authors further posited that malnutrition among mothers has an intergenerational effect, with repeating cycles of malnutrition and poverty in the long run. This necessitates reporting of socio-demographic characteristics of the mothers during antenatal and inclusion of nutritional counseling as part of routine antenatal care services.

Antenatal care involves routine visit for assessment by different health care professionals on regular basis throughout the period of pregnancy. Antenatal care is a complete health supervision of the pregnant mothers in order to maintain, protect and promote health and well being of mother and the fetus. It is one of the core interventions for improving maternal outcomes (WHO, 2014). Antenatal care services enable early identification of pregnancy related risks and complications; and ensure access of services including nutrition education, health education, vaccines, diagnostic tests and treatments (Muchie, 2017). It also helps to establish good relationship between pregnant women and service providers. Moreover, a pregnant woman visiting health facilities for antenatal care services would get advice and support, and will be more informed about health needs and self-care, and consequently leaded to an increased utilization of emergency care services. Lucas and Gills (2009) stated that the functions of antenatal care services include preparing the pregnant woman and her family for delivering, educating the pregnant woman, her family and community, assessment and monitoring of health status of the woman and progress of pregnancy, providing appropriate preventive measures, and nutritional supplements (iron, folic acid). Weighing mothers and monitoring progress is a gold standard for checkmating malnutrition among pregnant women. The follow-up supplementations and nutritional education are viable strategies to combat the problem. Howbeit, paucity of data exists about the spread of malnutrition among pregnant women based on their socio-demographic characteristics in Enugu State. There is need to understand also, the socio-demographic characteristics that determine malnutrition in the State.

Determinant refers to something that influences the outcome of another thing, an element that fixes or conditions an outcome. O'Sullivan, Burdet, and Diedrichsen (2009) defined determinant as a factor causing trouble in achieving a positive result or tending to produce a negative result. Determinants in the context of this study are socio-demographic characteristics that affect the

achievement of an optimal nutritional status in pregnancy. Studies have associated malnutrition with maternal illiteracy, lack of education, lack of support in the home, neglect and mothers going back to work early (Alamu, Eyinla, Sanusi & Maziya-Dixon, 2020; Tette et al., 2016). Some other studies have researched on some determinants such as illness, breastfeeding and having several children below 2 years of age, higher maternal age, socio-economic status, household food security, and social factors such as marital status, education, and income also have influence on maternal nutrition during pregnancy (Zewde et al., 2018). However, this study focuses on socio-demographic determinants (family size, parity, child spacing, marital status, income, level of education, age, and location of the mothers because these are basic to other determinants of malnutrition among pregnant women.

Level of education of partners determines how seriously partners take responsibility in ensuring adequate nutrition of their pregnant wives. Desyibelew and Dadi (2019) reported that low educational status of the partners significantly influenced maternal nutrition. Their study found that the odds of malnutrition were 1.7 times higher among pregnant mothers having a low educational attainment, which is consistent with other reports (Ahmed, Hossain & Sanin, 2012; Tekola, Berhe, Gebremariam & Gebremariam, 2018). On the other side, better educational attainment of partners might also be correlated with earning a better income to ensure their household food security (WHO, 2016).

Another factor that has been found to have influence whether people are malnourished or not is income status of the persons involved. A household with good income has a purchasing power for food and other nutritional supplements (Piate & Nnubia, 2016). However, it could also engender buying excessively and feeding on unhealthy foods which can lead to malnutrition (overweight or obesity). More than one in three low-and middle income countries face both extremes of malnutrition (WHO, 2019). With five years remaining in the UN Decade of Action on Nutrition (2016-2025), the World Health Organization and other concerned agencies have reiterated the need to approach nutrition and malnutrition from multiple perspectives to further understand malnutrition's multiple manifestations, and to achieve the global goal of eradicating hunger and preventing malnutrition in all its forms. Specifically, income is classified into low (less than N16,000), medium (N16,000-N50,000) and high group (more than N50,000) for the purpose of this work.

