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EFFECTS OF NUTRITION EDUCATION AMONG PREGNANT WOMEN USING FRUITS AND VEGETABLES FOR THE ACHIEVEMENT OF MDG5 IN ODOGBOLU LGA, OGUN STATE

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ABSTRACT : *Background: Nutrition education being a component of health education is propitious to create awareness on how to source, prepare, combine and use food resources for promoting good health among all groups of human beings; especially pregnant women who need adequate nutrition for their physiological needs and improve the health of both the mother and fetus. Studies have suggested that women have low dietary intake of fruits and vegetables. The Millennium Development Goals (MDGs) are a framework globally agreed for measuring development, progress, and poverty reduction through focusing efforts on achieving significant measureable improvement in people's lives. One of the components of MDG5 is nutrition in pregnancy; this component is the main focus of this study. Method: a quasi-experimental study for quantitative method adopting pre-and post test control experimental analysis was used while 194 pregnant women were purposively selected from 11 randomly selected antenatal clinics in Odogbolu local government area to participate. The nutrition intervention was for 3 months. FGD together with structured-validated questionnaire administered before and after the intervention were used to collect data. ANCOVA was used to test the two hypotheses at 0.05 alpha level.Result: There were significant effects of the intervention on the knowledge (F (2.174) = 1554.466, P <.05) and attitude (F (2.134) = 19.866, P <.05) of the women on fruits and vegetables consumption. The findings revealed a positive effect of the intervention; the participants were relatively aware of the importance of fruit and vegetables consumption in pregnancy after the intervention. Conclusion: The nutrition education intervention appears to have changed the attitude of pregnant women after the post test evaluation. Pregnant women apparently consumed more fruits and vegetables than they were doing before the intervention. Therefore, intensive health education should continuously be given to pregnant women on the value of fruit and vegetable.*

KEYWORDS: Nutrition, Education, vegetables, intervention, pregnant women

INTRODUCTION

Nutritional education is an essential component of antenatal care, helping to promote the health of the pregnant mother and the fetus by creating an awareness of imbibing the culture of eating well through positive change in their nutritional behavior. According to Abu-Saad and Fraser (2010), maternal nutrition is a modifiable risk factor of public health importance that can be

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integrated into efforts to prevent adverse birth outcomes, particularly among economically developing/low-income populations. Food must be supplied in the right quantity and quality to support the growth and development of the fetus and to improve the health of the mother by making up for the required physiological needs in pregnancy. Drug supplements are not always advisable in pregnancy because some of the women may abuse and misuse drug that may lead to teratogenic effects and other health challenges in pregnancy especially among the rural, poor and illiterate women. Food, when taken, is not prone to the aforementioned abuse and are not dangerous to the growing fetus because the physiological processes in the body has a natural way of removing any nutrients in excess of body need. Ladipo (2000) confirmed this by revealing that 'Even in developed countries, prenatal care providers have reservations about the widespread and indiscriminate use of prophylactic minerals and vitamins because of unproven benefits in well-nourished populations, risks of teratogenicity, and side effects. These concerns need to be considered in the context of developing countries'.

Health education intervention programme has always been attested as an efficacious tool to impart positive changes in health behavior and will only be propitious when the appropriate facilities are harnessed to achieve the predetermined goals of behavioral change which is primordial to health education enterprise (Adams, 2010). Nutrition education is a component of health education that helps to create awareness on how to source, prepare, combine and use food resources for promoting good health among all groups of human being. The focus of this research intervention was the physical application of fruits and vegetables consumption education with backup provision of readily available and financially accessible fruits and vegetables among pregnant women to improve their knowledge and motivate their positive behavioural change towards consumption.

Several studies have copiously established the fact that among many aetiological variables in illness and diseases, nutritional factors contribute almost preponderantly to the burden of preventable non-communicable diseases and premature death all over the world (WHO, 2003; Beaglehole and Yach, 2003). Having adequate diet which contains essential nutrients at its right proportion is said to be indispensable for the promotion of good health and wellbeing at every state and stage of life including pregnancy. It has also been evidently reported that dietary regimen that is high in fruits and vegetables are associated with preventing and treating metabolic syndrome (Feldeisen and Tucker, 2007).

