Original Research Article

Pattern of Vegetable Consumption among Pregnant Women Attending Primary Health Care Facilities in Patani Local Government Area of Delta State, Nigeria

ABSTRACT

Aim: Vegetables provide key nutrients essential to promoting and maintaining good health. This study aimed to determine the perception of the importance and pattern of vegetable consumption among pregnant women attending Primary Health Care facilities in Patani Local Government Area (L.G.A) of Delta State, Nigeria.

Study Design: A population-based descriptive cross-sectional survey of 368 pregnant women aged 15-49 years was conducted in Patani L.G.A, Plateau State, Nigeria using a multi-stage cluster random sampling design.

Methodology:Data were collected by face-to-face interview using a structured questionnaire. Food Frequency Questionnaire (FFQ) data were used to estimate habitual frequency of intake of dark green leafy vegetable for previous 7 days.

Results:Of the 368 pregnant women, age group 21-25 years and 26-30 years with prevalence of 95 (25.8%) and 90 (24.5%) respectively were the highest age groups. Two hundred and twenty-one (60.1%) agree that a maternal diet rich in vegetables and eaten during pregnancy reduces risk of gestational diabetes, hypertension, preterm birth and foetal growth restriction, and the perception of the respondents was high.Ugu leaf 257 (69.8%), Bitter leaf 173 (47.0%) and water leaf 151 (41.0%) were the most available vegetable in the respondent's community. 19% of the respondents did not consume vegetable, 26.6% consumed vegetable seven times and 13.9% consumed vegetables three times in the last 7 days prior to the study. The mean frequency of vegetable consumption is 11.6%.55% of respondents put vegetables into food towards the end of cooking the food.33.4%of the respondents spent ₦ 150- ₦ 200 to purchase vegetable to cook.

Conclusion:Vegetable consumption is highly nutritious especially during pregnancy. Its pattern of consumption varies depending on the perception of its importance, educational status, age group, types of vegetable available and the financial power of purchase.

1. INTRODUCTION

Vegetables are essential ingredients of a healthy diet because they are rich sources of minerals, flavonoids, and antioxidants necessary for good health [1].Vegetables provide key nutrients essential to promoting and maintaining health[2]. An abundance of evidence showed that diets rich in vegetables reduce chronic disease risk including coronary heart disease, stroke and asthma[2]–[4]. The botanical term vegetable refers to any plant, edible or not, including trees, bushes, vines and vascular plants. There are two slightly different botanical definitions for the term vegetable as it relates to food. According to one, a vegetable is a plant cultivated for its edible part(s); according to the other, a vegetable is the edible part(s) of a plant, such as the stems and stalk (celery), root (carrot), tuber (potato), bulb (onion), leaves (spinach, lettuce), flower (globe artichoke), fruit (apple, cucumber, pumpkin, strawberries, tomato) or seeds (beans, peas)[5]. The latter definition includes fruits as a subset of vegetables.

In developing countries, pregnant women start pregnancy with already depleted body stores of vitamins[6]. This is mainly due to poor nutritional intake, repeated infections, menstrual blood loss and frequent pregnancies. It is also associated with socioeconomic conditions, lifestyles, and health-seeking behaviours across different cultures[7], [8]. Pregnancy reflects a unique period when maternal dietary intake has implications for both the mother and the developing fetus.Inadequate vegetable consumption has unintended consequences, especially during critical life course stages, such as pregnancy. Suboptimal maternal dietary intake during pregnancy is associated with adverse pregnancy outcomes, including gestational diabetes and hypertension[9], and poorer birth outcomes[10]. Evidence suggests that improving prenatal vegetable intake can promote optimal pregnancy and birth outcomes. Higher maternal vegetable intake before or during pregnancy is associated with a decreased risk of miscarriage[11], pre-eclampsia[12], upper respiratory infections[13], protects against gestational diabetes in the mother[14] and improves infant birthweight[2], [15].

It has been established that inadequate vegetable consumption has unintended consequences such as gestational diabetes and hypertension and poorer birth outcomes especially during critical life course stage of pregnancy[9]. These consequences will continue to linger on pregnant women and their unborn child if research of this kind is not done to identify the perception of the importance and the pattern of vegetable consumption among pregnant women in Patani Local Government Area.

2. MATERIALS AND METHODS

2.1 Study Design

A descriptive cross-sectional study of vegetable consumption among pregnant women attending antenatal care in primary health care facilities in Patani Local Government Area of Delta State, Nigeria. Primary health care facilities were randomly

selected from each of the 10 political wards for wide coverage. Data were collected using self-administered questionnaires from 368 pregnant women.

