Original Article

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Effects of Nutritional Counselling on Dietary Intake and Nutritional Status of Pregnant Women Attending Health Facilities In Dang Province 5 Nepal

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ABSTRACT

Background: Proper nutrition counselling on healthy food habit to all pregnant women can be a strong weapon to achieve good health of mothers as well as healthy offspring. The main objective of this research was to assess the effectiveness of nutritional counseling on dietary intake and nutritional status of pregnant women.

Methods: Quasi-experimental research design was used to evaluate the effectiveness of nutritional counselling on dietary intake and nutritional status of pregnant women. The study area was chosen based on nonprobability purposive sampling technique and 110 participants who were pregnant before 20 weeks of gestation were included in the study who attended district hospital Lamahi and health post of Sisahaniya, Dang.

Risults: Mid Upper Arm Circumference (MUAC) measurement of pregnant women showed that 11.8% pregnant women were malnourished (MUAC <22cm) before intervention. The proportion of MUAC measurement improved after nutritional counseling (4.5%). Almost all participants consumed rice, and roti as main foods. Frequency of consuming dal, green vegetables, fruits, milk and milk products, meat, fish, and egg increased after nutrition counseling. The result indicated that the consumption of carbohydrate, protein, fat and energy increased after nutrition counseling (Carbohydrate-226 vs 289g, protein- 65 vs 77g, fat- 43 vs 50g, energy- 1648 vs 2041kcal).

Conclusions: Maternal nutrition during pregnancy is crucial for achieving healthy maternal and fetal outcomes. Nutrition counselling showed positive effects on nutritional status of pregnant women. Thus, nutrition counselling is essential for all pregnant women. It should be a major part of Antenatal care service to all pregnant women in Nepal.

Keywords: Malnutrition; malnutrition; maternal and fetal outcome; nutrition counseling; underweight.

INTRODUCTION

A healthy and diversified diet is crucial for the body's normal mechanism, growth and development. It contains adequate energy, protein, fat, carbohydrate, vitamins, and minerals, obtained through the varieties of foods, including cereals. green and orange vegetables and fruits, meat, fish, egg, beans, nuts, and milk products.[1] The food that the pregnant woman eats is her baby's main source of nourishment. Research showed that inadequate food intake during pregnancy leads to increase malnutrition among pregnant women that further leading to low birth weight baby and increases the risks of morbidity and mortality rate among mothers and children[2] There is lack of proper nutrition counseling service among pregnant women, only 23% women received counseling on maternal, infant and young child nutrition (MIYCN) and 51% pregnant women received counseling on the need to eat healthy food during pregnancy in Nepal.[3] Dietary counselling of pregnant women is potentially beneficial to both the pregnant mother and her child.[2] This study was therefore conducted to assess the effectiveness of nutritional counseling on dietary intake and nutritional status of pregnant women.

METHODS

A quasi experimental study design was conducted among

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110 pregnant women of 20 weeks' gestation period who attend the Antenatal Care Clinics to assess the effectiveness of nutritional counseling on dietary intake and nutritional status of pregnant women. Research was started after receiving the ethical approval from NHRC (636/2021P), and consent was taken from respondents of the study. The information given by the respondents was kept confidential. Nonprobability sampling technique was used to select study area. Every participant who were willing to participate in the study,20 weeks pregnant ,15-49 years were included in the study. Intervention was provided to all the participants and follow up interval was of two months between pre and posttest. Data was collected with face-to-face interview using semi-structured questionnaire. The questionnaire was developed by the researchers themselves through consultation with peers, experts and through extensive literature on socio- demographic status, dietary intake pattern and nutritional status of pregnant women. Dietary intake was evaluated by using Food Frequency Questionnaires and 24 hours' dietary recall methods. Anthropometric measurement (height and weight, BMI and MUAC) was done for assessment of nutritional status of participants. 24-hour dietary recall method and Food Frequency Questionnaires (FFQ) was applied to evaluate dietary intake pattern of pregnant women. Data entry was done in Microsoft Office Excel, and analysis in SPSS

RESULTS

There were 110 pregnant women participated in the study. Among them, 14.5% respondents were 15-19 years. Remaining women were age of 20-39 years. Most of the respondents (88%) were Hindu. and belonged to extended family (74.4%). More than half (60%) of the respondents were home makers. They were dependent on their husbands, and father-in-law to fulfill foods and financial demands in their households.

