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Dietary intake and diversity among pregnant women in Degema, Rivers State, Nigeria

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Abstract

Background: Dietary intake and diversity is an important measure of nutrient adequacy in pregnancy. However, not much is reported on dietary diversity and intake among pregnant women in Nigeria.

Objective: To determine dietary intake and diversity among pregnant women in Degema, Rivers State, Nigeria.

Methods: Convenience sampling technique was used to select 150 respondents among pregnant women attending antenatal clinic from October 2, 2019 to October 21, 2019 in three selected primary health centres in Degema. Structured questionnaire was used to collect data and hypotheses were tested at 0.05 level of significance.

Result: The mean age of the respondents was 30.93±1.27 years, 50.0% had attained secondary education, 27.1% had tertiary education, 34.3% were married, 26.4% were cohabiting. Self-employment (36.4%) and civil service (25.7%) were the major sources of livelihood of the respondents. More than half (54.3%) of the respondents earned ¦ 30,000 or less monthly. The average number of children for each woman was 3.01±1.86 with about half of them having between 3 and 5 children. The mean dietary diversity score was 5.33±1.74. A greater number (69.3%) attained the minimum dietary diversity score indicating that the dietary diversity of the respondents was high and adequate. Educational attainment significantly influenced dietary diversity of the respondents (χ^2= 9.827, p= 0.020) in the study area. In addition, daily meal frequency (x^2=10.097, p= 0.018), daily adequate meal (x^2=3.611, p= 0.050) and daily adequate fish/meat consumption (x^2= 4.660, p= 0.031) significantly influenced dietary diversity of the respondents.

Conclusion: The study strongly suggests that educational status, daily meal frequency, daily adequate meal and consumption of fish/meat influenced dietary diversity among pregnant women in Degema, Rivers State. A collective effort should be made to enhance the dietary diversity of pregnant women through the promotion of female education and nutritional counselling during antenatal care.

Keywords *Dietary diversity, dietary intake, nutrient inadequacy, maternal health*

Résumé

Contexte : L'apport et la diversité alimentaires sont une mesure importante de l'adéquation nutritionnelle pendant la grossesse. Cependant, peu de choses sont rapportées sur la diversité et l'apport alimentaires chez les femmes enceintes au Nigeria.

Objectif : Pour déterminer l'apport alimentaire et la diversité chez les femmes enceintes à Degema, dans l'État de Rivers, au Nigeria.

Méthodes : La technique d'échantillonnage de commodité a été utilisée pour sélectionner 150 répondantes parmi les femmes enceintes fréquentant la clinique prénatale du 2 octobre 2019 au 21 octobre 2019 dans trois centres de santé primaires sélectionnés à Degema. Un questionnaire structuré a été utilisé pour collecter les données et les hypothèses ont été testées au niveau de signification de 0,05.

Résultat : L'âge moyen des répondantes était de 30,93 ± 1,27 ans, 50,0 % avaient un diplôme d'études secondaires, 27,1 % avaient un diplôme d'études supérieures, 34,3 % étaient mariées, 26,4 % étaient en concubinage. Le travail indépendant (36,4%) et la fonction publique (25,7%) étaient les principales sources de revenus des répondantes. Plus de la moitié (54,3%) des répondants gagnaient 30000 ¦ ou moins par mois. Le nombre moyen d'enfants pour chaque femme était de 3,01±1,86 avec environ la moitié d'entre elles ayant entre 3 et 5 enfants. Le score moyen de diversité alimentaire était de 5,33 ± 1,74. Un plus grand nombre (69,3 %) a atteint le score minimum de diversité alimentaire indiquant que la diversité alimentaire des répondantes était élevée et adéquate. Le niveau d'éducation a influencé de manière significative la diversité alimentaire des

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répondantes (χ^2 = 9,827, p = 0,020) dans la zone d'étude. De plus, la fréquence de repas quotidien (χ^2 = 10,097, p = 0,018), de repas quotidien adéquat (χ^2 = 3,611, p = 0,050) et une consommation quotidienne adéquate de poisson/viande (χ^2 = 4,660, p = 0,031) ont influencé de manière significative la diversité du régime alimentaire des répondantes.