2.2 Study Area

Patani Local Government Area of Delta State, Nigeria was the study area. Its headquarters is in the town of Patani. It has an area of 217 km^2 and a population of 67,707 at the 2006 census[16]. The area is characterize with decrease vegetation attributed to urban expansion and flooding events due to rapid urbanization and anthropogenic activities [17].

2.3 Study Population

The study population for this study were pregnant women aged 15- 49 years attending antenatal care in primary health care facilities in Patani Local Government Area of Delta State.

2.4 Sample Size

The minimum sample size for this study was estimated using the formula for single proportion in line with [18].

$$n = Z^2pq/ e^2$$

Where;

n = the desired sample size (when population is >10,000)

Z = the abscissa of the normal curve that cuts off an area-α at the tails (1 - α equals the desired confidence level, e.g., 95%) which is 1.96.

e = the desired level of precision (degree of accuracy) which is 5% (0.05)

p = the estimated proportion of an attribute that is present in the population which is taken as 71% i.e 0.71 [prevalence of pregnant women consumed green leafy vegetables (Umallawala *et al.,* 2022)].

q = 1-p, i.e (1-0.71)

$$n = Z^2pq/e^2$$

$$n = (1.96)^2 \times 0.71 \times 0.29 /(0.05)^2$$

n = 316

Minimum sample size = 316 Participants

2.5 Sampling Technique

A total of 368 pregnant women from Patani Local Government Area of Delta State were randomly enumerated for the study. In the first stage, five (5) wards were randomly selected from the 10 wards in the Local Government Areas for the

survey. In the second stage, two (2) primary health care facilities were randomly selected from each of the wards. In the third stage, numbers of study participants were assigned to each selected health facility proportional to their twelve (12) months average client size attendance in the registration book of each antenatal care unit. Thus, mathematically, average number of pregnant women aged 15-49 years attending antenatal care in each health facilities multiplied by the total sample size (N = 368), divided by the total number of pregnant women attending the entire antenatal care facilities.

In other words,

$$\text{Number of participants per facility} = \frac{\text{average number of pregnant women aged } 15-49 \text{ years x } 368}{\text{total number of pregnant women attending the entire facilities } (490)}$$

This resulted in 38, 64, 86, 99 and 81 participants respectively from each of the five (5) facilities, making a total of 368 respondents.

2.6 Method of Data collection

Data were collected by face-to-face interview using a structured questionnaire. Food Frequency Questionnaires (FFQ) data were collected to estimate habitual frequency of intake of dark green leafy vegetable for previous 7 days. For example, an item consumed once a week was assigned a score of 1 while items consumed once daily was assigned a score of 7[19]. Nine (9) common dark green vegetables in Nigeria markets were enlisted for this study. .

2.7 Method of Data analysis

The statistical data obtained were analyzed using the Statistical Package for Social Sciences (IBM SPSS for Window 10 Version 20.0; SPSS Inc., Chicago, USA). Frequency distribution and descriptive statistics were presented in tables. Cross tabulation, Chi square test and Fisher's exact test were used to determine perception of importance and pattern of vegetable consumption among pregnant women attending antenatal care.All p-values reported were two tailed and statistical significances were defined at $P = .05$.

2. RESULTS AND DISCUSSION

2.1 Results

A total of 368 respondents were recruited to study vegetable consumption among pregnant women attending primary health facilities in Patani Local Government Area of Delta State, Nigeria.

In Table 1, age group 21-25 years and 26-30 years with prevalence of 95 (25.8%) and 90 (24.5%) respectively were the highest age groups. While age group 10-15 years with prevalence of 3 (0.8%) was the lowest. Majority of the respondents 306 (83.2%) were married, with secondary educational status of 240 (65.2%). Only 16 (4.3%) had no formal education. Most of the respondents were self-employed 165 (44.8%) and unemployed 150 (40.8%). 266 (72.3%) of the respondents' income per month were less than N 30,000 and 80 (21.7%) were between N 30,000 and N 50,000. 132 (35.9%) had 1-2 children, while 124 (33.7%) had 3-4 children.