Parity is another determinant of malnutrition during pregnancy. Parity in this context refers to the number of pregnancies a woman has, whether the baby is alive or dead. Parity is crucial in determining malnutrition because the physiological stress during pregnancy demands extra nutrient that could put pregnancy at higher risk for malnutrition, than other women's life

time if the extra nutritional requirements are not met adequately. Thus, when women enter in to vicious cycle of too many closely non-spaced pregnancies, her tissues becomes depleted and she will be highly vulnerable for malnutrition (Ramakrishnan, Grant, Goldenberg, Zongrone & Martorell, 2012). Desyibelew and Dadi (2019) found that women with two or more pregnancies had a 2.15 times increased chance of being malnourished than a women with a single pregnancy. Investigating the relationship between parity progression, child spacing (birth interval) and maternal nutritional status may be cumbersome because it involves many intervening variables. The effect of short birth interval (child spacing) has been demonstrated many times to be one of the key variables affecting maternal nutrition (Adebowale, Adepoju & Fagbamigbe, 2011).

Enugu State is blessed with many health facilities around the state. Pregnant women accessing antenatal care services in Enugu health facilities are numerous and attendance to antenatal care services is high (Okoronkwo, Odira, Nwaneri, Okpala & Okafor, 2016). This high level of attendance to ANC is a good sign which implies that inclusion of sound nutrition education or other strategies to boost maternal nutrition has higher probability of being successful. Enugu State is positioned in the high vegetative region of Nigeria. The lands are arable and the inhabitants appear very industrious. Although many researchers concentrate on the northern part of the Nigeria where poverty rate and malnutrition levels appears high, however, the findings of the study conducted by Ejiofor, Ozokono, & Ugwu (2019), shows that 46 per cent of pregnant women attending ANC in Enugu State are anaemic. This study therefore intends to determine socio-demographic determinants of malnutrition among pregnant women in Enugu State.

Purpose of the Study

The major purpose of this study was to find out the socio-demographic determinants of malnutrition among pregnant women accessing antenatal care services in Enugu State. Specifically, the study determined

1. socio-demographic characteristics of pregnant women accessing antenatal care services.
2. determinants of malnutrition among the respondents based on their body mass index.

Research Questions

1. What is the percentage analysis of socio-demographic characteristics of pregnant women accessing antenatal care services in Enugu State?
2. What is the percentage analysis of socio-demographic determinants of malnutrition among the respondents based on their body mass index?

Hypothesis (HO)

One null hypothesis was tested at $p \leq .05$ level of significance.

HO_1 Socio-demographic characteristics are not significant determinants of malnutrition among pregnant women assessing antenatal services in Enugu State based on their body mass index.

Methodology

***Research Design*:** The cross-sectional research design was used in the study.

***Area of the Study*:** The study was carried out in Enugu State. Enugu State is made up of three senatorial districts and 17 Local Government Areas (LGAs). It has interstate boundaries with Kogi and Benue States to the North, Abia State to the South, Anambra State to the West and Ebonyi State to the East. Majority of pregnant women in Enugu State are educated. A good number of them are public servants, others engage in trading, farming and other businesses.

***Population for the Study*:** The population for the study comprised of all registered pregnant women accessing antenatal care services in Enugu State at the time of this study (November, 2019) estimates at 112,273. There are 857 health facilities where antenatal services are rendered in Enugu State (Enugu State Ministry of Health, 2013).

***Sample for the Study*:** The sample size was four hundred (400) pregnant women accessing antenatal care services in Enugu State. This is in line with the suggestion of Cohen, Marion, and Morrison (2011), that when a population size is 112,273 and above at 95% confidence level (5% internal), the sample size should be 383 and above.

***Sampling Technique*:** The multistage sampling procedure was used to draw the sample size. The first stage involved clustering the health facilities in Enugu State into urban and rural groups based on the local government areas where they are situated. The second stage involved systematic sampling of forty health facilities (20 from private and 20 from public) out the eight hundred and fifty-seven health facilities in Enugu State. The third stage involved simple random sampling of thirteen (10) pregnant women from each of the forty selected health facilities, through balloting without replacement. This ensured proper representation of each selected health facility in Enugu. This brought the sample size to four hundred (400) pregnant women selected and used for this study.

