Effect of Antenatal Nutrition Education Programme on Nutritional Knowledge of Pregnant Women Attending Health Facilities in Benue State

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Abstract

The study examined the effect of antenatal nutrition education programme on nutritional knowledge and practices of pregnant women attending health facilities in Benue State, Nigeria. A quasi-experimental research design was adopted for the study. The study was conducted in Benue State. The population for the study consisted of 9.510 pregnant women attending selected health facilities in Benue State. A sample size of 310 pregnant women was used for the study. The multistage sampling techniques using Cochran (1963) formula was adopted to arrive at the sample size. A researcher designed structural questionnaire (NKPPWQ) was used for data collection in the study. The instrument attained a reliability coefficient of 0.85, which was high and thus, adopted. The ANEP was subjected to face and content validity. 310 copies of the questionnaire were administered for the study and all the 310 copies were valid and thus used for data analysis. Means, standard deviation and ANCOVA were used to determine the effect of ANEP on pregnant women. The study found that pregnant women exposed to ANEP had higher nutritional knowledge with mean posttest scores of ($\bar{x} = 6.94: SD = .38$) *than pregnant women not exposed* ($\bar{x} = 4.91: SD = .71$). *There was a significant difference between the mean nutritional knowledge scores of pregnant women exposed to ANEP and those not exposed (F =1,307) = 984.058, P=.000, partial eta squared =.762. It was recommended among others that antenatal nutrition education interventions should be adopted by health workers as a practical step for improving the nutritional knowledge and practice of pregnant women.*

Keywords: Antenatal nutrition education Programme, Knowledge, Pregnant women, Health Facilities, Benue State

Introduction

Pregnant women experience increase risk of nutritional deficiencies due to higher demands from the growing foetus, placenta and maternal tissues. Maternal nutrition at conception and during pregnancy influences the growth and potential development of the foetus and contributes to the maturity of a healthy baby (Bhutta, Das, & Rizvi, 2013). It is known that the foetus is nourished adequately at the expense of maternal stores and needs. However, it is becoming clear that this may not always be the case, and that foetal development can be less than optimal if certain nutrients are deficient during pregnancy (Zeisel, 2009).

Pregnancy related risks rank high among women in low and middle income countries (LMICs). Annual estimate of 600,000 women aged 15-45 years die of pregnancy related causes, with 99 per cent from developing world (World Health Organization [WHO], 2010). Nigeria alone accounts for 10 per cent of these deaths. Nigeria still has an extremely high

maternal mortality rate with a ratio of 512 per 100,000 live births ((National Population Commission (NPC) &ICF International, 2018). This implies that with about 24 million live births annually, an alarming record of 170,000 Nigerian women die as a result of complications associated with pregnancy and childbirth. According to Nigeria Demographic and Health Survey, infant and under 5 mortality rates for the five year period (2014-2018) are 67 and 132 deaths per 1,000 live births respectively (NPC &ICF, 2018). The neonatal mortality rate is 39 deaths per 1,000 live births. These mortality levels indicate that 1 in every 8 Nigerian children do not survive to their fifth birthday.

The nutritional status of Nigerian children seems to be very poor. The 2018 NDHS shows that 37 per cent of Nigerian children aged 6 – 59 Months are stunted, seven per cent are wasted (thin for their height), 22 per cent are underweight (thin for their age), and two per cent are overweight (heavy for their height), and only 11 per cent of children aged 6 – 22 months were fed a minimum acceptable diet. The report further shows that 68 per cent of children aged 6 – 59 months and 58 per cent of women aged 15 – 49 years are anaemic, 12 per cent of women aged 15 – 49 years are underweight while 28 per cent are overweight or obese. Reports showed that mothers and infants are at risk in Benue State too. NDHS 2018 reported an infant mortality rate of 40 deaths/1000 live births in the state (NPC & ICF, 2018). More so, District Health Information System (DHIS_2, 2020) reported a prevalence of maternal mortality rate of women in Benue State to be 23/100,000. These figures are alarming and are good indicators that a gap exists either among the pregnant women, the health facilities that take care of these women or both.

