

Effect of modern family planning use on nutritional status of women of reproductive age group at Tena District, Arsi Zone, Oromiya Region, Ethiopia: A comparative study

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Abstract

Background: Women in developing countries conceive on average six to eight children over their reproductive life span. Short inter-pregnancy intervals or early pregnancies result in maternal depletion of energy and protein and micronutrients leading to a reduction in maternal nutritional status at conception and altered pregnancy outcomes. Extending birth spacing would presumably provide the women the time to replenish their nutrient stores.

Objective: To Assess the Effect of Modern Family Planning Method utilization on the nutritional status of reproductive aged (15-49 years) women in rural settings.

Methods: A community based quantitative comparative cross-sectional study was conducted in three *kebeles* randomly selected at Tena Woreda, Arsi Zone, Oromiya Rgion in 2013. Prior to the study, family planning users (MFPM) and non-users for at least one year were identified and registered. A total of 360 sampled subjects were enrolled using systematic random sampling. Data were entered in Epi-Info version 3.5.1 and analyzed using SPSS version 17 software. To see the effect of modern family planning method use on the nutritional status of women, both bi-variate and multivariate logistic regression analysis were done and variables with variance inflation factor greater than 10 was removed from the multivariate analysis to avoid the problem of multi-collinearity.

Results: The mean height, weight, MUAC and BMI of the respondents were 156.7±5.5 (NFP 155.9±5.2 vs. FP 157.5±5.6), 50.0±7.2 (NFP 47.4 ±6.1 vs. FP 52.6±7.4), 23.4±2.9 (NFP 22.3±2.4 vs. FP 24.5±2.9) and 20.3±2.4 (NFP 19.4±2.1 vs. FP 21.1±2.4), respectively and the difference noted between the groups was significant. The proportion of respondents with height ≤145cm, weight ≤ 45kg, BMI below 18.5kg/m² and MUAC below 21cm was higher in NFP than FP users and the difference noted was significant except for height. About two-fifth (42.8%) of NFP user women and less than 1/5th (18.3%) of FP user women had weight below 45kg. One quarter (24.7%) of the respondents had MUAC below 21cm (38.3% NFP vs. 11.1% FP users). Women of NFP user were more underweight 70 (38.9%) than FP user women 26 (14.4%). The major factors associated with women's underweight include: currently lactating (AOR=4.6; 95%CI=2.4 to 9.1); FPM utilization (AOR=2.3; 95%CI = 1.3 to 4.6); educational status (AOR=2.6; 95%CI =1.3 to 5.3); illness in the past one year (AOR=1.9; 95%CI= 1.1 to 3.3), consumption of meal less than three times a day (AOR =3.6;95%CI=1.0 to 13.2) and never ate meat per week (AOR=4.1; 95%CI= 1.8 to 9.2).

Conclusions: The prevalence of underweight was significantly higher among women who did not use family planning than family planning users. Continuous supply of modern family planning with different range is important for improvement of women's nutritional and health status. Other than this, it is equally important to empower women and to have access for increased dietary intake during the different reproductive life span. [*Ethiop. J. Health Dev.* 2014;28(2):81-88]

Introduction

Despite encouraging accomplishments over the years, 529, 000 mothers are still dying each year, mostly from avoidable causes. Over 300 million women in the world currently suffer from long-term or short-term illness brought by pregnancy or childbirth (1).

In developing countries, a woman's lifetime risk of dying due to pregnancy and childbirth is 1 in 75, or almost 100 times higher than the 1 in 7,300 risk in developed countries. In sub-Saharan Africa, the risks are the highest in the world; a woman's lifetime chance of dying from pregnancy or childbirth-related causes is 1 in 22. Of the estimated 536,000 maternal deaths that occur annually worldwide, more than 99% occur in developing countries and 86% in sub-Saharan (2). Similarly in Ethiopia, women are the most affected segment of the population. Unwanted or mistimed pregnancies ending in clandestine

abortion is not uncommon resulting in serious health complications including death (3). Likewise, under nutrition is a serious problem in the country, affecting women and children (4).

It is widely reported that utilization of modern family planning services brings a wide range of benefits for women such as improving their health and enhances their status and rights (5-6) and most importantly helps to prevent under-nutrition including their families and society. Under-nutrition continues to be a major health burden in developing countries and it is globally the most important risk factor for illness and death, affecting hundreds of millions of pregnant women and young children (7).