***Instrument for Data Collection*:** Questionnaire served as instrument for data collection. Face validity of the instrument was established by five experts (two from the Department of Human Kinetics and Health Education, two from Nutrition and Dietetics Department and one from Science Education Department [measurement and evaluation unit], all in University of Nigeria, Nsukka). The internal consistency of the instrument was determined using Cronbach alpha statistics and a reliability co-efficient of .79 was obtained. The index was high enough and therefore considered reliable for use for the study. This is in line with the guidelines of Crouch, Mack, Wilson and Kwan (2017) that if the reliability coefficient obtained is

0.72 and above, the instrument should be considered reliable for the study.

***Method of Data Collection*:** Data for this study were collected by the researchers with the help of two assistants from each health facility. The assistants were trained on how to administer and gather data from the pregnant women. The rationales for using assistants from each facility were to avoid bias from the researchers as well as increase acceptability of the instruments. Patients readily accept instructions from the health workers. A total of 400 copies of the questionnaire were administered on the respondents by hand and collected at the spot. Only those who gave consent and declared their interest were used. Data collected were cross-checked for completeness. Logical techniques were employed to identify errors during data cleaning. Out of 400 copies of questionnaire only 391 copies of questionnaire did not have errors and were used for data analysis.

***Data Analysis Techniques*:** Frequencies and percentages were used to assess the characteristics of the pregnant women, while weighing scale and tape measurements were used to gather information that were calculated to determine the body mass index (BMI) of the respondents. Logistic regression was used to test the null hypothesis at .05 level of significance.

Findings

The following findings were made and presented in tables to answer the research questions and null hypotheses.

Table 1: Percentage Responses on Socio-Demographic Characteristics of Pregnant Women (Respondents) (N=391).

S/N	Item Statement	F	%
1	**Family size (Household size)**		
	1-5 persons	179	45.8
	6-8 persons	172	44.0
	9 persons and above	40	10.2
2	**Mothers Monthly Income (in Naira)**		
	Less than 16,000	114	29.2
	16,000 to 50,000	168	43.0
	More than 50,000	109	27.9
3	**Educational level**		
	No formal education	37	9.5
	Primary education	74	18.9
	Secondary education	179	45.8
	Tertiary education	101	25.8
4	**Age ranges**		
	15-25 years	128	32.7
	26-35 years	172	44.0
	36 years and above	91	23.3
5	**Parity**		
	Prima (First Pregnancy)	97	24.8
	Primip (Second pregnancy)	74	18.9

	Multip (third to fifth pregnancy)	123	31.5
	Grand multip (More than the fifth pregnancy)	97	24.8
6	**Child spacing (After last delivery)**		
	Less than 15 months	74	18.9
	15-24 months	229	58.6
	More than 24 months	88	22.5
7	**Marital status**		
	Once married	19	4.9
	Never married	72	18.4
	Staying married	300	76.7
8	**Location**		
	Rural	192	49.1
	Urban	199	50.9

Table 1 shows that the respondents whose household were 1-5 persons had highest frequency and closely followed by households with 6-8 persons (1-5 persons =45.8% > 6-8 persons = 44% > 9 persons and above = 10.2%). Majority of the pregnant women (43%) earn between 16,000 to 50,000 naira monthly, followed by those who earn less than N16,000 (29.2%) and more than N50,000 (27.9%). More than three quarter (76.7%) of respondents are staying married while others are either never married or once married but no longer staying married.

Table 2: Percentage Responses on Socio-Demographic Characteristic of Pregnant Women Based on BMI (N=391).