Fruit and vegetables consumption has been significantly reported to have led to reduced incidence of many non-communicable diseases such as cardiovascular conditions, some type of cancers, overweight and obesity with all its attendant ill health conditions like arteriosclerosis, musculoskeletal conditions, and so on (Donaldson, 2004). It is then obvious that failure to consume adequate quantity of fruits and vegetables may increase individual's susceptibility to the aforementioned non-communicable diseases. Research in the field of health promotion and education has embarked on concerted effort to increase fruits and vegetables intake all over the world (WHO, 2003).

Studies also revealed that women have low dietary intake of fruits and vegetables (Kimberly, Joanna, Jill, Marcia and Jesse, 2012); and several reasons have been said to bedevil fruits and vegetables consumption such as: high cost of purchase, environmental availability, lack of knowledge and socio-economic status while a handful of such studies have focused on barrier and enabling factors to fruits and vegetables intake among pregnant women in Nigeria. Many studies

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have reported that Nigerians have not satisfactorily imbibed the culture of fruits and vegetables consumption especially among the urban and suburban dwellers (Ladipo, 2000). Though, the rural agrarian dwellers may take more of local vegetables which are rich in vitamins and minerals if properly prepared due to accessibility, but there is no relevant data to determine whether the recommended quantity is been consumed by the local community members of Nigeria. In U.S. where several intervention programmes have been embarked upon by researchers to improve fruits and vegetables consumption, it is still being reported that no satisfactory significant increase has been recorded among adults between the year 1988 – 1994 and 1999 – 2002 and that, there is a mean daily decreases in consumption among adolescents (Larsen, Harris, Ward and Popkin, 2007).

Several counseling programmes have been adopted by community obstetrics and gynecologists, community midwives and community extension workers during antenatal clinic at both the hospitals and health centres to boost fruits and vegetables intake among pregnant women in Nigeria but not much of a success has been recorded in this direction. So far, a handful are said to comply. Fruits and vegetables are rich sources of vitamins, minerals, fibres and they also contain antioxidative properties (Elbagermi, Edwards and Alajtah, 2012). The benefits and importance of fruits and vegetables in pregnancy are great and enormous. They include prevention of allergies in children such as wheezy babies and Eczema (Kristie – Leong, 2010) and prevention of some teratogenic ill health conditions such as spinal bifida and Neural Tube Defect (NTD). Fruits and vegetables contain high cellulose and fibres which provide benefit such as good bowel movement. They serve as natural laxatives that prevent constipation which may eventually cause haemorrhoid and anal fistula post-nataly, if not adequately prevented in pregnancy.

Fruits and vegetables contain beta-carotene, needed for baby's cells and tissues development, vision and immune system while vitamin C is crucial for baby's bone and teeth, and collagen in baby's connective tissue. Folic acid helps to prevent neural tube defect and promote a healthy birth weight which makes delivery easier and prevents complications associated with second stage of labor such as laceration. The mineral and vitamin components in fruits and vegetables may prevent disease associated with toxaemia in pregnancy such as high blood pressure (P.I.H), proteinuria, pedal-edema and its associated complications.

The word vegetable embraces a preponderance of plant foods. According to Olusanya (2008) vegetables can be broadly classified into root vegetables such as carrots, parsnips and turnips, tubers vegetables e.g. potatoes, yams and coco yams, green leafy vegetables, e.g. spinach, cabbage, lettuce, water-leaf, bitter-leaf, pumpkin, amaranthus etc., fruits vegetables such as tomatoes, cucumber, okra, water melon etc and seed vegetables e.g. peas, lentils, soya-beans etc. for the purpose of this intervention, the main focus is on the green leafy vegetables because of its richness in minerals and vitamin components coupled with their accessibility and affordability.

They are said to be very rich in calcium, iodine, phosphorus, iron and sulphur. It is however reported that the presence of phytic and oxalic acids in them, tend to bind calcium and iron in the vegetables and distort the bioavailability of these minerals from the vegetables. Vitamins A, B – complex, C and K are also present in varying amount and the carotene pigments present in some vegetables such as carrot, serve as a good precursor for vitamin A (Olusanya, 2008).