Conclusion: L'étude suggère fortement que le niveau d'éducation, la fréquence des repas quotidiens, un repas quotidien adéquat et la consommation de poisson/viande ont influencé la diversité alimentaire des femmes enceintes à Degema, dans l'État de Rivers. Un effort collectif doit être fait pour améliorer la diversité alimentaire des femmes enceintes par la promotion de l'éducation des femmes et des conseils nutritionnels pendant les soins prénatals.

Mots-clés *Diversité alimentaire, apport alimentaire, insuffisance nutritionnelle, santé maternelle*

Introduction

Adequate nutrition is vital for healthy living as it is widely accepted that we are what we eat. From birth, through the developmental stages of life till old age, good nutrition is essential for healthy growth of the body, mental development, performance and productivity and overall well-being of the individual [1]. There is no single food that can give all the nutrients that the human body requires, hence the need to consume a wide variety of foods to meet one's nutritional requirements [2]. This guarantees the improvement of diet quality and ensures adequate supply of nutrients for the individual. Diet diversity thus ensures the adequate intake of all the necessary nutrients required to maintain a healthy lifestyle in all age groups, irrespective of gender. However, it is of particular importance among vulnerable age groups such as newborns, growing children, women of reproductive age (especially the pregnant women) as well as the elderly [3].

Women of reproductive age are vulnerable to malnutrition especially during pregnancy. During this period, a woman's body undergoes dramatic changes to cater not only for her own needs but also that of the developing foetus. These changes usually take a heavy toll on the woman's body necessitating the need for balance which can be obtained through an adequate and balanced diet; thus, ensuring that there is sufficient energy intake for adequate growth of the foetus without drawing on the mother's tissues to maintain her pregnancy [4,5]. This ensures proper development of the foetus, maintenance of maternal health, reduction in risks of chronic diseases and positively influences birth outcomes [6]. Conversely, poor nutritional status during pregnancy has been associated with adverse pregnancy outcomes such as low birth weights, intrauterine growth retardation and preterm delivery [7]. In an ideal situation, everyone should have access to adequate nutrition, however many are denied access to this fundamental need. Across sub-Saharan Africa, a wide range of malnourishment has been reported [8] with an estimated 27-51 percent among underweight women of reproductive age; and most of them become pregnant with increased malnourishment with poor nutritional status [9]. Granted that it is widely accepted that the consumption of diversified diet is an important measure of nutrient adequacy especially in pregnancy, nevertheless, low birth weights, infant and maternal morbidity and mortality associated with malnutrition still remain a plague in Nigeria [10-12]. Maternal malnutrition is acknowledged as a major predisposing factor for morbidity and mortality among African women [13]. Based on this premise, it is therefore expedient to examine the dietary intake diversity among pregnant women in Degema, Rivers State, Nigeria.

Materials and method

Research design, sampling technique and sampling size

This study was carried out in Degema, a local government area in Rivers State which is one of the oil-rich states in the Niger delta region of Nigeria. Descriptive survey design was adopted in conducting this study. The target population for the study consisted of all pregnant women registered for antenatal care in healthcare facilities in Degema. A two-stage sampling procedure was adopted in this study. The first stage involved the purposive selection of three (3) healthcare facilities in Degema (Degema Town, Obuama and Usokun Healthcare facilities); the second stage involved the use of convenience sampling in the selection of fifty (50) pregnant women who came for antenatal care from October 2, 2019 to October 21, 2019 in each of the selected Healthcare facilities to make a total of 150 respondents. Each selected healthcare facility had between 70 -100 registered pregnant women.

Data collection

A structured questionnaire divided into two parts was used for data collection. The first part covered the socio-demographic data of the respondents, while the second part of the questionnaire comprised of dietary intake (eating) pattern and tools for measuring diet diversity was based on the FAO guidelines for measuring minimum dietary diversity in women [14]. A total of ten food groups was used. Respondents who consumed <5 food groups were classified as

not attaining minimum diet diversity score, whereas those who consumed ≥5 food groups were classified as attaining minimum diet diversity score.

the confidentiality of the information provided. Participation in the study was voluntary and each respondent was made to be aware that they could refuse to answer any question or reject the questionnaire.