Table 1: Sociodemographic Information of Respondents

Variables	Options	Frequency (N= 368)	Percentage (%)
Age Group	10-15 years	3	0.8
	16-20 years	43	11.7
	21-25 years	95	25.8
	26-30 years	90	24.5
	31-35 years	80	21.7
	36-40 years	46	12.5
	40 years and above	11	3.0
Marital Status	Single	59	16.0
	Married	306	83.2
	Divorced	2	0.5
	Widow	1	0.3
Educational Background	No formal Education	16	4.3
	Primary Education	57	15.5
	Secondary Education	240	65.2
	Tertiary Education	55	14.9
Occupational Status	Self Employed	165	44.8
	Privately Employed	40	10.9
	Government Employed	13	3.5
	Unemployed	150	40.8
Minimum Income per Month	< N 30,000	266	72.3
	N 30,000-N 50,000	80	21.7
	N 51,000 - N 100,000	13	3.5
	> 100,000	9	2.4
Number of Children	None	56	15.2
	1-2	132	35.9
	3-4	124	33.7
	5-6	50	13.6
	7-8	3	0.8
	> 8	3	0.8

3.1.1 Importance of Vegetable Consumption

In Table 2, although, majority of the respondents 237 (64.4%) agree (A) that vegetables are known to be rich in vitamins, minerals and fibre, the perception of its importance is low. Meanwhile, 221 (60.1%) agree (A) that maternal diet rich in vegetable and eaten during pregnancy reduces risk of gestational diabetes, hypertension, preterm birth and foetal growth restriction and the perception of the whole respondents was high. Similarly, 221 (60.1%) agree (A) that intake of vegetables reduces risk of NCDs such as heart diseases, colorectal cancers and stroke and the perception of the whole respondents was high.

Table 2: Perception of the Importance of Vegetable Consumption by Respondents

Variables	Mean	SA (%)	A (%)	UN (%)	DA (%)	SD (%)	REMARK
1) Vegetables are known to be rich in vitamins, minerals and fibre	1.42	116 (31.5)	237 (64.4)	8 (2.2)	5 (1.4)	2 (0.5)	Low
2) Maternal diet rich in vegetable and eaten during pregnancy reduces risk of gestational diabetes, hypertension, preterm birth and foetal growth restriction	1.51	112 (30.4)	221 (60.1)	28 (7.6)	6 (1.6)	1 (0.3)	High
3) Intake of vegetables reduces risk of NCDs such as heart diseases, colorectal cancers and stroke	1.54	102 (27.7)	221 (60.1)	36 (9.8)	9 (2.4)	0 (0)	High

SA= Strongly Agree, A= Agree, UN= Undecided, DA= Disagree, SD= Strongly Disagree
Weighted mean= $\frac{1.42+1.51+1.54}{3}$ = 1.49

3.1.2 Patterns of Vegetable Consumption

In Table 3, Ugu leaf 257 (69.8%), Bitter leaf 173 (47.0%) and water leaf 151 (41.0%) were the most available vegetable in the respondent's community. While Uziza leaf 4 (1.1%) and Okazi (Afam) leaf 5 (1.4%) were the least available vegetable in the respondent's community.

Table 3: Vegetables available in Respondents Community

Variable	Options	Frequency (N= 368)	Percentage (%)
Greens	Yes	83	22.6
	No	285	77.4
Ugu	Yes	257	69.8
	No	111	30.2
Water Leaf	Yes	151	41.0
	No	217	59.0
Bitter Leaf	Yes	173	47.0
	No	195	53.0
Scent Leaf	Yes	115	31.3
	No	253	68.8
Uziza Leaf	Yes	4	1.1
	No	364	98.9
Curry Leaf	Yes	15	4.1
	No	353	95.9
Okazi Leaf (Afang Leaf)	Yes	5	1.4
	No	363	98.6
Garden Egg	Yes	14	3.8
	No	354	96.2

Figure 1 showed that 19% of the respondents did not consume vegetable in the last 7 days prior to the survey. While 26.6% consumed vegetable seven times, 13.9% consumed vegetables three times in the last 7 days prior to the study. The mean frequency of vegetable consumption is 11.6%.