Table 1. Sociodemographic factors. n=110

Characteristics	Categories		Frequency	Percentage
Age in years	15-19		14	12.7
	20-24		33	30.0
	25-29		46	41.8
	30-34		15	13.6
	35-39		2	1.8
Religion	Hindu		97	88.2
	Islam		1	.9
	Christian		10	9.1
	Others		2	1.8
Types of family	Nuclear		30	27.3
	Extended		80	72.7
Education ofrespondent	Illiterate		1	.9
	Literate		3	2.7
	Primary		8	7.3
	Lower secondary		17	15.5
	Secondary		36	32.7
	Higher secondary		30	27.3
	Above higher secondary		15	13.6
Occupation ofRespondent	Housewife		65	59.1
	Famer		25	22.7
	Wage labor		1	.9
	Business		9	8.2
	Service		8	7.3
	Others		2	1.8
Households' money Providers	Herself	2		1.8
	Husband	69		62.7
	Father -in-Law	24		21.8
	Mother -in-Law	8		7.3

Nutrition status of pregnant women was assessed by measuring body weight, height, Body Mass Index (BMI), and Mid Upper Arm Circumference (MUAC) before and after nutrition counseling intervention. It shows that more than half of the respondents (58.2%) were of normal BMI status, 18.2% pregnant women were under-weight, 20% overweight, and 3.6% obese. Most of the respondents (88.2%) had normal MUAC (>22 cm- normal). However, 11.8% pregnant women were malnourished (MUAC <22cm) before intervention. The proportion of MUAC measurement improved after intervention (4.5%).

Table 2. Nutrition status of pregnant women. n=110

Characteristics	Categories	Frequency	Percentage
BMI	<18.5 -underweight	20	18.2
	18.5-24.9 - normal	64	58.2
	25-29.9- overweight	22	20.0
	30 & above - obesity	4	3.6
MUAC before intervention	>22 cm-normal	97	88.2
	<22 cm-malnourished	13	11.8
MUAC after intervention	>22 cm-normal	105	95.5
	<22 cm-malnourished	5	4.5

Food frequency questionnaire (FFQ) was used before and after nutrition counseling of pregnant women. It indicates detailed food intake including food list, frequency and quantity of consumed foods within a month. The FFQ clearly pointed out the consumption of foods patterns, frequency of foods, quantity and quality of foods during pregnancy period improved after nutrition counseling program.