Table 1: Socio-demographic characteristics of pregnant women in Degema

Variables	Description	Frequency	Percent
Age	18-25	48	34.3
	26-35	51	36.4
	e" 36	41	29.3
	Mean/SD	*30.93±1.27*	
Educational attainment	Informal education	12	8.6
	Primary	20	14.3
	Secondary	70	50.0
	Tertiary	38	27.1
Marital status	Single	29	20.7
	Cohabiting	37	26.4
	Married	48	34.3
	Divorced	8	5.7
	Separated	18	12.9
Occupation	Civil servant	36	25.7
	Private employed	24	17.1
	Self employed	51	36.4
	Fulltime housewife/unemployed	29	20.7
Monthly income (¦)	d" 30,000	76	54.3
	31,000-100,000	36	25.7
	Ã 100,000	28	20.0
	Mean/SD	¦87,825.71±*51,423.94*	
Religion	Christianity	120	85.7
	Islam	12	8.6
	Traditionalist	8	5.7
Number of children	0-2	58	41.4
	3-5	68	48.6
	6-8	11	7.9
	Ã 8	3	2.1
	Mean/SD	*3.01±1.86*	

Validity and reliability of instrument

Series of consultations were carried out with other experts in the field and experts in the field of measurement and evaluation for vetting and subsequent corrections. A pre-test was carried out by giving the questionnaire to pregnant women attending antenatal clinic in a Primary Health Centre in Port Harcourt metropolis. The test-retest reliability index of 0.87 was obtained, indicating that the instrument met the appropriate psychometric requirements for data collection and was considered good for the study.

Ethical considerations

This study was conducted in accordance with the Declaration of Helsinki. A written informed consent was obtained from each participant after the purpose of the study was explained to them, and they were assured of

Data analysis

Data analysis was performed using SPSS software version 21. Descriptive statistics was carried out using frequency tables, percentages and mean, while inferential statistics were carried out using Chi-square test. The level of significance was set at $p \leq 0.05$.

Results

Socio-demographic characteristics of the respondents

Table 1 showed the sociodemographic characteristics of the women. The average age of the respondents was 30.93±1.27 years, half of the respondents (50.0%) had secondary education while more than a quarter (27.1%) had tertiary education. More than a third (34.3%) and a quarter (26.4%) were legally married and cohabiting respectively. A good number

of the respondents were either self-employed (36.4%) or civil servants (25.7%) with a mean monthly income of ¦ 87,825.71±51,423.94. The average number of children each woman had was 3.01±1.86. Christianity (85.7%) was the dominant religion in the study area.

week, while 15.7% consumed fish and palm oil simultaneously for seven or more times per week, and 14.3% consumed leafy vegetables.

Table 2: Distribution of respondents by different type of food groups consumed per week at Degema