Women's limited nutritional knowledge and poor nutritional practices have been attributed to negative nutritional outcomes for children and their mothers. A Nigerian study by Onyeneho et al. (2016) reported that only 7.8 per cent of pregnant women were aware of anaemia as a nutritional deficiency which is attributed to poor nutritional practices in pregnancy and 59.8 per cent of pregnant women met the recommended guidelines for update of iron supplements and micronutrients during pregnancy. Fadare, Amare, Mavrotas, Akenle and Ogunniyi (2019) reported that only about 49 per cent (48.9%) of women had a good nutrition-related knowledge in Nigeria. Poor nutritional practices during pregnancy could lead to chronic energy deficiency. Chronic energy deficiency is caused by eating too little or having an unbalanced diet that lacks adequate nutrients. Women of reproductive age are especially vulnerable to chronic energy deficiency and malnutrition due to low dietary intakes, poor food distribution within the household, improper food storage and preparation, dietary taboos, infectious diseases, poor nutritional knowledge and inadequate care practise (NPC & ICF, 2018).

Knowledge about nutrition in pregnancy is essential for prevention of nutrition related problems. Knowledge is a familiarity, awareness or understanding of someone or something, such as facts, information, descriptions, or skills, which is acquired through experience or education by perceiving, discovering or learning. Knowledge refers to a theoretical or practical understanding of a subject. It can be more or less formal or systematic. Thomas, Tirmizi, Owais, Das and Rhaman (2015) conceptualized knowledge as the sum of a humans conceptions, views and propositions, which have been established and tested as correct reflections as far as they are of objective reality. According to Kaur, Bassi, and Sharma (2011), previous studies have found that knowledge is one of the first step to changing behaviour. Therefore nutrition knowledge is an essential basis for good dietary habits. Conversely, a lack of knowledge is a risk factor for malnutrition.

Therefore, it is important that pregnant women be provided with quality education on nutrition. Antenatal nutrition education programme (ANEP) ensures that pregnant women are well informed about nutrition in pregnancy. Such a programme provides expectant mothers with information that enables them to identify potential warning signs of malfunction or

abnormalities during pregnancy and strategies to adhere to the prescribed treatments and referrals (Meija & Rezeberga, 2017). Nutrition education at antenatal care (ANC) visit is undeniably crucial to overcome malnutrition and other pregnancy complications related to poor nutrition (Isolauri, 2011). Meija and Rezeberga (2017) documented that nutrition education helps the mother to adhere to healthy nutritional practices and controlling medical and other associated health risk factors to improve mother's health and pregnancy outcomes.

Antenatal care nutrition education programme covers topics such as; Importance of good nutrition in pregnancy; essential nutrient required in pregnancy; common food sources needed in pregnancy; healthy weight gain during pregnancy; iron supplementation; other nutritional concern; food cravings and other aversions and alcohol consumption in pregnancy (Getachew et al., 2018). Nutrition education programme among pregnant women has been shown to improve nutritional knowledge and practices. A study conducted in Addis Ababa by Zelalem, Endeshaw, Ayenew, Shiferaw and Yiigu (2017) on effect of nutrition education on knowledge and healthy dietary practices indicate that after nutrition education programme intervention, the proportion of pregnant women with knowledge of proper nutrition during pregnancy increase from 53.9to 97 per cent. While the pregnancy specific dietary practices of pregnant women increases from 46.8 to 83.7 per cent respectively. Fellah, Pourabbas, Dephished, Veisani and Shadnoush (2013) reported that nutrition education had positive effects on levels of nutritional awareness of pregnant women and showed significant improvement in the level of awareness of pregnant women who received at least two educational sessions on healthy nutrition. Nutrition knowledge of pregnant women significantly increased from 3% before intervention to 31% after the intervention. WHO (2013) also recommended that ANC providers should provide adequate, specific and acceptable nutrition related advice to their ANC clients during every visit of ante partum. Isolauri (2011) noted that women who received the nutrition education believed that such training was beneficial in preparing pregnant women for childbirth.