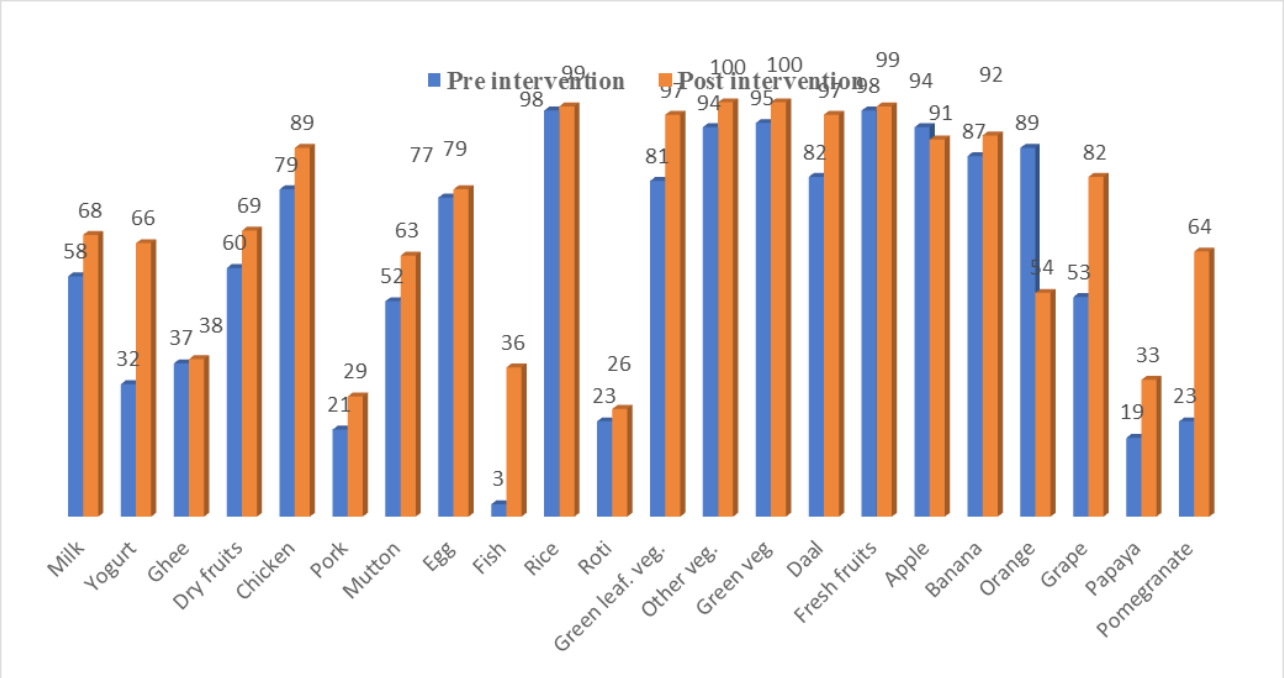

Figure 1. Frequency of foods within a month.

Table 3. Mean nutrients and energy intake of pregnant women n=110

Descriptive Statistics pre intervention					
Nutrients	No. participants	Minimum	Maximum	Mean	Std. Deviation
Carbohydrate	110	70.00	406.00	226.7182	62.71578
Protein	110	15.00	124.00	65.3000	20.78000
Fat	110	20.00	84.00	43.3182	14.30528
Energy	110	655.00	2625.00	1648.1273	378.03267
Descriptive Statistics Post intervention					
Carbohydrate	110	96.00	442.00	289.3818	56.94098
Protein	110	22.00	133.00	77.2909	18.76917
Fat	110	22.00	110.00	50.9455	17.39073
Energy	110	735.00	2960.00	2041.5091	356.74092

The table shows that mean carbohydrate, protein, fat (measured in gram) and energy (measured in Kcal) before and after intervention. Actual intake of carbohydrate, protein, fat and energy from consumed foods within 24 hours of the day was assessed using 24 hours' dietary recall method. The result indicates mean carbohydrate, protein, fat and total energy increased after nutritional counseling intervention.

Paired sample tests were done to identify the effectiveness of nutrition counseling program. As per the paired sample test of energy before and after nutrition counseling intervention, mean energy intake before intervention program = 1648.1273 kcal with its SD ±378.03 kcal. Likewise, Mean energy intake after intervention program =2041.40 kcal with its SD ±356.74 kcal. Here the mean energy intake improved after intervention.

According to the result of Paired sample test of body weight of pregnant women before and after nutrition counseling intervention, Mean weight gain before intervention program = 53.0818 kg with its SD ± 9.37 kg. Likewise, Mean weight gain after intervention program = 58.1618 kg with SD ±8.83kg. The test indicated that mean weight of pregnant women increased after nutrition counseling intervention.

MUAC measurement before and after nutrition counseling was assessed using paired sample test. It shows that there is a difference between MUAC measurement before and after nutrition counseling intervention. Mean MUAC measurement before intervention program = 25.72cm with its SD ±2.95cm. Likewise, Mean MUAC measurement after intervention program = 26.28cm with its SD ±2.75cm. Here the mean MUAC measurement of pregnant women increased after intervention.