Food groups/items Carbohydrates	Not at all Freq. (%)	1-2 times Freq. (%)	3-4 times Freq. (%)	5-6 times Freq. (%)	≥ 7 times Freq. (%)
Cassava products	7(5.0)	66(47.1)	38(27.1)	14(10.0	15(10.7)
Cocoyam	73(52.1)	47(33.6	12(8.6)	5(3.6)	3(2.1)
Yam	24(17.1)	71(50.7)	32(22.9)	10(7.1)	3(2.1)
Potatoes	38(27.1)	67(47.9)	24(17.1)	10(7.1)	1(0.7)
Rice	12(8.6)	53(37.9)	49(35.0)	20(14.3)	5(3.6)
Maize	45(32.1)	74(52.9)	13(9.3)	4(2.9)	4(2.9)
Wheat	86(61.4)	28(20.0)	19(13.6)	6(4.3)	1(0.7)
Bread	19(13.6)	74(52.9)	40(28.6)	3(2.1)	4(2.9)
Protein					
Egg	21(15.0)	85(60.7)	26(18.6)	3(2.1)	5(3.6)
Poultry (chicken/turkey)	36(25.7)	63(45.0)	28(20.0)	7(5.0)	6(4.3)
Beef	35(25.0)	65(46.4)	33(23.6)	7(5.0)	0(0.0)
Snail	56(40.0)	45(32.1)	25(17.9)	10(7.1)	4(2.9)
Sea foods (fish)	14(10.0)	50(35.7)	39(27.9)	15(10.7)	22(15.7)
Beans	22(15.7)	75(53.6)	31(22.1)	6(4.3)	6(4.3)
Soybean	76(54.3)	43(30.7)	16(11.4)	3(2.1)	2(1.4)
Groundnut	24(17.1)	63(45.0)	39(27.9)	9(6.4)	5(3.6)
Fat and Oil					
Margarine/butter	65(46.4)	53(37.9)	15(10.7)	5(3.6)	2(1.4)
Palm oil	8(5.7)	52(37.1)	37(26.4)	21(15.0)	22(15.7)
Vegetable oil	41(29.3)	50(35.7)	22(15.7)	13(9.3)	14(10.0)
Mineral salt and vitamins					
Leafy vegetables (ugu, green)	9(6.4)	63(45.0)	37(26.4)	11(7.9)	20(14.3)
Fruits (carrots, oranges, pear, avocado,etc)	13(9.3)	57(40.7)	35(25.0)	20(14.3)	15(10.7)
Beverages (Bournvita, Milo, etc)	29(20.7)	61(43.6)	28(20.0)	13(9.3)	9(6.4)

Different types of food groups consumed by the pregnant women in Degema, Rivers State

Table 2 revealed that all the different types of food groups were consumed at least 1-2 times per week. Maize (52.9%), bread (52.9%) and yam (50.7%) were consumed 1-2 times a week. More than one-third (35.0%) consumed rice 3-4 times weekly, a little above one-quarter (28.6%) consumed bread 3-4 times a week. The result further showed that a good number (60.7%) consumed eggs 1-2 times a week, more than half (53.6%) consumed beans 1-2 times per week, 27.9% consumed fish and groundnut 3-4 times every week and 26.4% consumed palm oil and leafy vegetables 3-4 times per week, concurrently. The result also showed that 10.7% of the respondents consumed cassava products 7 or more times per

Dietary intake (eating) pattern of pregnant women in Degema, Rivers State

The result of dietary intake pattern as presented in Table 3 revealed that almost half of the respondents (43.6%) eat breakfast, lunch and dinner daily up to three to four times in a week, while 3.6% do not eat breakfast, lunch and dinner daily. A good number of the respondents (67.9%) eat breakfast, while 32.1% do not eat breakfast. When asked the frequency of their daily meal intake, 6.4% ate once a day, 45.7% ate two times a day, 33.6% ate three times a day, while 14.3% ate more than three times a day. When asked if they take adequate meal in a day, a good number (67.1%) believed that they take adequate meal, while 32.9% believed that they do not take adequate meal. When asked if they eat food from

Table 3: Distribution of respondents by dietary intake (eating) pattern

Variables	Description	Frequency	Percent
How often do you eat breakfast, lunch and dinner in a week?	Never	5	3.6
	1-2 times	55	39.3
	3-4 times	61	43.6
	Ã 4	19	13.6
Do you have breakfast daily?	Yes	95	67.9
	No	45	32.1
How frequent is your daily meal?	Once a day	9	6.4
	Two times a day	64	45.7
	Three times a day	47	33.6
	More than three times a day	20	14.3
Frequency of local snacks consumption per week	Never	39	27.9
	1-2 times	45	32.1
	3-4 times	41	29.3
	Ã 4	15	10.7
Do you take adequate meal each day?	Yes	94	67.1
	No	46	32.9
Do you eat food from various food groups daily?	Yes	88	62.9
	No	52	37.1
Do you eat adequate meat/fish daily?	Yes	93	66.4
	No	47	33.6
Do you eat adequate fruits and vegetables?	Yes	102	72.9
	No	38	27.1
Do you eat geophagic substance (paper, clay, metal, chalk, soil, glass, sand)?	Yes	21	15.0
	No	119	85.0
If yes, which substance	Chalk	10	7.1
	Clay	11	7.9
Dietary diversity scores of respondents	2-3	23	16.4
	4-6	77	55.0
	≥7	40	28.6
	Mean/SD	*5.33±1.74*	
Minimum Dietary diversity score attainment	Minimum DDS attained	97	69.3
	Minimum DDS not attained	43	30.7