While encouraging consumption of vegetables, it is important to educate on the preparation and consumption of these vegetables because the rich component of vitamins and minerals may be

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lost during preparation for example, a great percentage of the mineral elements and water soluble vitamins (B – complex and C) leak out into the boiling water during preparation which our vegetables are exposed to before cooking. Also, the process of re-warming our vegetable soups is a remarkable process of reducing its nutrients.

In the case of fruits, they are primarily rich in vitamin C and cellulose, because they are commonly eaten raw, the greater amount of the vitamins are retained when consumed since they are not exposed to heat and other process that could lead to the loss of their essential nutritive components. Fruits are made up of appreciable quantity of carbohydrate in varying forms. The main carbohydrate found in unripe fruits is in form of polysaccharides (starch), but when they are ripe, the polysaccharide is converted to monosaccharide (Fructose and Glucose). Many of the available fruits also contain some minute quantity of carotene and the vitamin B groups. Except for pears which are rich in fat, fruits are poor source of fat and contain an insignificant quantity of protein i.e. poor source of protein.

Fruits are said to contain different kinds of organic acids such as citric acid commonly found in pineapples, tomatoes and other citrus fruits, tartaric acid found in grapes, oxalic acid found in unripe tomatoes and strawberries, linoleum acid found in avocadoes pear.To increase the palatability of fruits and make it more acceptable, it can be prepared in various dishes or forms such as fruits salad where different fruits are used like the combination of banana, water melon, cucumber, pawpaw, pineapples, and other fruits according to the taste of the individual. Also, banana fritters, pawpaw fool, mango fool, pineapple drink and grape fruits and drink are forms in which fruits can be prepared for consumption.

The Millennium Development Goals are a framework globally agreed for measuring development, progress, and poverty reduction through focusing efforts on achieving significant measureable improvement in people's lives. (WHO, 2005, World Bank, 2005).
Goal 5 which is the target of this intervention research is to improve maternal health indices which include good motherhood, ante-natal care including nutrition in pregnancy (The focal point of the study), good environment for child delivery and comprehensive postnatal care. The aforementioned situations have not improved yet in Nigeria because the maternal mortality rate of 704 (2003), 840(2008), 630 (2010), 560 (2013) per 100,000 live birth (NPC, 2003, 2008, 2010, 2013) and NDHS, 2003, 2005) is alarming and unacceptable. Nigeria accounted for about 13% of the global maternal death with an estimated 36,000 women dying in pregnancy or at child birth each year (World Bank, 2011). Nigeria also has about 260,000 neonatal deaths annually, 13% of which can be prevented with live saving interventions such as provision of required maternal health medicines and supplies (Onyebuchi, 2015). Therefore, this study has a purpose of accessing pregnant women to educate them and provide physical intervention materials to elicit the subsequent behavioural change that encourages fruits and vegetables consumption for an improved ante natal health.

METHODOLOGY

Research Design

It was a mixed method of research design that adopted both quantitative and qualitative strategies. It employed a quasi-experimental study for quantitative analysis adopting pre-and post test with control and experimental analysis. The research questions and hypotheses answered and tested respectively are stated below.

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Research Questions

1. Will participants have adequate knowledge on the importance of fruits and vegetables consumption in pregnancy?
2. Are there factors hindering the choice of fruits and vegetables consumption in pregnancy?

Hypotheses

1. There will be no significant difference in the knowledge of experimental and control groups of pregnant women on the importance of fruits and vegetables consumption in pregnancy after the intervention programme.
2. There will be no significant difference in the effect of the intervention programme on the attitude of experimental and control group towards fruits and vegetables consumption.

Population

The study population covered all the registered pregnant women in the twenty two (22) antenatal clinic centres covering all the wards in Odogbolu Local Government Area of Ogun State, Nigeria.

Sample

This study used 194 participants, purposive sampling technique was used to select 10 health centres while stratified random sampling technique was used to select members as presented in table 1 below from each of the selected centres. The use of purposive sampling in this study is in line with the opinion of many researchers that people with predetermined criteria are eligible for certain studies (Adeleke, 2010; Duda, 2010).