Correlation between weight gain and energy intake, and energy intake and MUAC of pregnant women was tested, and compared with p-value, there is some positive correlation between energy intake and anthropometric measurement (weight and MUAC). It clearly showed that nutritioncounseling program is an effective intervention.

DISCUSSION

National Nutrition Policy and Strategy, 2004 highlighted that nutritional education and counselling is an effective tool in order to improve nutritional status of women during pregnancy.[4] Proper dietary counselling of pregnant women is potentially beneficial to both the pregnant women and her children.[2,5,6] A similar study indicated that nutritional education and counselling (NEC) improves nutrition status of pregnant women, gestational weight gain, birth weight, and lowered the risk of preterm birth and anemia.[7,8]

Nutritional status of pregnant women was assessed by measuring anthropometric indices including height, weight, BMI and MUAC measurement. In this study, 18.2% pregnant women were under-weight, 20% overweight, and 3.6% obesity. This finding is in line with the NDHS report 2016 indicates the proportion of underweight among women age15-49 years found 19%, 15% overweight, and 3% obesity in province 5 of Nepal.[3] MUAC measurement of pregnant women showed that 11.8% pregnant women were malnourished (MUAC <22cm) before nutrition counseling intervention. The proportion of malnutrition among pregnant women reduced after nutrition counseling intervention (4.5%), as also proved in previous study.[9] Inadequate food intake during pregnancy leads to increase malnutrition among pregnant women that further leading to low-birth-weight baby and increases

the risks of morbidity and mortality rate among mothers and children.[10]

Consumption of milk and milk products by the participants improved after nutritional counseling program where, consumption of milk before and after counseling was 58% and 68%, yogurt and paneer 32% and 66%, and 16% and 19% respectively. The national report of Nepal shows 30% women consumed milk and milk products during pregnancy period[3]. Meat, egg and fish consumption patterns found in increasing trend in after counseling program (chicken meat 79% and 89%, mutton meat 52% and 63%, pork meat 21% and 29%, fish 2.7% and 36%, and egg 77% and 79%) within a month.[3]

Almost all participants consumed rice and roti as main foods, which is in line with the findings of the NDHS, 2016.[3] Most of the participants consumed different types of vegetables including green leafy vegetables, green vegetables, and other vegetables. The consumption pattern of vegetables of the participants was improved after nutrition counseling program. This finding proved another similar research.[11,12] Most of the participants consumed different types of daal with their meals. The proportion of consuming daal increased after intervention, as it supports another research.[12] Overall, consumption pattern of fresh fruits and dry fruits increased after nutrition counseling where, apple 91% vs 94%, banana 87% vs 92%, pomegranate 23 % vs 69%, grape 57% vs 82%, papaya 19% vs 33%, and dry fruits 60% vs 69%.

In this study, macro nutrients (CHO, protein, fat) and energy from consumed foods within 24 hours of the day were evaluated using 24 hours' dietary recall method to the participants. The result indicates that protein, fat, CHO and energy intake of pregnant women improved after nutrition counseling. The improvement was there because they were following balanced diet and consumption of protein rich foods were also included in their diet same kind of findings was present in other studies also. [12,13]

The results of this study can be taken as a basis for further extensive research. More researches should be carried out on nutrition among pregnant women, so that issues of magnitude, consequences can be addressed, hence following evidence based policy formulation on subject. Limitations of the research includes small sample size, short duration of study, and follow up method. Insufficient fund for the research.

CONCLUSIONS

Maternal nutrition during pregnancy is crucial for achieving healthy maternal and fetal outcomes. Adequate nutrients should be provided to all pregnant women in order to fulfill the demands of nutrients in the body for both mother and her fetus. Nutrition counseling is an effective tool to improve maternal nutrition, which further enhances healthy gestational weight gain, reduce maternal health problems and complications, and low birth weight baby. This study indicated that nutrition status and dietary pattern of pregnant women improved after nutrition counseling. Frequency of foods, carbohydrate, protein, fat and energy intake pattern increased after nutrition counseling program. Nutritional status of pregnant women improved after nutrition counseling. Overall nutrition counselling showed positive effects on nutritional status of pregnant women. Thus, nutrition counselling is essential for all pregnant women. It should be a major part of ANC service to all pregnant women in Nepal.