This study will be conducted in Benue state. Benue state is one of the states in north central Nigeria with a population of about 4,253,641 in 2006 census (National population commission 2006). It is inhabited predominantly by the Tiv, Idoma and Igede people, who speak Tiv, Idoma, and Igede languages respectively. The people in the state are predominantly farmers, traders and few civil servants. With its capital at Makurdi, Benue is a rich agricultural region which popularly grow crops such as; potatoes, cassava, soya bean, guinea corn, flax, yams, sesame, rice, and groundnuts. Although there is abundance of food in the state, the researcher observed that many people in the state lack the knowledge of combining the various food items to make a balance diet. For instance a pregnant woman will eat roasted yam in the morning without stew or palm oil. In the afternoon she will eat pounded yam with stew, no vegetables and fruits which contains the essential vitamins and minerals to make a balance diet. The effects of consuming these foods in inadequate proportions is that it can lead to a poor nutritional status, which can impair people's daily health and wellbeing and reduce the ability to lead an enjoyable and active/healthy life. In short-term, it can contribute to the risk of developing some complications in pregnancy such as anaemia, having low birth weight infant, preterm birth, still birth and inadequate breast milk production which could result to poor initiation of exclusive breastfeeding or poor breastfeeding practices.

In Benue state, pregnant women are restricted from taking certain foods due to cultural beliefs, food taboos, illiteracy, poverty and poor knowledge regarding various classes of food to be eaten during pregnancy resulting to inadequate nutrition in pregnancy. The study will ascertain the nutritional knowledge and practices of pregnant women and implement antenatal nutrition education programme with the aim of improving nutritional knowledge and practices. Eating the right diet enables pregnant women to have adequate

store of nutrient for their health and the foetus. Thus implementing antenatal nutrition education programme could improve the nutritional knowledge and practice of pregnant women attending health facilities for antenatal care in Benue State.

Purpose of the Study

The purpose of the study is to determine the effect of antenatal nutrition education programme on nutritional knowledge and practices of pregnant women attending health facilities in Benue state. Specifically the study seeks to determine the:

1. level of nutritional knowledge among pregnant women;
2. difference in the mean nutritional knowledge scores of pregnant women exposed to ANEP and those not exposed;

Research Questions

The following research questions are posed for the study:

1. What is the level of nutritional knowledge among pregnant women in Benue state?
2. What is the difference in the mean nutritional knowledge scores of pregnant women exposed to ANEP and those not exposed?

Hypothesis

1. There is no significant difference in the mean nutritional knowledge scores of pregnant women exposed to ANEP and those not exposed ($p \leq 0.05$).

Methods and Materials

Design of the Study: The study adopted quasi-experimental research design. Specifically, the design is pre-test-post-test non-randomized control group design.

Area of the Study: The study was conducted in Benue State.

Population for the Study: The population for the study consisted of 9, 510 pregnant women attending antenatal care in the selected health facilities in the state from January 2020 to December 2020 (District health information system 2 (DHIS2) (2020). There are about 250 functional health facilities in the state.

Sample and Sampling Technique: The sample size consisted of 310 pregnant women attending antenatal care clinics in Benue state. The sample size was determined using the single population proportion of nutritional knowledge and practices. The prevalence good nutritional knowledge (P=48.9%) as reported by Fadare et al. (2019) will be used for the study. By hypothesizing that the prevalence of good nutritional knowledge would be improved by 25 per cent in this study, the proportion of pregnant women with good knowledge of nutrition in the intervention/experimental group (P_1) will be 73.9% (25%+48.9%). And 5% contingency for drop outs or attrition during the study will be added. Thus, using the formula as recommended by Cochran (1963) as follows:

$$n = \frac{Z^2 \times P(1 - P)}{d^2}$$

Where, n=required sample size

Z = the confidence interval (1.960)

