



EFFECT OF CAPACITY BUILDING AND TEXT MESSAGING INTERVENTION ON DIETARY BEHAVIOUR AMONG PREGNANT WOMEN IN DHANUSHA DISTRICT OF NEPAL

Jitendra Kumar Singh

PhD Research Scholar, Department of Community Medicine, Institute of Medical Sciences, Banaras Hindu University, Varanasi, UP, India. - Corresponding author

Shri Prakash Singh

Professor & Head, Department of Community Medicine, Institute of Medical Sciences, Banaras Hindu University, Varanasi, UP, India.

ABSTRACT **Background:** Adequate dietary behaviour among pregnant women is important for healthy mom and health baby. The objective was to assess the effect of capacity building and text messaging intervention on dietary pattern among pregnant women in Dhanusha district of Nepal.

Methods: This study was conducted in six villages of Dhanusha district of Nepal. 426 pregnant women in their second trimester were selected by multistage random sampling. Data analysis was done using SPSS software version 21.0

Results: Significantly high amount of food consumption was observed in intervention group as compared to control group at post-intervention for all food groups except cereals/grains and other vegetables.

Conclusions: This intervention encouraged balanced and diversified diet among pregnant women in rural area of Dhanusha district of Nepal.

KEYWORDS : Dietary behaviour, FCHV, Text messages.

Introduction:

Dietary behaviour plays an important role in human health. Under nutrition may result from poor dietary quality and diversity. Inappropriate and inadequate dietary pattern among pregnant women have resulted in the deficiency of essential nutrients which create risk leading to several unhealthy maternal and child complications. Adequate nutritional status of pregnant women is important for healthy mom and health baby. It is, therefore, essential to improve dietary intake among pregnant women to increase maternal and child survival. The objective of this study was to assess the effect of capacity building and text messaging intervention on dietary pattern among pregnant women in Dhanusha district of Nepal.

Methodology:

Study Setting:

This article is a part of a thesis entitled "Effect of capacity building and technological intervention to enhance maternal and child health service utilization among pregnant women from rural Nepal". This was an intervention study conducted in the Dhanusha district of Nepal from July 2015 to December 2016. There are 101 villages in Dhanusha district consisting nine wards in each village in Nepal.

Study Subjects: Pregnant women in their second trimester (13 to 28 weeks of gestation), who were residents of 52 wards in six villages of Dhanusha district of Nepal.

Sample size and sampling technique: Sample size was calculated by using formula: $n = \frac{2(Z_{\alpha/2} + Z_{\beta})^2 (P_1Q_1 + P_2Q_2) / (P_1 - P_2)^2}$ for the purpose of the trial by considering prevalence of 12% for delivery attended by skilled health professionals. The required sample size calculated after adjusting for cluster effect with 20% attrition rate was as 354. However, 426 eligible expectant women were available in the study area at the time of survey. Multi stage sampling was adopted. Two Primary Health Care facilities were purposively selected. Six villages stratified by population size were then selected randomly from the catchment area of these two primary health care facilities. Out of 54 wards present in selected villages, 52 wards were selected after exclusion of two wards that were in semi-urban area. Then, 52 clusters were matched into 26 pair and randomized either in intervention or control group. Finally, pregnant women of 2nd trimester (13-28 weeks of gestation) in 52 clusters were identified with the help of female community health volunteers and enrolled for study.

Data Collection and analysis: Data collection was done by using pre-tested interview schedule and food frequency questionnaire (FFQ). Purpose of the trial was clearly explained among participants and consent was taken. Data entry was done in EpiData software version

3.1 and analysis was done in SPSS software version 21. Dietary intake data from FFQ was entered into nutrition software (developed by NIN, ICMR, Hyderabad, India) for the assessment of quantitative calculations. This trial consists of several follow up. Therefore, data used for this study was from baseline survey (at 13-28 week of gestation) and first follow up (at 38-39 weeks) after intervention. Hence, 413 participants were included in final analysis after 23 participants lost to follow up as there were 426 participants at baseline.

Inclusion criteria: Pregnant women between 15 and 45 years of age.

Exclusion Criteria:

- 1) age above 45 years
- 2) women with a disability that makes the intervention difficult
- 3) Pregnant women who did not give consent to participate.