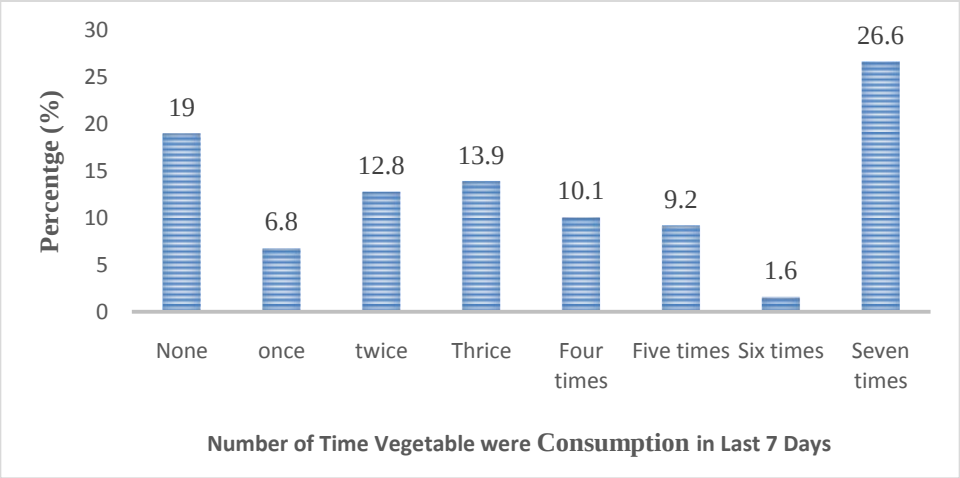

Figure 1: Number of Time Vegetable were Consumption in Last 7 Days

In Figure 2, 14% of the respondents put vegetables into food at the beginning of cooking, while majority 55% put vegetables into food towards the end of cooking the food.

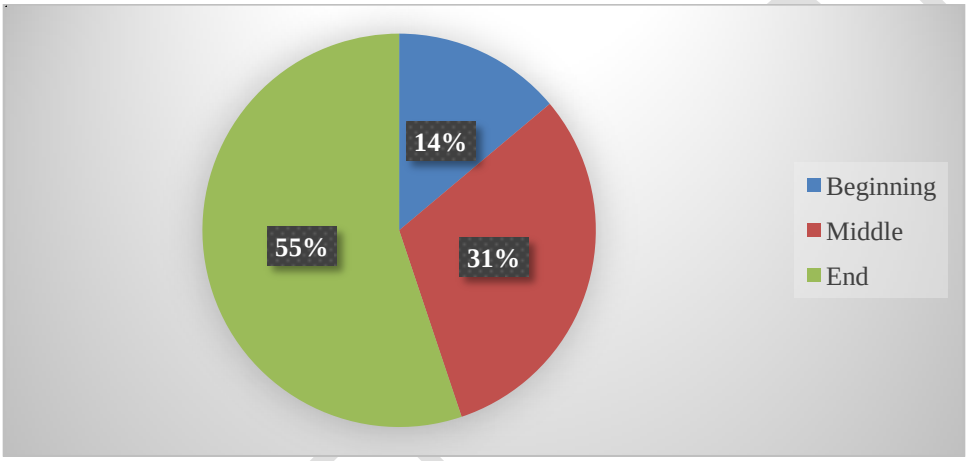

Figure 2: Time Vegetable was put into food while Cooking

In Figure 3, majority (33.4%) of the respondents spent between N 150- N 200 to purchase vegetable to cook, while 15.8% spent between N 50 – N 100 vegetables to cook.