P=prevalence rate in a prior study (48.9%)

d=margin of error (0.05)

$$n = \frac{1.962 \times 0.739(1-0.739)}{(0.05)^2} \quad n = \frac{3.8416 \times 0.739(0.261)}{.0025}$$

$$n = \frac{3.8416 \times 0.1929}{.0025} \quad n = \frac{0.7410}{.0025} = 296.4$$

The total sample size for the study was 296 multiply by 5% (296 x 0.5=14.8). Therefore, the estimated sample size based on Cochran's formula was 310 (i.e. 296+14.8). Hence, the total sample size to be included in this study will be 310 (i.e. 155 for each group)

pregnant women. The first stage involves the use of simple random sampling technique of balloting without replacement to select two Senatorial districts out of the three senatorial districts in Benue state. The second stage involves the use of simple random sampling technique to select two local government areas (LGAs) each in the selected two senatorial districts. This stage produced four LGAs. In the third stage, purposive sampling technique was used to select one primary health facility (PHC) in each of the selected four LGA. The reasons for selecting primary health facilities include availability of qualified health workers, improved quality of care when compared to other health facilities, availability drugs, and high patronage by women in Benue state. In the fourth stage, convenience sampling was used to select 78 pregnant women each in two primary health facilities to form the experimental group (n=156) while 77 pregnant women each were selected in another two primary health facilities to constitute the control group (n^2=154). At the end of the sampling procedure, a total of 310 pregnant women participated in the study.

Instrument for Data Collection: The instrument for data collection is a researcher designed structured questionnaire titled "Nutritional Knowledge of pregnant women Questionnaire (NKPWQ). The NKPPWQ contains 3 items in Section A which collect personal information on age, level of education and monthly income. Section B contains 8 items that seek to elicit information on pregnant women's knowledge of nutrition during pregnancy. Section C contains 8 items that generated information on nutritional practices of pregnant women. The face and construct validities of the instrument NKPPWQ was established by seven experts from University of Nigeria, Nsukka and fifty pregnant women attending ANC services respectively. Subsequently, their responses were extracted and subjected to principal component analysis (PCA). Prior to performing the PCA, the suitability of data for PCA was assessed. The internal consistency of the instrument NKPPWQ was established using Kuder-Richardson-20 (K R-20) and a reliability index of .82 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 Analysis: The retrieved copies of the NKPPWQ were cross-checked for completeness of responses before analyses. All the copies were properly filled or completed and retrieved. The Statistical Package for Social Sciences version 25 (SPSS version 25) was used for data analysis. Data generated from the study was analyzed on item by item basis. Frequencies, percentages, mean and standard deviation was used to answer research questions. While ANCOVA was used to test the null hypotheses at.05 level of significance and appropriate degrees of freedom. In taking decision regarding the null hypotheses, when the calculated p-value is less than 0.05 level of significance, the null hypotheses will be accepted because it is significant. However, when the calculated p-value is greater than 0.05, the null hypotheses will be rejected because it is not significant.

Results

Table 1: **Mean Analysis of Difference in the Nutritional Knowledge of Pregnant Women Exposed to ANEP and those not Exposed (n= 310)**

		Pre-test		Post test		
Group	N	$\bar{x}$	SD	$\bar{x}$	SD	MG/MD
Experimental Group	156	4.19	1.93	6.94	.38	2.75
Control Group	154	3.05	1.52	4.91	.71	1.86

Note: $\bar{x}$ = Mean; SD = Standard Deviation; MG = Mean gain; MD = Mean Difference

Results in Table 1 show that pregnant women who were exposed to ANEP had a mean pre-test score of 4.19 with SD value of 1.93 and a mean posttest score of 6.94 with SD value of .38. Additionally, pregnant women in the control group who were not exposed to treatment had a mean pre-test score of 3.05 with SD value of 1.52 and a mean protest score of 4.91 with SD value of .71. Specifically, the mean difference or gain scores of 2.75 and 1.86 for the experimental and control group, respectively shows that pregnant women in the experimental group had a higher posttest mean score than those in the control group (MD = 2.75 > 1.85). The results implied that pregnant women in the experimental group had higher nutritional knowledge more than those in the control group after the intervention. Furthermore, the SD values of .38 and .71 for the two groups indicate that pregnant women exposed to ANEP varied in their nutritional knowledge score than those in the control group.