S/N	Maternal Characteristics	Well Nourished (Normal BMI)		Malnourished (Underweight Overweight+Obese)	
		F	%	F	%
1	**Family size (Household size)**				
	1-5 persons	106	59.2	73	40.8
	6-8 persons	80	46.5	92	53.5
	9 persons and above	12	30.0	28	70.0
2	**Mothers Monthly Income (in Naira)**				
	Less than 16,000	62	54.4	52	45.6
	16,000 to 50,000	92	54.8	76	45.2
	More than 50,000	44	40.4	65	59.6
3	**Educational level**				
	No formal education	14	37.8	23	62.2
	Primary education	41	55.4	33	44.6
	Secondary education	96	53.6	83	46.4
	Tertiary education	47	46.5	54	53.5
4	**Age ranges**				
	15-25 years	62	48.4	66	51.6
	26-35 years	90	52.3	82	47.7
	36 years and above	46	50.5	45	49.5

5	**Parity**				
	Prima (First Pregnancy)	57	58.8	40	41.2
	Primip (Second pregnancy)	37	50.0	37	50.0
	Multip (third to fifth pregnancy)	56	45.5	67	54.5
	Grand multip (More than the fifth pregnancy)	48	49.5	49	50.5
6	**Child spacing (After last delivery)**				
	Less than 15 months	38	51.4	36	48.6
	15-24 months	117	51.1	112	48.9
	More than 24 months	43	48.9	45	51.1
7	**Marital status**				
	Once married	9	47.4	10	52.6
	Never married	44	61.1	28	38.9
	Staying married	145	48.3	155	51.7

Normal BMI = 18.5-24.9kg;
Malnourished (Underweight = < 18.5kg; Overweight = 25 – 29.9kg; Obese = ≥ 30kg)

Table 2 indicates that smaller households have more pregnant women with normal BMI, while the higher the family size, the higher the malnutrition on the pregnant women. Based on mothers income, the lesser the income, the more the pregnant women with normal BMI, while the highest income reported highest number of malnourished pregnant women. For parity, the distribution seems balanced except for Prima that showed normal BMI with considerable gap.

Table 3: Summary of Logistic Regression Analysis of Socio-Demographic Determinants and Malnutrition (Normal or malnourished) among Pregnant Women in Enugu State (N= 391)

S/N	Variable	Est	SE	Wald	P-value	Exp(B) OR	95% CI for Exp(B)	
							Lower	Upper
1	Family size	1.147	.443	6.695	.010*	3.150	1.321	7.513
2	Mothers Income level	.390	.195	3.995	.046*	2.428	.757	2.694
3	Educational level	.252	.286	.777	.378**	1.287	.735	2.254
4	Age ranges	.136	.330	.170	.680**	1.146	.600	2.189
5	Parity	.301	.352	.732	.392**	1.351	.678	2.693
6	Child spacing	.847	.345	.6.030	.014*	.973	.562	1.685
7	Marital status	.722	.335	4.652	.031*	2.058	1.068	3.965
8	Location	.055	.232	.057	.812**	1.057	.671	1.664
	Constant	-1.456	.603	5.829	.016*	.233		

** Significant ** Not Significant; Degree of freedom (df) = 1*

Table 3 shows the logistic regression analysis of socio-demographic characteristics and malnutrition among pregnant women. The table

shows that family size (p= .010; AOR = 3.150; CI at 95% =1.321-7.513), mothers' income (p= .046; AOR = 2.428; CI at 95% = .757-2.694), child spacing (p= .014; AOR = 973; CI at 95% =562-1.685), and marital status (p= .031; AOR = 2.058; CI at 95% =1.068-3.965) are significant determinants of malnutrition among pregnant women, since their p-values are less than .05 level of significance at one degrees of freedom. On the other hand, educational level, age, parity and location are not significant determinants of malnutrition among the respondents.

Discussion of Findings

Findings in Table 1 shows that the respondents whose household were 1-5 persons had highest frequency and closely followed by households with 6-8 persons (1-5 persons =45.8% > 6-8 persons = 44% > 9 persons and above = 10.2%). Majority of the pregnant women (43%) earn between 16,000 to 50,000 naira monthly, followed by those who earn less than N16,000 (29.2%) and more than N50,000 (27.9%). More than three quarter (76.7%) of respondents are staying married while others are either never married or once married but no longer staying married.