Intervention

Intervention was implemented by two approaches:

1. Capacity building of Female Community Health Volunteers (FCHVs) and
2. Repeated text message through mobile phone to the pregnant women.

One day reinforcement training was given for the Capacity building of FCHV. Training focused on MCH service utilization and dietary intake for pregnant women. Monthly Supervision and monitoring of FCHVs were also made during study period. On the same time, text message were sent to the pregnant women through their mobile phones. Text messages were also focused on service utilization and dietary intake. Text messages were sent in local language (Nepali) either at evening or morning. Text message were sent one message per fortnight between 4th and 6th months and every week thereafter till delivery.

Ethical approvals: Ethical approvals were obtained from Ethics Committee of Banaras Hindu University, Varanasi, India as well as from Ethical Review board of Nepal Health Research Council, Nepal. Trial was registered with ISRCTN60684155.

Results:

Table 1 presents the socio-demographic characteristics of study participants at baseline survey. Mean age of the pregnant women in intervention and control group was 23.1±5.4 and 22.7±5.0 years. Year of education and family size in intervention group was 9.1±3.3 and 4.8±2.1 while in control group 8.7±3.7 and 5.2±2.4 respectively. Age of gestation was 18.2±2.8 and 18.1±2.6 weeks in intervention and control group. Regarding mobile phone, vast majority of women in both groups (87.2% in intervention and 93.2% in control group) had mobile phone in their family. There were no significant difference of socio-demographic variables among pregnant women in intervention and control except family size and presence of mobile phones in family.

Table-1: Socio-demographic characteristics of study participants in Intervention and Control group at baseline (at 13-28 week of gestation).

Characteristics at baseline	Intervention (n=219)	Control (n=207)	p-value
	Mean±SD	Mean±SD	
Age of Mothers	23.1±5.4	22.7±5.0	p=0.261
Year of Education	9.1±3.3	8.7±3.7	p=0.239
Family Size	4.8±2.1	5.2±2.4	p=0.044
Gestational age (weeks)	18.2±2.8	18.1±2.6	p=0.684
Mobile phone	n, (%)	n, (%)	P=0.034
Yes (Within Family)	191(87.2)	194(93.2)	
No (Neighbour)	28 (12.8)	13(6.8)	

Table 2 demonstrates the amount of food consumed from different food groups by pregnant women in intervention and control group at baseline and post- intervention (at follow up-II). Overall mean daily intake (in grams) from different food groups at baseline and post-intervention respectively were; 366.4±51.2 and 394.7±56.9 for cereals/grains, 27.2±5.5 and 36.0±5.9 for pulses/legumes, 73.3±18.7 and 91.2±19.4 for leafy vegetables, 108.2±19.0 and 134.5±24.4 for other vegetables, 28.8±5.8 and 32.7±7.1 for citrus fruits, 77.0±19.7 and 82.2±19.1 for other fresh fruits/nuts, 308.5±51.4 and 344.3±52.4 for dairy products, 26.7±5.4 and 36.6±7.0 for egg/fish/meat, 35.4±7.4 and 36.1±7.9 for fats and oils, & 27.0±5.7 and 30.1±6.9 for beverage/sugar. There was no significant difference between intervention and control group for consumption of amount of foods from all the food groups at baseline (p>0.05). The significantly high amount of food consumption was observed in intervention group as compared to control group at post-intervention for all the food groups (p<0.05) except two food groups; cereals/grains and other vegetables.

Table 2: Mean daily Intake of Food Category among Pregnant women in intervention and control group at baseline and post intervention (Follow up- I)