Table 1: Distribution of Participants by Health Centres

S/N	Health Centre	No of Pregnant Woman	Percentage
1.	Ososa Health Centre	32	16.47
2.	Idowa Health Centre	28	14.43
3.	Igbile Health Centre	28	14.43
4.	Mobalufon Health Centre	24	12.37
5.	Odogbolu Health Centre	22	11.34
6.	Okun Owa Health Centre	18	9.28
7.	Holy Trinity Health Centre	13	6.70
8.	Ibefun Health Centre	12	6.19
9.	Ayepe Health Centre	9	4.64
10.	Odoolowu Health Centre	8	4.12
	TOTAL	**194**	**100%**

As illustrated in table one above, one hundred and ninety four (194) participants were selected for the study. Stratified random sampling technique was used to select the sample from the ten (10) purposively selected health centres out of the twenty two (22) existing health centres of the local government: Ososa health centre n=32(16.47%), Idowa health centre n=28(14.43%), igbile health centre n=28(14.43%), Mobalufon health centre n=24 (12.37%), Odogbolu health centre n= 22(11.34%), Okun-owa health centre n=18(9.28%),holy trinity health centre n=13(6.70%), Ibefun health centre n=12(6.19%), Ayepe health centre n= 9(4.64%) and Odoolowu health centre n= 8(4.12%).

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Intervention Procedure

At the onset of the study, the research team developed a farm where vegetables were planted to provide fresh from the farm supply for the women. A letter was written to the local government for ethical approval through the director of primary health care services to the local government management and a meeting was held between the research team and the management and ethical approval was granted after the meeting.

The training of Nurses and Community health extension workers as research assistants were held for two days at the local government headquarters where the demonstration on how best to prepare vegetables were carried out, how the intervention programme will be conducted and their roles and how data will be collected for the purpose of the study at their various health centres / posts. For eight weeks, the first phase of the intervention project was conducted with education on the benefits of copious consumption of fruits and vegetables in pregnancy and how best to prepare vegetables without losing the essential nutrients in them.

Questions were asked by the participants and researchers while answers were provided. Also, several limitation issues were raised by the participants and plausible answers were provided to guide the study on the antenatal clinic days which fell mostly on Thursdays and Tuesdays of the week at the health centres and posts. Data were collected by researchers and assistants across the health centres on the clinic days.

The first week at all the clinics was used as the information and preparation week with the distribution of fruits and vegetables to the participants at all the clinics. On the subsequent weeks, the research coordinator and the team visited the centres to collect information and supply fruits and vegetables to the centre research assistants.

Research Instrument

The main instruments used in the study were:

1. Comprehensive health issues interview guide (CHIIG)
2 Attitude on F&V consumption questionnaire (AFVQ)
3 Questionnaire on the importance of fruits and vegetables in pregnancy and health seeking behaviour.(QIFVP)

Reliability of the Instrument

The instruments used were tested for internal consistency using Cronbach alpha reliability method and results were as follows: Comprehensive health issues interview guide (CHIIG) (0.8), Attitude on F&V consumption questionnaire (AFVQ) (0.76); Questionnaire on the importance of fruits and vegetables in pregnancy and health seeking behaviour(QIFVP) (0.90). Others were administered as qualitative data gathering instruments such as Health Education Inventory, follow-up focus group discussion guide and intervention guide.

RESULT

Data were analyzed and interpreted with descriptive statistics of frequency counts, percentages and pie charts; inferential statistics of analysis of co-variance was used to test the hypotheses at 0.05level of significance.

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Table 2: Demographic profile of sampled participants (n = 194)

Variable	***F***	***%***
Age Group:		
10 – 19	49	25.26
20 – 29	72	37.11
30 – 39	26	13.40
40 above	47	24.23
Total	194	100%
Age of Gestation:		
4wks – 8wks	22	11.34
9wks – 13wks	33	17.01
18wks – 22wks	79	40.72
23wks – 27wks	38	19.59
28wks above	22	11.34
Total	194	100%
Occupation:		
Civil Servant	51	26.29
Farmer	63	32.47
Artisan	41	21.13
House wife	30	15.46
Other self employed	09	04.64
Total	194	100%
Parity:		
Primigravida	90	46.39
Gravida 2 – 4	97	50.00
Granda 5 above	07	3.61
Total	194	100%
Religion:		
Christianity	96	49.48
Islam	98	50.52
Total	194	100%
Level of Education		
University Degree	22	11.34
College / Polytechnic	41	21.13
Secondary School	78	40.21
Primary School	41	21.13
No formal education	12	06.19
Total	194	100%