The nutritional status of women is important, because it is through women and their off-spring that the bad effects

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of malnutrition are propagated to future generations (8-9). A malnourished mother is likely to give birth to a low birth-weight (LBW) baby susceptible to disease and premature death, which undermines the economic development of the family and society, and continues the cycle of poverty and malnutrition (8). Women in developing countries conceive and nourish with their own bodies six to eight children over their reproductive life span. Due to the high energy and nutrient demands of pregnancy and lactation, women spend a large proportion of their reproductive years under possible nutritional stress (10). In addition, when women are married at an early age they are exposed to frequent unwanted pregnancies and early childbearing, lower gestational weight gain and an increased risk of low birth-weight, pregnancy induced hypertension, pre-term labor, iron deficiency anemia, underweight and mortalities (11-12). Poor maternal nutrition contributes to at least 20% of maternal deaths, and increases the poor pregnancy outcomes, including newborn deaths (13).

Despite the enormous benefits of family planning and being a constituent of reproductive health and HIV/AIDS, little is being done to tackle the problem especially in countries most affected and there is an obvious funding gap for Maternal Nutrition (14), and Family Planning in most developing countries has lost focus. Policymakers have turned their attention to other issues such as HIV/AIDS, infectious diseases, and alleviating persistent poverty (2, 5, 8, 15-17).

Many researches done on modern family planning utilization have focused on children's benefits and less data are available regarding the effect on the women end, and thus, this study was conducted to shed some light on the importance of family planning use and produce evidence based information that could help in addressing the maternal malnutrition in general and enlighten the line ministries to consider some program initiatives in particular.

Methods

A community based quantitative comparative cross-sectional study was conducted from January- February 2013 in three randomly selected *kebeles* of the *Tena Woreda* district, *Arsi* Zone, which is located about 260 km away from Addis Ababa. According to the population projection for 2012, the total population of the *Woreda* was 77,562 of which 38,905 are men and 38,657 women (18). Muslim and orthodox Christians are the two predominant religions in the district. Agriculture is the main economic source of the population. Wheat, *teff*, barley, sorghum and onion, are the major agricultural products produced in the area. The district was purposively selected among the 25 districts of *Arsi* Zone because of previous exposure of the principal author to the district.

The sample size was calculated using prevalence of underweight among ever contraceptive users ($p=9\%$) and non-users ($p=27\%$) in Nigeria (19) of two-sample proportion, 95% confidence level and power of 80%, 10 non response rate and design effect of 2. The estimated sample size was 360 subjects, 180 subjects for each ever and non-ever users of modern family planning users.

A prior survey was done to identify women who utilized at least one FP method for at least one year and registered. Apart from registration, all houses of ever family planning user women were marked with chalks and given identification number. Using PPS (Probability Proportional to population Size), the required sample size was allocated to the study *kebeles* and subjects were selected by systematic random sampling method until the required sample size was obtained.

Data were collected using a pre-tested structured questionnaires developed based on literatures to collect socio-demographic and other relevant reproductive health information that included family planning utilization and nutrition related information of the women. A team consisted of three individuals involved in data collection.

All anthropometric measurements (weight, height, and arm circumference) were taken by the trained diploma nurses based on standard procedure outlined in the Anthropometric Indicators measurement Guidelines (20). Middle upper arm circumference was measured in centimeter with a non-stretched measuring tape with the right arm hanging relaxed. The measurement was taken midway between the tip of the acromion and olecranon process. The tape was placed gently but firmly round the arm to avoid compression of soft tissue. Measurement was taken to the nearest 0.1 cm; Weight was measured in kilogram without shoes using a battery powered digital scale with a capacity of 200 kg and precision of 0.1 kg to the nearest 0.1 kg and height was measured barefoot to the nearest 1 cm using stadiometre (a vertical tape fixed perpendicular to the ground on the wall). Body mass index (BMI) was calculated as weight in kg/height in m^2 , and values below or equal to 18.5 kg/m^2 was considered undernourished or chronic energy deficient (CED).

Data were entered, cleaned, rechecked and analyzed using Epi-Info version 3.5.1 and SPSS software version 17. Descriptive analysis was made for socio demographic, obstetric and other contextual factors for both MFP and NFP users. Odds ratio with 95% confidence interval was computed to assess the presence and degree of association with the outcome variables. Both bivariate and multivariate logistic regression models were run to see the association of important contextual factors with the outcome variables. The chi-square test was used to describe the data between ever FP user and NFP and test their significant differences while t-test was used to see the mean differences of BMI, height, weight and MUAC of both groups. The result was

presented using appropriate frequencies, proportions, odds ratio and 95% confidence interval. A P-value < 0.05 was considered statistically significant. Variables with Variance inflation factor greater than 10 (VIF>10) was removed from the multivariate analysis to avoid the problem of multi-collinearity.