Table 2 indicates that smaller households have more pregnant women with normal BMI, while the higher the family size, the higher the malnutrition on the pregnant women. This finding is not surprising because the quality of food in smaller household is usually richer than the quality of food in larger household who will be interested in quantity of food to go round the various mouths to be fed. This finding is in line with the findings of Serbesa, Iffa and Geleto (2019) whose study reported the effect of large family size on nutritional status of pregnant women and that large family size has been implicated as a risk factor for the prevalence of malnutrition among pregnant women. The table further shows that based on mothers' income, the lesser the income, the more the pregnant women with normal BMI, while the highest income reported highest number of malnourished pregnant women. This finding is rather surprising because one would expect that pregnant women with highest income should feed better than those with lesser income. However, the reason for this finding may be due to the nature of work that women with highest income perform which does not give them time to cook and fed well on balanced meal, hence, they resort to eating junks. According to Getanch and Negesse (2019), maternal income is a predictor of malnutrition among pregnant women. The findings of this study on maternal income is in tandem with the findings of Gebre, Biadgilign, Taddese, Legesse and Letebo (2018) who reported that housewives were less likely to be malnourished compared to those who engaged in work. However, the study's findings contradict the findings of Serbesa, Iffa and Geleto (2019) who found that the pregnant women and lactating mothers who had a monthly income

greater than 2000 ETB were less likely to be underweight than those who earned less than 1000 ETB (AOR=2.056, 95% CI: 1.051–4.023). also, the study's finding disagrees with the findings of Desyibelew and Dadi (2019) who found that there was decreased odds of malnutrition among pregnant women with better economic status.

Table 2 shows that for parity, the distribution seems balanced except for Prima that showed normal BMI with considerable gap. This finding is anticipated because primas and their partners give their full resources to the pregnancy because of the excitements that comes with first pregnancy. This finding agrees with the findings of Bestman, Kaminga and Luo (2020) found that multi-parity is statistically significant factor that determine maternal under nutrition.

Table 3 shows the logistic regression analysis of socio-demographic characteristics and malnutrition among pregnant women. The table shows that family size (p= .010; AOR = 3.150; CI at 95% =1.321-7.513), mothers' income (p= .046; AOR = 2.428; CI at 95% = .757-2.694), child spacing (p= .014; AOR = 973; CI at 95% =562-1.685), and marital status (p= .031; AOR = 2.058; CI at 95% =1.068-3.965) are significant determinants of malnutrition among pregnant women, since their p-values are less than .05 level of significance at one degrees of freedom while educational level, age, parity and location are not significant determinants of malnutrition among the respondents. These findings are anticipated because marital status determine the number of people in a given household and the income flow in a family which impact on the quality of food taken in that family unlike age, parity, location and educational level. This finding aligns with the findings of Kedir, Berhane and Worku (2016) who found no association between malnutrition and maternal age but contradicts the findings of Lindsay, Gibney and McAuliffe (2012), Ramlal et al. (2012), Getanch and Negesse (2019) and Bestman, Kaminga and Luo (2020) in which age was a significant determinant of malnutrition among pregnant women. also, the findings of this study agrees with the outcome of Serbesa, Iffa and Geleto (2019)'s study that reported that inadequate spacing is a determinant of malnutrition among pregnant women.

Conclusion

The findings of the study revealed that income level, family size, child spacing and marital status were significant determinants of malnutrition among pregnant women accessing antenatal services in Enugu State health facilities. The study therefore concludes that income level, family size, child spacing and marital status are socio-demographic determinants of malnutrition while education level, age and parity are not socio-demographic determinants of malnutrition among women accessing antenatal services in Enugu State.

Recommendations

Based on the findings of this study, the discussion and conclusion, the study recommends that:

1. Nutrition education programmes of the ante-natal clinics should be revised to include malnutrition and its attendant consequences among pregnant women.
2. Family planning should be encouraged to reduce the significant impact of family size on nutrition of pregnant women and their families.
3. Adequate child spacing should be encouraged in order to improve maternal health.
4. Working class pregnant women should be encouraged to eat well balanced food to improve pregnancy outcomes.

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