Table 2: **Mean Analysis of Difference in the Scores on Nutritional Knowledge of Pregnant Women of Different Age Groups Exposed to ANEP and those not Exposed (n= 310)**

Group	Age Categories	N	Pre-test $\bar{x}$	Pre-test SD	Post test $\bar{x}$	Post test SD	MG/MD
Experimental Group	< 20 years	58	4.29	1.97	6.95	.29	2.66
	20-25 years	64	4.78	1.62	6.90	.53	2.12
	36-44 years	22	3.23	1.74	7.00	.44	3.77
Control Group	45-49 years	12	2.25	1.76	7.00	.57	4.75
	15- 20 years	59	2.85	1.55	4.83	.67	1.98
	20-25 years	59	3.58	1.33	4.78	.62	1.20
	36-44 years	21	2.52	1.66	5.14	.85	2.62
	45-49 years	15	2.47	1.41	5.40	.74	2.93

Note: $\bar{x}$ = Mean; SD = Standard Deviation; MG = Mean gain; MD = Mean Difference

Results in Table 2 show that pregnant women in the experimental group aged 15-24 years, 25-34 years, 35-44 years and 45 -49 years had pre-test mean nutritional scores of 4.29 (SD = 1.97), 4.78 (SD = 1.62), 3.23 (SD = 1.74) and 2.25 (SD = 1.76). And post-test mean nutritional scores of 6.95 (SD=.29), 6.90 (SD = .53), 7.00 (SD = .44) and 7.00 (SD = .57).For those aged 15-24 years,25-34 years, 35-44years and 45-49years,respectively. Also, the results shows that pregnant women aged 36-44years and 45-49years had higher mean scores than those in other age categories post-intervention.Also pregnant women in the control group had pretest mean scores of 2.85 (SD = 1.55), 3.58 (SD = 1.33), 2.52 (SD = 1.66) and 2.47 (SD =1. 41) for those aged 15-24 years, 25-34 years, 35-44 years and 45-49 years, respectively., and post-test mean scores of 4.83 (SD = .67), 4.78 (SD = .62), 5.14 (SD = .85) and 5.40 (SD = .74) were obtained by pregnant women aged 15-24years ,25-34years, 35-44years. 45yearyears respectively.

Furthermore, the mean difference scores of 2.66, 2.12, 3.77 and 4.75, respectively for experimental group pregnant women aged 15-24 years, 25-34 years, 35-44 years and 45-49 years and 1.98, 1.20, 2.62 and 2.93 for those aged 15-24 years, 25-34 years, 35-44 years and 45-49 years respectively in the control group shows that pregnant women of different age

groups exposed to ANEP had higher nutritional knowledge mean gain than those not exposed.

Table 3: **Analysis of Covariance (ANCOVA) showing difference in the Mean Nutritional Knowledge scores of Pregnant Women Exposed to ANEP and those not Exposed**

Source	Type III Sum of Square	Df	Mean Square	F	Sig	Partial Eta Squared
Corrected Model	323.468[a]	2	161.734	516.623	.000	.771
Intercept	2177.862	1	2177.862	6956.698	.000	.958
NKW pretest	3.099	1	3.099	9.898	.002	.031
Group/Treatment	308.069	1	308.069	984.058	.000	.762
Error	96.109	307	.313			
Total	11329.000	310				
Corrected Total	419.577	309				

a. R Square = .771 (Adjusted R Squared = .769)

b. Dependent variable: NKW Posttest scores

c. Covariates: NKW pretest scores

Cohen's (1986) Guidelines for interpretation of Partial Eta Squared

(Effect Size) Small effect size = .01-.059 or 1% to 5.9%

Medium effect size = .06 - .099 or 6% to 9.9%

Large effect size = .138 - 1.00 or 13.8% to 100%.