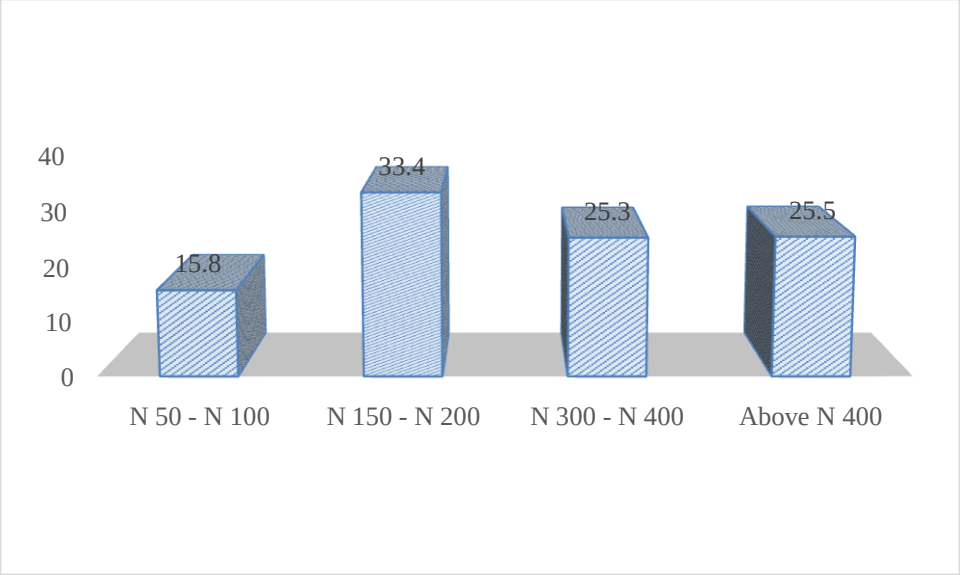

Figure 3: Amount of Vegetable in Naira Purchase to Cook

In Table 4, 21 (21.1%) of respondents age group 21-25 years spent between N50 – N100 to purchase vegetable. In age group 26 – 30 years, 33 (36.7%) of respondents spent between N 150 – N200, and 24 (26.7%) spent above N 400 to purchase vegetable. 101 (33.0%) of married respondents spent between N 150 – N200, and 82 (26.8%) spent above N 400 to purchase vegetable. The association between age group, marital status and cost of vegetable purchased was not statistically significant (*P*>.05). Majority 8(50.0%) of respondents with no formal education spent between N50 – N100 to purchase vegetable, while 17 (30.9%) of respondents with tertiary education spent above N 400 to purchase vegetable. The association between educational status and cost of vegetable purchased was statistically significant (*P*= 0.009).While 33 (22.0%) unemployed respondents spent between N50 – N100 to purchase vegetable, 7 (53.8%) of respondents with government employment spent above N 400 to purchase vegetable. The association between occupational status and cost of vegetable purchased was statistically significant (*P*= 0.003). Findings showed that 4 (30.8%) of respondents whose minimum income per month were between N 51,000 – N 100, 000 spent between N50 – N100 to purchase vegetable and 30 (37.5%) of respondents whose minimum income per month were between N 30,000 – N 50, 000 spent above N 400 to purchase vegetable. The association between occupational status and cost of vegetable purchased was not statistically significant (*P*= 0.109). While 1 (33.3%) of respondents with 7-8 and greater than 8 children respectively spent between N50 – N100 to purchase vegetable, 37 (29.8%) of respondents with 3-4 children spent between N 300 - N 400 to purchase vegetable. The association between number of children and cost of vegetable purchased was not statistically significant (*P*= 0.749).

Table 4: Sociodemographic by Cost of Vegetables Purchased in Naira to Cook

Variables		Cost of vegetables purchase in Naira N = 368 (%)					
		N 50 – N 100	N 150 – N 200	N 300 – N 400	Above N 400	$\chi 2$	P-Value
Age Group	10-15 years	0(0)	1(33.3)	2(66.7)	0	23.4980	0.172
	16-20 years	10(23.3)	17(39.5)	7(16.3)	9(20.9)		
	21-25 years	20(21.1)	31(32.6)	23(24.2)	21(22.1)		
	26-30 years	11(12.2)	33(36.7)	22(24.4)	24(26.7)		
	31-35 years	14(17.5)	25(31.3)	24(30.0)	17(21.3)		
	36-40 years	2(4.3)	15(32.6)	11(23.9)	18(39.1)		
	> 40 years	1(9.1)	1(9.1)	4(36.4)	5(45.5)		
Marital Status	Single	9(15.3)	22(37.3)	16(27.1)	12(20.3)	7.362	0.599

	Married	48(15.7)	101(33.0)	75(24.5)	82(26.8)		
	Divorced	1(50.0)	0(0)	1(50.0)	0(0)		
	Widow	0(0)	0(0)	1(100.0)	0(0)		
Educational Status	No formal Education	8(50.0)	0(0)	4(25.0)	4(25.0)	22.119	0.009
	Primary Education	10(17.5)	22(38.6)	16(28.1)	9(15.8)		
	Secondary Education	33(13.8)	82(34.2)	61(25.4)	64(26.7)		
	Tertiary Education	7(12.7)	19(34.5)	12(21.8)	17(30.9)		
Occupational Status	Self Employed	20(12.1)	66(40.0)	36(21.8)	43(26.1)	25.415	0.003
	Privately Employed	4(10.0)	7(17.5)	17(42.5)	12(30.0)		
	Government Employed	1(7.7)	1(7.7)	4(30.8)	7(53.8)		
	Unemployed	33(22.0)	49(32.7)	36(24.0)	32(21.3)		
Minimum Income per Month	< N 30,000	47(17.7)	93(35.0)	69(25.9)	57(21.4)	14.399	0.109
	N 30,000-N 50,000	6(7.5)	25(31.3)	19(23.8)	30(37.5)		
	N 51,000 - N 100,000	4(30.8)	2(15.4)	3(23.1)	4(30.8)		
	> 100,000	1(11.1)	3(33.3)	2(22.2)	3(33.3)		
Number of Children	None	11(19.6)	16(28.6)	16(28.6)	13(23.2)	11.049	0.749
	1-2	21(15.9)	49(37.1)	28(21.2)	34(25.8)		
	3-4	19(15.3)	35(28.2)	37(29.8)	33(26.6)		
	5-6	5(10.0)	20(40.0)	12(24.0)	13(26.0)		
	7-8	1(33.3)	1(33.3)	0	1(33.3)		
	> 8	1(33.3)	2(66.7)	0(0)	0(0)		