The study protocol was reviewed and approved by the Research and Ethics Committee of the school of public health, Addis Ababa University. Permission was obtained from *Tena Woreda* Health Office as well as from all study subjects who consented to participate after the nature of the study was explained to them in their local languages.

Results

A total of 360 subjects (180 FPM user at least for one year and 180 NFPM users) participated in this study making the response rate 100%.

Table 1 displays some of the socio-demographic characteristics of the respondents. Less than half (42.8%) of them were within the age category of 35-49 years in both ever family planning users and non-users and the overall mean age of the women was 32.8(±8.2) years

[FPM users 31.4(±6.8) vs NFP users 34.3(±9.2) years] and the difference was significant (p=0.001). Nearly two third (63.4%) of Orthodox Christians, one third (30.7%) of Muslims and 7(46.7%) Protestants were ever modern family planning users and the proportion of FPM users was significantly higher among the Orthodox Christians (p=0.001). Although the majority of the respondents were Oromos (n=289) followed by Amhara (n=68) and others (n=3) ethnicities, the difference in terms of FPM use was marginally significant (p=0.05). About three-fifth (59.3%) (p=0.001) who ever used modern family planning had formal education and 79 (70.5%) non users had no formal education. Three fifth (60.0%) (p=0.001) of the women used FPM, their spouses had formal education and more than three fourth (78.0%) women who didn't utilize FPM their husbands had no formal education. Among women who stayed less than 10 years in marriage, 86 (61.4) were FP users while 56 (70.9%) of women with marital duration of more than 20 years were NFP users. Over two-third (67.5) (p=0.001) who had a family size of more than five household members were NFP users and over three fifth (63.4%) (p=0.001) FPM user women possessed radio and the differences noted between owns and non-owns was significant.

Table 1: Socio demographic characteristics of respondents by ever MFPM users at *Tena Woreda, Arsi Zone,, Oromiya Region, 2013(N=360)*.

Variables	Ever FPM users		Total	P-Value
	No n (%)	Yes n (%)		
Age category (in years)				
15-24	33(55.9)	26(44.1)	59(100)	
25-34	55(37.4)	92(62.6)	147(100)	
>34	92(59.7)	62(62.6)	154(100)	
Mean	34.3(±9.2)	31.4(±6.8)	32.9(±8.2)	0.001
Religion				
Muslim	97(69.3)	43(30.7)	140(100)	
Orthodox	75(36.6)	130(63.4)	205(100)	
Protestant	8(53.3)	7(46.7)	15(100)	0.001
Ethnicity				
Oromo	152(52.6)	137(47.4)	289(100)	
Amhara	28 (41.2)	40 (58.8)	68(100)	
Other	-	3(100)	3(100)	0.052
Woman education				
No	79(70.5)	33(29.5)	112(100)	
Yes	101(40.7)	147(59.3)	248 (100)	0.001
Husband education(n=337)				
No	64(78.0)	18(22.0)	82(100)	
Yes	102(40.0)	153(60.0)	255(100)	0.001
Marital status				
Single	14(60.9)	9(39.1)	23(100)	
Married	150(47.5)	166(52.5)	316(100)	
Widowed/divorced	16(76.2)	5(23.8)	21(100)	0.022
Marital duration(n=337)				
1-10 years	54(38.6)	86(61.4)	140(100)	
11-20 years	56(47.5)	62(52.5)	118 (100)	
>20 years	56(70.9)	23(29.1)	79(100)	0.001
Family size				
≤5	51 (30.2)	118(69.8)	169(100)	
>5	129(67.5)	62 (32.5)	191(100)	
Mean	6.9(±1.9)	4.97(±1.6)	5.9(±2.02)	0.001
Radio				
No	105(67.7)	50 (32.3)	155(100)	
Yes	75 (36.6)	130(63.4)	205(100)	0.001

* n=337; MFPM=Modern family planning methods

Table 2 indicates the anthropometric measurements of the respondents by FP utilization. The mean height, weight, MUAC and BMI of the respondents were 156.7 ± 5.5 (NFP 155.9 ± 5.2 vs. FP 157.5 ± 5.6), 50.0 ± 7.2 (NFP 47.4 ± 6.1 vs. FP 52.6 ± 7.4), 23.4 ± 2.9 (NFP 22.3 ± 2.4 vs. FP 24.5 ± 2.9) and 20.3 ± 2.4 (NFP 19.4 ± 2.1 vs. FP 21.1 ± 2.4), respectively and the difference noted between the groups was significant. The proportion of respondents with height ≤ 145 cm, weight ≤ 45 kg, BMI below 18.5kg/m^2 and MUAC below 21 cm was higher in