Table 3 shows the results of one-way between groups ANCOVA conducted to compare the effect of ANEP on the mean nutritional knowledge scores of pregnant women. The ANEP was the treatment, the posttest score was the dependent variable and covariate was the pretest score. Preliminary checks were performed to ensure that there was no violation of the assumptions of normality, linearity, homogeneity of variances and regression slopes, and reliable measurement of the covariate. After adjusting for the covariate, (pretest score), there was a significant difference between the mean scores in nutritional knowledge of pregnant women exposed to ANEP and those not exposed F(l,307) = 984.058, p = .000, partial eta squared = .762. Since the p-value of .000 was less than .05 level of significance, the null hypothesis was rejected. This implies that ANEP was effective in increasing nutritional knowledge of pregnant women. Also, the partial eta squared value of .762 (76.2%) shows that ANEP contributed significantly to the increment in the nutritional knowledge of pregnant women in the experimental group.

Discussion

Findings in Table 1 shows that pregnant women exposed to ANEP had higher posttest mean score (6.94 with SD = .38) compared to those in the contra group (4.91: SD = .71) with mean difference or gain scores of 2.75 and 1.86 for experimental and control group. Also, the findings in table 3 showed a significant difference between the mean scores on nutritional knowledge of pregnant women exposed to ANEP and those not exposed, F (1,307) = 984.058, P = .000, partial eta squared = .762. This implies that ANEP was effective in increasing/improving the nutritional knowledge of pregnant women. The finding is not surprising rather expected since ANEP is a health education construct meant for addressing nutritional problems and nutritional related problems in pregnancy and thus, justifies the

expectation in making significant positive impact in increasing the nutritional knowledge of pregnant women in experimental group.

The findings are in line with Kamau, Mirie, and Kimani (2019) who revealed in their study that highest level of knowledge was among women who obtained information from brochures (91%) and community health workers (87%) Kaur (2011) who reported that knowledge is one of the first step to changing behavior. Therefore nutritional knowledge is an essential basis for good dietary habits. Conversely, a lack of knowledge is a risk factor for malnutrition. Funnel, Naicker, Chang, Hill, and Kayyali (2018) reported a significant effect of ANEP on nutritional knowledge of pregnant women. Nankumbi, Ngabirano, and Nalwadda (2018) reported that majority of pregnant women had knowledge of effects of maternal nutrition on birth outcomes. The similarities in the findings could be due to the nature and or composition of the participants in both studies.

Findings in table 2 showed that pregnant women exposed to ANEP had higher nutritional practice posttest mean scores (5.39: SD 1.03) than those in the control group (4.91: SD .48). The mean gain score or difference of 0.85 and 1.03 for experimental and 0.02 and .48 for control group (table 2) showed that pregnant women exposed to ANEP had higher mean gain scores. This finding portrays the significant effect of ANEP on pregnant women in Benue state in improving nutritional practice. The finding was quite encouraging and very much expected. This is because ANEP is structurally and constructively designed to improve nutritional practice of pregnant women. This finding reflects the positive effect of well-designed ANEP and other health education construct in combating malnutrition and other nutrition related problems in pregnancy. The present finding is in line with Araban, Baharzadeh and Karimy (2017) who reported that intervention strategies can increase preventive behaviours in pregnant women aim at increasing iron and folic acid intake. Diddana, Kelkay, Dola, and Sadore (2018) reported in their study post intervention of good nutrition practice of 84.1%. Therefore, the finding was in agreement with the present study that ANEP have positive effects on dietary habits, Nandita Perumal et al (2013) asserted that the number of ANC visits are correlated with health related knowledge and practice and this can be achieved through ANEP.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Antenatal nutrition education interventions should be adopted by health workers as a practical step for improving the nutritional knowledge and practice of pregnant women.
2. Policymakers should also consider and incorporate some relevant health education intervention in improving the quality of health workers in health settings.
3. Ante natal health facilities should be established across the state to ensure accessibility to pregnant women.

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