3.2 DISCUSSION

This study showed that 64.4% of pregnant women agreed that “Vegetables are known to be rich in vitamins, minerals and fibre”. Despite their agreement, their general perception on the nutritional composition of vegetable is low. This may probably due to the low educational status of majority of the respondents. Studies showed that vegetables are known to be rich in vitamins and dietary fiber, and are essential ingredients of a healthy diet because they are rich sources of minerals, flavonoids and antioxidants necessary for good health [1], [20].The pregnant women had high perception on “maternal diet rich in vegetable and eaten during pregnancy reduces risk of gestational diabetes, hypertension, preterm birth and foetal growth restriction”. This high perception of risk reduction of pregnancy associated complications may probably stem from the immemorial traditional belief of the medicinal values of herb in management of pregnancy related complications. Despite the enormous benefits of vegetable during pregnancy, studies showed that many women are unaware of how much their nutritional status impacts their pregnancy and infant outcomes [21]–[23].This study also

showed that pregnant women have high perception on “Intake of vegetables reduces risk of NCDs such as heart diseases, colorectal cancers and stroke”. This is in consonance with other studies that showed that high intake of vegetable diet has been associated with reduced risk of many non-communicable diseases including coronary heart diseases, colorectal cancers and strokes[3], [4]. The mean frequency of vegetable consumption is 11.6%. This is far lower than the mean frequencies of similar studies such as 40.2% among college students[24], 72.4% among females in Finland[25] and 65.0% among female participants in Poland[26]. Similarly, some studies demonstrated frequencies of daily intake as low as 11.2% in Saudi Arabia[27], 12.4% in South Africa[28] and 14.3% in Zimbabwe [29]. This study showed that 29.2% of respondents with secondary educational level consumed vegetable seven times in the week preceding the study. Educational background significantly influences the number of times vegetables were consumed by respondents (*P*= 0.037). Similar studies showed that vegetable consumption varies between educational groups across Europe, with larger differences in Northern European countries than in Mediterranean countries[30]. However, a higher level of education is overall associated with a higher consumption of vegetables[31].

This study also showed that 50.0% of respondents with no formal education spent between N50 – N100 to purchase vegetable, while 30.9% of respondents with tertiary education spent above N 400 to purchase vegetable. The association between educational status and cost of vegetable purchased was statistically significant (P= 0.009). Finding showed that a higher socioeconomic status and the intention to lose weight represented independent factors associated with more favourable vegetable consumption[32].

4. CONCLUSION

Green leafy vegetables are rich sources of vitamins like beta-carotene, ascorbic acid, riboflavin, folic acid, and minerals like calcium, iron, and phosphorous. Inadequate vegetable consumption has unintended consequences, especially during critical life course stages, such as pregnancy. In this study, pregnant women have a high perception of a maternal diet rich in vegetables and eaten during pregnancy and the resultant risk reduction of gestational diabetes, hypertension, preterm birth, and fetal growth restriction. The mean frequency of vegetable consumption was very low compared to studies in other settings. The majority of respondents with secondary educational levels consumed vegetables seven times in the week preceding the study. Educational and financial status significantly influences the number of times vegetables are consumed by respondents.

CONSENT

Informed consent was obtained from all participants included in this study after detailed explanation of the study procedure both in English Language and local dialect.

ETHICAL APPROVAL

Ethical approval for this study was obtained from the research and ethics committee of Novena University, Ogume, Delta State. Permission was taken from the chairman of Patani Local Government Council. Informed consent was obtained from all participants after detailed explanation of the study procedure with assurance of confidentiality of the information that was collected. All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

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