NFP than FP users and the difference noted was significant except for height. About two fifth (42.8%) of NFP user women and less than one fifth (18.3%) of FP user women had weight below 45kg. One quarter (24.7%) of the respondents had MUAC below 21cm (38.3% NFP vs. 11.1% FP users). Women of NFP user were more underweight 70(38.9%) than FP user women 26(14.4%).

Table 2: Anthropometric status of respondents by ever FPM utilizations at Tena Woreda, Arsi Zone, Oromiya Region, Ethiopia, 2013 (N=360).

Measurements	Ever FPM utilization		Total	p-value
	NFPM user n (%)	FPM user n (%)		
Height (in cm)				
≤145	5(2.8)	2(1.1)	7(1.9)	
>145	175(97.2)	178(98.9)	353(98.1)	0.449
Mean ±SD	155.9±5.2	157.5±5.6	156.8±5.5	0.008**
Weight (in kgs)				
≤45	77(42.8)	33(18.3%)	110(30.6)	
>45	103(57.2)	147(81.7)	250(69.4)	0.001*
Mean±SD	47.4±6.1	52.6±7.5	50.0±7.3	0.000**
MUAC (in cm)				
≤21	69(38.3)	20(11.1)	89(24.7)	
>21	111(61.7)	160 (88.9)	271(75.3)	0.001*
Mean±SD	22.3±2.4	24.6±2.9	23.4±2.9	0.000**
BMI (in kg/m^2)				
<18.5	70(38.9)	26(14.4)	96(26.7)	
18.5-24.99	107(59.4)	141(78.3)	248(68.9)	
≥25	3(1.7)	13(7.2)	16(4.4)	0.001*
Mean±SD	19.5±2.2	21.2±2.5	20.3±2.5	0.000**

*=chi-square test; **=t-test

Table 3 shows the association of BMI status with the obstetric and socio-demographic characters between the groups. In the bivariate analysis, respondents' birth interval between the youngest and the next old child less than 24 months, gravidity of more than four, past history of at least one abortion, no Antenatal care (ANC) during pregnancy, did not use FP, currently lactating, religion, education of spouse, polygamy and education were factors crudely associated with being underweight. The above associations, however, were lost and only currently lactating and women educational status remained a significant determinant of women's underweight in the Multivariate logistic regression analysis. Women who were currently lactating were more than 4 times underweight than non-lactating women (AOR=4.6; 95%CI=2.4 to 9.1). Illiterate women were 2.9 more likely to be underweight than educated women (AOR=2.6.3; 95%CI =1.3 to 5.3).

Table 4 illustrates the association of BMI status by decision making power, morbidity, dietary and FP use of respondents. Notwithstanding husbands' decision to

allow their wives go to health facility, respondents had illness in the past year, frequency of meals less than 3 times a day, never consumed fruit or vegetables, never consumed meat weekly, and did not use FPM were associated with the level of low BMI status, only FP utilizations, having illness in the past year, frequency of meal less than three times a day and never consumed meat per week remained significant in the multivariate analysis. Those women who were ill over the past year were about 2 times more likely to be underweight than who didn't have any illness (AOR=1.9; 95%CI= 1.1 to 3.3). Those women who ate meals less than three times per day were more than 3 times underweight than the women who ate three times or more (AOR =3.6;95%CI=1.0 to 13.2). Never having meat per week increases the odds of underweight by 4 times than having at least once or more (AOR=4.1; 95%CI= 1.8 to 9.2). NFP users were more than two times more likely to be underweight than their counter parts (AOR=2.3; 95%CI =1.3 to 4.1).