Food Groups (Gram per day)	Average intake of Food			Test of P-value
	Total (n=413)	Intervention (n=214)	Control (n=199)	
Baseline	Mean ±SD	Mean ±SD	Mean ±SD	Independent t-test
Cereals/Grains	366.4±51.2	365.7±50.2	367.2±52.5	p>0.05
Pulses/Legumes	27.2±5.5	27.0±5.8	27.5±5.1	p>0.05
Leafy vegetables	73.3±18.7	73.9±18.8	72.6±18.6	p>0.05
Other Vegetables	108.2±19.0	108.8±19.1	107.6±19.0	p>0.05
Citrus Fruits	28.8±5.8	29.2±6.2	28.5±5.2	p>0.05
Fresh fruits/nuts	77.0±19.7	77.1±20.0	77.0±19.4	p>0.05
Dairy products	308.5±51.4	307.8±50.7	309.2±52.4	p>0.05
Egg/Fish/Meat *	26.7±5.4	26.6±5.8	26.8±5.1	p>0.05
Fats and Oils	35.4±7.4	36.0±8.1	34.9±6.6	p>0.05
Beverage/Sugar	27.0±5.7	27.2±6.1	26.8±5.1	p>0.05
Post Intervention [Follow up-I]				
Cereals/Grains	394.7±56.9	397.6±58.1	391.6±55	p>0.05
Pulses/Legumes	36.0±5.9	36.6±6.0	35.3±5.7	p<0.05
Leafy vegetables	91.2±19.4	96.0±18.8	86.0±18.7	p<0.05
Other Vegetables	134.5±24.4	133.3±25.9	135.7±22.4	p>0.05
Citrus Fruits	32.7±7.1	34.7±7.7	26.7±6.1	p<0.05
Other Fruits/Nuts	82.2±19.1	84.7±19.6	77.5±18.3	p<0.05
Dairy Products	344.3±52.4	350.9±50.7	337.2±53.2	p<0.05
Egg/Fish/Meat *	36.6±7.0	38.8±7.1	34.1±6.1	p<0.05
Fats and Oils	36.1±7.9	37.0±5.2	35.2±8.5	p<0.05
Beverage/Sugar	30.1±6.9	31.2±7.7	28.8±5.6	p<0.05
*n=326 (intervention=168 & Control=158)				

Discussion:

This results show that the capacity building and text message intervention was associated with positive changes of dietary practices among pregnant women. The intervention was successful in improving dietary intake pattern among pregnant women.

There was similar distribution of socio-demographic characteristics in

intervention and control group. The findings are in line with the findings of Nepal Demographic Health Survey 2016 (NDHS, 2016) that show the true representation of population. At baseline before intervention, the mean daily intake of food among the women in intervention and control group was similar for all food groups such as cereals or grain, pulses or legumes, leafy vegetable, other fresh vegetables, citrus fruits, other fruits or nut, dairy products, egg or fish or meat, fats or oils and sugar or beverages (p>0.05). At post intervention, a significant intervention effect was found in intervention area. Significantly high mean daily intake of pulses or legumes, leafy vegetable, fruits, dairy products, egg or meat or fish, fats or oils and sugar or beverages was observed in intervention group as compared to control group (p<0.05). No significant difference was observed between in intervention and control group for cereals or grain and other vegetable intakes were detected (p>0.05).

Our intervention findings show significant improvements in dietary intake among pregnant women. The findings of the present study are supported by number study conducted to improve dietary practices. A study in Nepal (Bhandari et al., 2016) demonstrated that the majority of women consumed cereals at least once a day, vegetables thrice a week, meat or meat products and fruits once a week while milk and milk products was consumed once a day in all three ecological regions of Nepal. Another study conducted in rural Nepal (Campbell et al., 2014) revealed that rice, potatoes, legumes and vegetable oil consumed regularly among reproductive aged women while food from animal origin and fruits were consumed infrequently. An interventional study (Burr et al., 2007) shows consumption of fruit juice increased substantially among pregnant women in a deprived population in the voucher group as compared to advice group. Another study based on telephone-delivered message (Williams-Piehot et al., 2004) demonstrated that messages improved the fruit and vegetable intake among participants.

Health education regarding dietary practice either from any source has great effect on improvement in dietary practices. Anthony Worsley (Worsley, 2002) explained role of nutrition knowledge on dietary behaviour in public health nutrition. There are several ways to learn and use food-related knowledge they can improved dietary practices (Bhandari et al., 2016) also explored that the women who did not get nutrition education from any organizations were more likely to get malnourished and the finding was supported by a study done in Pakistan (Zahid Khan, Rafique, Qureshi, & Halai Badruddin, 2013).

Conclusion:

This study has confirmed that traditional dietary practices in rural area can be changed by health education given by community volunteers or through mobile phones. This intervention encouraged balanced and diversified diet among Pregnant women in rural area of Dhanusha district of Nepal. However, the challenge to receive text messages due to poor education among some participants and attitudinal change among some FCHVs to collaborate with community people is important problems that need to be addressed.

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