different food groups daily, 62.9% believed that they ate food from different food groups daily, while 37.1% believed that they do not eat food from different food groups daily. A good number (66.4%) indicated that they ate adequate quantity of fish/meat daily, majority (72.9%) admitted that they consumed adequate quantity of fruits and vegetables daily. Moreover, 85.0% of the respondents indicated that they do not eat geophagic materials such as calabash chalk and clay, while 15% ate geophagic materials. The result further revealed that the mean dietary diversity score (DDS) was 5.33±1.74; more than half (55.0%) of the respondents had a DDS range of 4-6, 28.8% had a DDS range of e"7, while 16.4% had a DDS range of 1-3. In addition, majority (69.3%) of the respondents attained the minimum five-point score, while 30.7% did not attain the minimum score.

Influence of socio-demographic characteristics on dietary diversity in Degema, Rivers State

The influence of selected socio-demographic characteristics on dietary diversity scores is presented on Table 4. The result revealed that only educational attainment (x^2= 9.827, p= 0.020) significantly influenced dietary diversity in Degema, while age (x^2= 2.800, p= 0.247), occupation (x^2= 3.538, p= 0.316) and monthly income (x^2= 3.662, p= 0.160) do not significantly influence dietary diversity in the study area.

Influence of dietary intake pattern on dietary diversity among respondents in Degema, Rivers State

The influence of dietary intake pattern on dietary diversity as presented on Table 5 indicates that daily

Table 4: Influence of socio-demographic characteristics on dietary diversity at Degema

Variables	Dietary diversity		x^2-value	p-value
Age	Minimum DDS not attained	Minimum DDS attained		
18-25	19(39.6)	29(60.4)		
26-35	14(27.5)	37(72.5)	2.800	0.247
≥36	10(24.4)	31(75.6)		
Educational attainment				
Informal	5(41.7)	7(58.2)		
Primary	10(50.0)	10(50.0)	9.827	0.020*
Secondary	23(32.9)	47(67.1)		
Tertiary	5(13.2)	33(86.8)		
Occupation				
Civil servant	8(22.2)	28(77.8)		
Private employed	10(41.7)	14(58.3)	3.538	0.316
Self employed	14(27.5)	37(72.5)		
Fulltime housewife	11(37.9)	18(62.1)		
Monthly income (₦)				
≤30,000	28(36.8)	48(63.2)		
31,000-100,000	10(27.8)	26(72.2)	3.662	0.160
≥100,000	5(17.9)	23(82.1)		

meal frequency (x^2= 10.097, p= 0.018), daily adequate meal (x^2= 3.611, p= 0.050) and daily adequate consumption of fish/meat (x^2= 4.660, p= 0.031) significantly influence dietary diversity among the respondents at Degema. Conversely, regular eating of three times meal per week (x^2= 6.614, p= 0.085), frequency of snacks eating (x^2= 4.189, p= 0.242), eating of breakfast (x^2= 3.319, p= 0.191) and eating different food groups (x^2= 0.559, 0.455) had no significant influence on dietary diversity of the respondents.

Discussion

The results of this study revealed that majority of the respondents were young women who are literate (with at least a secondary school level of education) thus are aware of the benefits and importance of adequate dietary intake. A large number were economically active as shown by the large percentage who were self-employed or in paid employment hence have the means to Kafford basic necessities. However, many may not be able to afford beyond the very basic life necessities since many earned an income that is less than $1.90 per day as stipulated by World Bank [15] thus an indication that a good number of the respondents were living below poverty line. The mean number of children that respondents had showed a level of reproductive literacy and awareness.