In table 2 above, the age distribution shows that majority of the participants 72 (37.11%) were age between 20 – 29, 26(13.40%) were age between 30 – 39 years of age while 49(25.26%) were age between 10 – 19 years of age. 79(40.72%) of the participants registered at 18 -22 weeks of gestation which is the highest age of registration among the participants while 22 (11.34%) registered at 4 weeks – 8 weeks and 28 weeks of gestation respectively. 51 (26.29%) of the participants were civil servants, 63(32.47%) were farmers, 41(21.13%) were artisans and 30 (15.46%) were housewives, the remaining 09(04.64%) feel into other self employed category. 90(43.39%) were primigravida i.e. carrying the first pregnancy, 97 (50.00%) were gravid 2 – 4 while 07(3.61%) were gravida 5 and above. 96(49.48%) of the participants were Christians while

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98(50.52%) of them were Muslims. 22 (11.34%) were University graduates, 41(21.13%) attended College / Polytechnic, 78(40.21%) attended Secondary School, 41(21.13%) had primary school leaving certificate while just 12(6.19%) of them had no formal education.

Research question1: will the participants be knowledgeable on the importance of fruits and vegetables consumption in pregnancy?

Table 3: Knowledge of participants on the importance of fruits and vegetables consumption in pregnancy.

S/N	Importance of F & V Consumption	No	Yes	Total
1.	Consuming fruit and vegetables in pregnancy improves health.	13 (6.7%)	181 (93.30%)	194
2.	Fruit and vegetables intake in pregnancy helps in bowel movement.	29 (14.95%)	165 (85.05%)	194
3.	Fruits and vegetables provide for blood need in pregnancy.	45 (23.20%)	149 (76.80%)	194
4.	Fruits and vegetables consumption prevent constipation.	51 (26.29%)	143 (73.71%)	194
5.	Fruits and vegetables consumption will prevent anaemia in pregnancy.	62 (31.96%)	132 (63.04%)	194
6.	Fruits and vegetables will provide essential nutrients in pregnancy	42 (21.65%)	152 (78.35)	194
7.	Fruits and vegetables will make the baby well after delivery	56 (28.87%)	138 (71.13%)	194
8	Fruits and vegetables is better than Drug supplements.	96 (49.18%)	98 (50.52%)	194
9.	Fruits and vegetables will prevent high blood pressure	68 (35.05%)	126 (64.95%)	194
10.	Fruits and vegetables will prevent some non communicable diseases both in pregnancy and after delivery	72 (37.11%)	122 (62.87%)	194

In table 3 above, it is revealed that: 13(06.70%) of the participants disagreed, while 181(93.30%) agreed that the consumption of fruit and vegetable in pregnancy improves health. 29 (14.95%) of the intervention participants answered 'No', while 165 (85.05%) of the 194 participants answered 'Yes' that fruits and vegetable in pregnancy helps in bowel movement. 45 (23.20%) of the participants answered 'No', while 149 (76.80%) answered 'Yes' to the question that Fruit and vegetable consumption in pregnancy will provide for blood need in pregnancy. 51 (26.29%) of the intervention participants answered 'No' and 143 (73.71%) answered 'Yes' to the statement that fruits and vegetable consumption in pregnancy will prevent constipation.

Also, 62(31.96%) of the participants answered 'No' while 132 (63.04%) answered 'Yes' to the statement that fruits and vegetable consumption will prevent anaemia in pregnancy. 42 (21.65%) of the intervention participants answered 'No' while, 152 (78.35%) of the respondents answered 'Yes' to the statement that fruit and vegetable consumption will provide essential nutrients in pregnancy. 56(28.87%) of the study participants answered 'No' while 138(71.13%) of the intervention participants answered 'Yes' to the statement that fruits and vegetable consumption makes the body well after delivery.