Table 3: Association of BMI status of the respondents by some obstetric and socio-demographic characters of respondents in Tena woreda, Arsi Zone, Oromiya Region, 2013

Variables	BMI<18.5	BMI≥18.5	COR(95%CI)	AOR(95%CI)
BI b/n young and next old child (n=294)				
<24 months	40(46.0)	47(54.0)	5(2.1, 11.8) **	2.3(0.6, 8.1)
24-36 month	40(26.3)	112(73.7)	2.1(0.9, 4.8)	1.2(0.4, 3.6)
>36 month	8(14.5)	47(85.5)	1	1
Gravidity(n=344)				
≤4	34(19.0)	145(81.0)	1	1
>4	62(37.6)	103(62.4)	2.6(1.6, 4.2)**	1.6(0.6, 4.9)
Abortion (n=344)				
0	28(18.3)	125(81.7)	1	1
≥1	68(35.6)	123(72.1)	2.5(1.5, 4.1) **	1.3(0.6, 2.7)
ANC(n=344)				
No	77(35.0)	143(65.0)	2.9(1.7,5.2) **	1.6(0.8, 3.3)
Yes	19(15.3)	105(84.7)	1	1
Ever FP used(n=344)				
No	70(39.5)	107(60.5)	3.6(2.1,5.9) **	0.9(0.4, 2.4)
Yes	26(15.6)	141(84.4)	1	1
Lactating (n=344)				
No	37(22.7)	126(77.3)	1	1
Yes	59(32.6)	122(67.4)	3.9(2.2, 6.7)**	4.6(2.4, 9.1) *
Religion (n=344)				
Muslim	41(37.3)	68(62.7)	1.9(1.2, 3.2) **	1.3(0.7, 2.4)
Christians	55(23.5)	179(76.5)	1	1
Education (n=344)				
No	47(43.5)	61(56.5)	2.9(1.8, 4.8) **	2.6(1.3, 5.3)**
Yes	49(20.8)	187(79.2)	1	1
Polygamy (n=323)				
No	80(26.1)	227(73.9)	1	1
Yes	8(50.0)	8(50.0)	2.8(1.1, 7.8)*	3.2(0.5, 5.3)
Husband education(n=323)				
No	32(41.0)	46(59.0)	2.4(1.4, 4.0) **	1.1(0.5, 2.2)
Yes	56(22.9)	189(77.1)	1	1
Family size (n=344)				
≤5	37(23.3)	122(76.7)	1	1
>5	59(31.9)	126(68.1)	1.5(0.9, 2.3)	05(0.2, 1.3)

BI=birth interval b/n =between 1=reference;

* P-value significant at the level of 0.05, **p-value significant at the level of 0.001

Table 4: Association of BMI status by decision making power, morbidity, dietary and MFPM use of respondents at Tena woreda, Arsi Zone, Oromiya Region, 2013.

Variables	Nutritional status (BMI)			
	BMI (<18.52)	BMI (≥18.5)	Crude OR (CI)	Adjusted OR(CI)
Decision on partner earn				
Women	8(27.6)	21(72.4)	1.4(0.6, 3.4)	1.1(0.4, 3.5)
Husband	41(43.6)	53(56.4)	2.9(1.7, 4.8) **	1.6(0.7, 3.0)
Jointly	47(21.3)	174(78.7)	1	1
Decision to go HCF				
Women	15(22.1)	53(77.9)	1.01(0.5, 1.9)	0.8(0.4, 1.9)
Husband	43(42.2)	59(57.8)	2.6(1.5, 4.4) **	1.5(0.7, 3.1)
Other	38(21.8)	136(78.2)	1	1
Illness in the past year				
No	54(22.2)	189(77.8)	1	1
Yes	42(41.6)	59(58.4)	2.5(1.5, 4.1) **	1.9(1.1, 3.3) *
Frequency of meals/ day				
<3times	10(66.7)	5(33.3)	5.7(1.9, 17.0) **	2.3(1.0, 13.2)*
≥3times	86(26.1)	243(73.9)	1	1
Eat vegetable/week				
Never	12(48.0)	13(52.8)	2.6(1.1, 5.9)*	1.7(0.6, 4.8)
≥1	84(26.3)	235(73.7)	1	1
Eat fruit /week				
Never	43(38.1)	70(61.9)	2.1(1.3, 3.4) **	0.9(0.5, 1.7)
≥1	53(22.9)	178(77.7)	1	1
Eat meet/week				
Never	88(34.1)	170(65.9)	5.1(2.3, 10.9) **	4.1(1.8, 9.2) **
Once or more	8(9.3)	78(90.7)	1	1
Ever FPM user				
No	70(39.5)	107(60.5)	3.6(2.1,5.9)**	2.3(1.3,4.1)*
Yes	26(15.6)	141(84.4)	1	1

Discussion

The present study revealed the effect of modern family planning method (MFPM) use on BMI status of reproductive age women. Socio demographic/economics and decision making power, health and dietary history and ever FP use was significantly associated with women's underweight. The effect, however, was confounded with past obstetric history of the respondents. The odd of being underweight was more than 2 times higher among NFP user women than their counterparts. This was consistent with the study findings of Nigeria (19). Short birth interval was another factor identified in this study for being underweight and is in agreement with the finding of Nigeria (21) which documented that short birth interval was associated with women's underweight.