Majority of the respondents consumed foods from almost all the major food groups. Rice was the most consumed member of the carbohydrate food group and it was followed by cassava products which a large group of the respondents consumed several times in a week. This finding is similar to that of Akarolo-Anthony *et al* [16] who reported that rice is the most consumed carbohydrate followed by cassava products such as 'fufu' and 'garri', this is collaborated by the FAO Report [17] that rice and cassava (products) are the major staples in Nigeria. The major source of protein in the study area Degema was the animal protein (fish), majority consumed this in their diet several times within a week. Others supplemented this protein intake with the consumption of beans which is a very good protein supplement. The choice of fish and other sea foods as the major source of protein could be due to the strategic location of Degema on an outlet of the River Niger (the Sambreiro River), hence there is an abundant source for seafoods and the locals engage in fishing as one of their major occupations [18-20], thus its availability and affordability makes it a top choice for consumption. Availability and affordability are key factors that plays a major role in the access to a balanced and adequate diet, the reason being that food may be available but the individual may not have the required purchasing power; this therefore affects the choice and decision on an adequate diet.

Table 5: Influence of dietary intake pattern on dietary diversity among respondents

Variables	Nutritional intake Minimum DDS not attained	Minimum DDS attained	x^2-value	p-value
How often do you eat breakfast, lunch and dinner in a week?				
Never	4(80.0)	1(20.0)		
1-2 times	16(29.1)	39(70.9)	6.614	0.085
3-4 times	19(31.1)	42(68.9)		
Ã 4 times	4(21.1)	15(78.9)		
Frequency of local snacks consumption per week				
Never	16(41.0)	23(59.0)		
1-2 times	13(28.9)	32(71.1)	4.189	0.242
3-4 times	12(29.3)	29(70.7)		
Ã 4 times	2(13.3)	12(86.7)		
How frequent is your daily meal?				
Once a day	7(77.8)	2(22.2)		
Two times a daily	17(26.6)	47(73.4)	10.097	0.018*
Three times a day	13(27.7)	34(72.3)		
Ã3 times a day	6(30.0)	14(70.0)		
Breakfast				
Yes	31(33.3)	64(67.7)	3.314	0.191
No	11(24.4)	34(75.6)		
Do you take adequate meal each day?				
Yes	24(25.5)	70(74.5)	3.611	0.050*
No	19(41.3)	27(58.7)		
Do you eat food from various food groups daily?				
Yes	29(33.0)	59(67.0)	0.559	0.455
No	14(26.9)	38(73.1)		
Do you eat adequate meat/ fish daily?				
Yes	23(24.7)	70(75.3)	4.660	0.031*
No	20(42.3)	27(57.4)		
Do you eat adequate fruits/ vegetables?				
Yes	31(30.7)	70(69.3)	0.000	0.993
No	12(30.8)	27(69.2)		

A good number of the respondents met their fat and oil requirement from the consumption of palm oil. Palm oil can be locally processed from palm trees that are grown in the area consequently it is also readily accessible, affordable and available. In order to meet the required necessary minerals and vitamins, leafy vegetables such as 'ugu' (pumpkin leaves), fruits like carrots, oranges and pear were consumed several times within the week. Pumpkin leaves are crops that are usually grown in gardens around the home or farms that are not so far from the home; orange and pears trees can be found growing in the compounds of indigenes usually used as environmental covers in these localities thus their fruits are also readily available and affordable. Giving credence to this finding, earlier research had shown that availability and affordability of 'ugu' leaves made it the favourite leafy vegetables in Rivers State [21-23].

The result showed that a large percentage of the respondents promptly ate their breakfast however, a reasonable number skipped breakfast. A similar result was obtained by Nana and Zema [24] among pregnant women in north western Ethiopia. They reported that most pregnant women do skip meals and that breakfast was the most skipped meal. The reasons for skipping breakfast by pregnant

women has been attributed to lack of appetite, nausea and sometimes a long-term habit of not eating breakfast [25]. Many women experience an aversion to food when pregnant, this is mostly due to the fact that many pregnant women find out that they get nauseous at the sight of food. Changes such as increase in hormones (oestrogen and human chorionic gonadotropin-hCG) levels and a loss of taste contribute to this nauseous feeling that many women experience during pregnancy [26]. Several of the respondents reported consuming snacks regularly, this is in tandem with the work of Nana and Zema [24] who posit that it is the habit of pregnant women to snack, some pregnant women even go to the extent of exchanging their meals for snacks [27]. Eating of snacks by pregnancy women is a way many of these women make up for the energy they require in between meals, those who did not eat breakfast often resort to eating snacks when they get hungry. Food taboos, belief system and wealth indices also play important roles in diet adequacy. In some localities, women and children are restricted from locally available and affordable nutritious food substances that would ensure a balanced and adequate diet because of perceived harm that such foods could cause to the women and children; for others, their religious affiliations prohibit consumption of certain foods irrespective of their nutritious content [28-31].