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CONFLICT OF INTEREST

Authors declare no conflict of interest

REFERENCES

1. WHO. International Food Safety Authorities Network. Geneva: WHO Geneva;3/2008.Availablefrom:https://www.who.int/foodsafety/fs_management/No_03_nutrition_Apr08_en.pdf Accessed on: 8/10/2021

2. Laitinen K. Impact of dietary counselling on nutrient intake during pregnancy : a prospective cohort study. 2006; 96(4):1095–104.

3. Ministry of Health. Nepal Demographic Health Survey 2016.Kathmandu: GovernmentofNepal;2016. Accessedon:8/10/2021Availablefrom:https://www.dhsprogram.com/pubs/pdf/fr336/fr336.pdf

4. Ota E, Hori H, Mori R, Tobe-Gai R, Farrar D. Antenatal dietary education and supplementation to increase energy and protein intake. Cochrane database of systematic reviews. 2015;2(6):1-8.Accessed on 7/9/2022.Available from [PubMed]

5. Anleu E, Reyes M, Araya B M, Flores M, Uauy R, Garmendia ML. Effectiveness of an intervention of dietary counseling for overweight and obese pregnant women in the consumption of sugars and energy. Nutrients. 2019 ;11(2): 385.Accessed on 7/9/2022. [PMC6412784]

6. Diddana TZ, Kelkay GN, Dola AN, Sadore AA. Effect of nutrition education based on health belief model on nutritional knowledge and dietary practice of pregnant women in Dessie Town, Northeast Ethiopia: A cluster randomized control trial. Journal of nutrition and metabolism. 2018;2018(1):6731815. Accessed on 8/9/2022.[PubMed]

7. Sisay G, Tesfaye A, Hessen R, Tesafye T. Under-Nutrition and Associated Factors Among Pregnant Women in Public Health Care Hospitals of Gedeo Zone, SNNPR, Ethiopia: A Cross-Sectional Study. 2021,1-11.Accessed on 7/9/2022.Available from [Article]

8. Fadare O, Amare M, Mavrotas G, Akerele D, Ogunniyi A. Mother's nutrition-related knowledge and child nutrition outcomes: Empirical evidence from Nigeria. PloS one. 2019 ;14(4):0212775. Accessed on 8/9/2022.[Article]

9. Mulligan AA, Luben RN, Bhaniani A, Parry-Smith DJ, O'Connor L, Khawaja AP, et al. A new tool for converting food frequency questionnaire data into nutrient and food group values: FETA research methods and availability. BMJ open. 2014 Mar 1;4(3):1-11 Accessed on 7/9/2022.Available from [Article]

10. Srour MA, Aqel SS, Srour KM, Younis KR, Samarah F. Prevalence of anemia and iron deficiency among Palestinian pregnant women and its association with pregnancy outcome. Anemia. Hindawi.2018 Dec 24;1-5

11. Soylu M. Effects of nutrition education on general health and nutrition status of pregnant women. European Journal of Sustainable Development Research. 2019;3(1):18-23. Accessed on 7/9/2022.

12. Hillesund ER, Bere E, Sagedal LR, Vistad I, Øverby NC. Effect of a diet intervention during pregnancy on dietary behavior in the randomized controlled Norwegian Fit for Delivery study. Journal of developmental origins of health and disease. 2016 Oct;7(5):538-47. Accessed on 7/9/2022. Available from [Article]

13. Fadare O, Amare M, Mavrotas G, Akerele D, Ogunniyi A. Mother's nutrition-related knowledge and child nutrition outcomes: Empirical evidence from Nigeria. PloS one. 2019 Feb 28;14(2):0212775. Accessed on 7/9/2022.Available from https://journals.plosone