When a woman is not using FP, she is more likely to have short birth interval between the subsequent many pregnancies, deliveries/abortion leading to heavy blood loss with probable large family size. Repeated delivery with short birth spacing predisposes the woman to an overlap of pregnancy and lactation, resulting in sharing of nutrients among three lives; the mother, the newborn and the fetus. On top of these, due to longtime lactation the women will have little recovery time to regain body fat and nutrients lost due to reproductive stress, especially, if she doesn't get adequate dietary intake. Therefore, an appropriate spacing allows mothers to recover and regain their nutritional status with better fetal

outcomes and child survival. When there is a large family size in the household, food is not prepared in quality and often diluted to serve the large family and mothers usually give more priority to their family members and skip meals. Other implication of large family size is depletion of produced crops because of feeding and selling of crops for other basic needs which eventually lead to household food insecurities and underscores the need for FP use.

Women of higher gravidity were more likely to be underweight than lower gravidity. Women of gravidity of more than 4 were more than 2 times underweight than the women of gravidity below 4. This finding is consistent with the Bangladesh study findings (22). This could be due to the fact that women with higher gravidity are at greater risk of excessive stresses from repeated pregnancies, abortions, overlap of pregnancy and lactations which leads to inadequate recuperative periods between pregnancies.

In this study, currently lactating mother was a strong determinant of malnutrition. Currently lactating women were more than 4 times underweight than non-lactating women. A similar result was reported in Bangladesh (23) and attributed to closely spaced pregnancy which leads to depletion of maternal energy and nutrients. When the data was disaggregated by FP utilization, the majority of currently lactating women were not using FP, suggesting

that, FP has tremendous effect in maintaining women's nutritional status.

Educational status of the women was significantly associated with their nutritional status. Women who had no formal education were more likely to be underweight by 40% than who had formal education. This finding is in line with various study findings in Bangladesh (24), Nigeria (25) and Ethiopia (26-27) and all the studies suggested that women with more years of schooling have better maternal health and caring practices. This is sometimes possible because lack of education alone may not enable women from making independent decisions, accepted by other household members, access to household resources that are important to nutritional status. Even though the effect of educational status of husbands is masked in multivariate analysis of this study, it was a significant predictor of nutritional status of the women in some previous studies (4, 24-25, 28-31). Mostly, husbands are the main sources of income and decision makers of the family in most households and their higher level of schooling contribute to achieve better nutritional status of their spouse.

History of illness over the past one year was also an important determinant of the nutritional status of women. Women who were ill over the past years were 2 times more likely to be underweight than their counterparts. Similar findings were reported in the recent studies conducted in Bangladesh on adolescent girls (32), Chad (33) and in Ethiopia (27). The possible explanation for the association is that infections decrease appetite and lead to inadequate dietary intake, reduces nutrient absorption, and the metabolic stress of illness which further increases energy and nutrient needs. Usually women who did not use FPM were more likely to be sick because they are less likely able to influence the decision on health care seeking behaviors than ever user women and they may have too little time to take care of their own and children's sanitation.

Missing the usual frequency of meals (breakfast, lunch and dinner) in a day is a factor that affects the nutritional status of women. Those women who ate meals less than three times a day were more than 3 times underweight than the women who ate three times or more. This is probably due to the fact that women are busy/have workload, which might lead them to have too little time to have meals on time. On the other hand, if they are poor and have large family size, shortage of food may occur because of sharing with other household members and women simply skip their meal or stay without food. Likewise, women who had not consumed meat once per week had increased the odds of being underweight by 4 times compared to those women having at least once or more. Similar findings were reported from a cohort study in ten European countries (34). This is likely because meat is a good source of high energy, fat and protein that can help increase weight gain.

In conclusion, the effect of FP on the nutritional status (as measured by BMI, MUAC and Weight) of women was better among women who utilized family planning than those who did not. Educational status of the women, current lactation, illness over the year preceding pregnancy, frequency of meals per day and eating meat per week were the other variables significantly associated with the nutritional status of the women indicating that the identified factors are important for some improvement in program initiatives.

One of the limitations of this study was that it was not easy to measure temporal relationships. In addition, there might be some level of social desirability bias in the responses of the study participants.

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