The mean dietary diversity score in this study was consistent with that reported in six Nigerian States [32], but was lower than that obtained in Ogun State, Nigeria [33]. Majority of the respondents attained the minimum dietary diversity score of 5 points, while a reasonable number failed to attain the minimum point. This finding contradicts Aliwo *et al* [34] who reported low dietary diversity among majority of the pregnant women in Ethiopia. The attainment of minimum dietary diversity by majority of the respondents in this study could have been driven by the affordability of locally available food such as cassava products, palm oil, egg, sea foods (fish), fruits and vegetables; and this is similar to the observation made by Adubra *et al* [35].

Influence of socio-demographic characteristics on dietary diversity among pregnant women in Degema, Rivers State

The influence of selected socio-demographic characteristics on dietary diversity among respondents in this study reveals that only educational attainment significantly influenced the dietary diversity of the respondents. This finding is in agreement with that of Kiboi, Kimiywe and Chege [22] who reported that an association exists between respondents' educational level and dietary diversity attainment. In addition, they reported that respondents with secondary and tertiary education were three times more likely to attain minimum dietary diversity than respondents with lower educational attainment. Education exposes individuals to a wider range of dietary options available and the health benefits, thus the individual can make informed decisions concerning food choice based on these wide range. It is pertinent to note that this can be hindered if one does not have the required purchasing power. Age had no significant influence on dietary diversity of the respondents, although it was observed that majority of the older women attained the minimum dietary diversity in the study area. This finding contradicts Gitagia *et al* [36] who observed that age has a significant influence on dietary diversity among respondents on high potential (wealth indices). Availability and affordability may play a role in the non-significant effect that age had on the dietary diversity in the study area. Many of the food substances in the various food groups can be accessed locally hence they are readily available and affordable to all age groups. The current study further showed that dietary diversity was not significantly influenced by respondents' occupation and monthly income; availability and affordability of food substances in this case ensures that irrespective of the individual's economic status, there are food choices that are within the purchasing power of respondents. The fact that majority of the respondents with monthly income greater than ¦ 100,000 attained minimum dietary diversity, signifies that wealth indices could positively influence minimum dietary diversity attainment in the study area [22,34].

Influence of dietary intake pattern on dietary diversity

Adequate dietary intake is often associated with food variety and diet quality of individuals. Sadly, most pregnant women in developing countries often fall short of their basic nutritional requirement with severe consequences on feto-maternal health and pregnancy outcomes [34,37]. The result presented on Table 5 indicates that dietary diversity of pregnant women in Degema was significantly influenced by daily meal frequency, daily adequate meal intake and daily adequate fish/meat consumption. This finding agreed with Sangeetha *et al* [38] who reported that daily consumption of diet-rich in diversity is associated with adequate and greater nutrients intake which could serve as an indicator for minimum dietary diversity attainment. Suffice to note that regular eating of three times meal, regular eating of breakfast, frequent eating of snacks, eating foods from different food groups, and daily consumption of fruits/vegetable had no significant influence on dietary diversity in the study area. These could be due to the fact that most of the respondents had poor eating habit as evidenced in their dietary intake pattern.

This study had some limitations. Availability and accessibility of food in the study area and respondents may likely vary with seasons and this may affect dietary diversity of respondents. Thus, twenty-four-hour recall may not reflect a true picture of the respondents' feeding experience.

Conclusion

Dietary intake and diversity among pregnant women in Degema, Rivers State is high and adequate. The study strongly suggests that educational status, daily meal frequency, daily adequate meal and consumption of fish/meat influence dietary diversity among pregnant women in Degema, Rivers State. A collective effort should be employed to enhance the dietary diversity of pregnant women through the promotion of female education and nutritional counselling during antenatal care.

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