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96 (49.48%) of the participants answered 'No' and 98(50.52%) answered 'Yes' to the statement that Fruit and Vegetable consumption is better than drug supplements in pregnancy. 68(35.05%) answered 'No' while 126 (64.95%) answered 'Yes' of the intervention participants answered 'Yes' to the statement that fruit and vegetable consumption in pregnancy will prevent Pregnancy induced Hypertension (P.I.H). 88 (45.36%) of the study participants answered 'No' while, 106 (54.64%) of the intervention participants answered 'Yes' to the statement that fruit and vegetables consumption in pregnancy will prevent congenital diseases and lastly, 72 (37.11%) of the participants answered 'No' while 122 (62.87%) of the intervention Participants answered 'Yes' to the statement that fruit and vegetable consumption will prevent some non-communicable diseases at both during and after pregnancy.

It could be inferred from table 1 above that pregnant women in Odogbolu local government appear not to have an adequate knowledge on the importance of fruit and vegetable consumption in pregnancy, before the intervention

Table 4: Ancova on hypothesis 1: There will be no significant difference in the knowledge of experimental and control groups of pregnant women on the importance of fruits and vegetables consumption in pregnancy after the intervention programme.

Source	Sum of Square	df	Mean square	F	Sig.
Corrected Model	4771.116	2	2321.548	82.713	.000
Pretest	2.174	1	2.174	0.79	.073
Main Effects: Treatment groups	4738.921	2	4738.921	1554.466	.000
Error (Residual)	4682.266	144	31.042		
Corrected Total	8644.291	148			

Table 4 shows that there is a significant difference in the knowledge of the participants towards fruits and vegetable consumption after the intervention (f(2.174) = 1554.466, P value is .00 which is <.05). The multiple classification analysis was also carried out to show the direction of the difference. The mean scores of the two groups were: treatment group (grand mean) (93.53 + 5.06) = 98.59 and the control group (grand mean) (93.54 – 6.74) = 86.08. This shows that the mean score of the treatment group is greater than the control group. Therefore, the group that was exposed to the fruits and vegetables intervention treatment (experimental group) has better knowledge towards the importance of fruits and vegetable consumption in pregnancy than the control group.

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Table 5: Ancova analysis on hypothesis 2: There will be no significant difference in the effect of the intervention programme on the attitude of experimental and control group towards fruits and vegetables consumption.

Source	Sum of Square	df	Mean square	F	Sig.
Corrected Model	631.844	2	301.978	13.01	.000
Pretest	93.308	1	84.506	4.322	.065
Main Effects: Treatment groups	499	2	366.991	19.999	.000
Error (Residual)	3624.007	144	32.721		
Corrected Total	6117.76	148			

Table 5 above shows the difference in attitude of participants towards fruit and vegetable consumption is significant (F (2.134) = 19.866, P is .00 <.05). The result signifies that there was significant difference in the effect of the intervention programme on the attitude of experimental and control group towards fruits and vegetables consumption. Therefore, the null hypothesis is rejected and the alternate hypothesis is upheld. The multiple classification analysis was also carried out to show the direction of the difference. The mean score of the treatment group = 37.61 and the control group of 32.78. This means that the mean score of the treatment group is greater than of the control group; indicating better attitude by the treatment group when compared.

DISCUSSION OF FINDINGS

In this intervention, it was revealed that the problem of preservation has hindered the continuous consumption of fruit and vegetable. Some of the fruits can be preserved for consumption later if refrigeration facilities were available and vegetables are better eaten fresh. It was also found out that allergies to some fruits and vegetables also hinder consumption, though this is not an active factor for not consuming fruits and vegetables among the intervention group since only about 12% of the participants reported this as a hindering factor.

The intervention programme has tremendously improved the knowledge of the participants towards the importance of fruits and vegetables consumption in pregnancy. Also, the attitude of the participants have changed consequent upon the effect of the intervention programmme. There is a growing body of basic research suggesting that fruit and vegetable intake may reduce oxidation, inflammation, cell proliferation and other important disease – related processes. (International Fruit and Vegetable Alliance (IFAVA, 2012).Evidence from mechanistic experimental studies suggests that fruit and vegetable may have an even greater role to play in human health than the already positive results from observational studies.

Behavioural approach research review suggests that statistically significant increase in fruits and vegetables intake are demonstrated when behaviour – based interventions are employed. Among the most supported are interventions applying motivational interviewing or stages of change at the individual level and socio – ecological or socio contextual theory at the group (e.g. worksite and church), level. Achieving and sustaining fruits and vegetables intake at currently recommended levels across the population which also will require stronger interventions that are strategically

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combined with other approaches, including efforts to address taste, convenience, availability and access and competitive foods, as well as enhancing the perceived value of habitually adopting this behavior. (Thomson, 2011).

Examination of the US government support for Fruits and vegetables to their level of importance, it was found out that the US government support for Fruits and Vegetables is low and this low priority status is inconsistent with the large fruit and vegetable consumption gap, the enormous economic costs and substantial health risk associated with that gap the intervention among pregnant women has tremendously improved F&V consumption among the study participant.
An intervention sent by e-mail targeting self-efficacy or self – efficacy and action plans resulted in an increase of fruits and vegetables consumption at 6 months after intervention (Luszcznyska, Tryburcy and Schwarzer, 2007).The result findings is also in line with studies showing that planning intervention may work because they encourage a person to engage in more frequent use of strategy planning. (Luszcznyska, 2006).

Several cohort studies have examined the relation between fruit and vegetable intake and coronary heart disease and the results revealed an inverse association between high intake of fibre from fruit and vegetables and chronic coronary heart disease (CHD) risk (Dauchet, Amouyed, Hercberg and Dallogeville, 2006).On fruits and vegetables and heart disease prevention: Fruits and vegetables may reduce chronic diseases and more specifically, coronary heart diseases, (Pereira et al, 2004) reported that by means as potassium, folate, vitamins, fiber and other phenolic compounds (Van Duyn and Pivonka, 2000).

On consumption: Guenther et al, (2006), Bazzano, (2006), Serdula et al (2004), Guenther et al (2006); Casagrande et al (2007), Larsen et al 2007 and Vitolin et al, (2007) reported that most of the US population does not integrate a sufficient amount of fruit and vegetables (at least 5 day a day) into their daily diet which suffice as one of the reasons why fruits and vegetable intervention was required to improve consumption for the benefit derivable.

On barrier, the following researches have worked on Fruits and Vegetables consumption with its barriers among children. (Hill et al, 1998, Campbell et al 1999, Cullen et al 2003), and their findings is in support of this result like cost of purchase, family preference and preparation as limiting factors to vegetables consumption.

Hill et al, (1998), Campbell et al (1999) reported that the primary individual, impediment was a perceive lack of time due to long working hours and extensive preparation time required for cooking vegetables. Also, the high cost and high spoilage rates of fruits and vegetables deterred many participants from consuming fruits and vegetables on a daily basis (Dermon et al, 2002), Pollard et al 2002, Dibsdall et al 2002).

Kratt et al, 2000 and Campbell et al (2007) also found out that the home food environment impacted on what the family unit (parents, children or adolescents) ate.Aside from the environmental variations, the previous researches have established the need for improved fruits and vegetable intake and have identified limitations that should be mitigated through health education intervention.

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CONCLUSION

It was established in the study that F&V consumption in the study area among pregnant women is insufficient and several reasons were put forward by the participants during interview session: accessibility, cost of preparation, influence of the spouse, method of preparation, time required to prepare it and taboo among other reasons.

The intervention provided information on the importance of F&V consumption, how best to prepare it and the need to increase the consumption at the end of the three months, there was a remarkable improvement in the consumption behavior due to attitudinal change which was statistically demonstrated in the study. In the study, education was also provided on how to grow and prepare vegetables all year round in the home neighbourhood. Several challenges were reported by the participants such as the husband's choice of meal and taboos in pregnancy some of which were demystified during interview and discussion session.

RECOMMENDATION

The following recommendations were consequently suggested:

1. More intervention should be conducted among the general population for improved fruits and vegetables consumption and issue of taboos should be paramount.
2. Fruits and vegetables education should be integrated into nutrition education at all clinics and health centers.
3. Fruits and vegetables should be grown around the home and school gardens for increased accessibility.
4. Government policy should support growth of fruits and vegetable for increased production.

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