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Original Research

Dietary And Nutritional Status Of Pregnant Women Aged 18-49 Years. A cross-section study

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ABSTRACT:
Aim: Purpose of the study is to assess dietary diversity, nutritional status and the factors affecting the two among pregnant women attending gynaecology clinic for regular check up. **Material and methods:** 10,000 Pregnant women aged 18-49 years, who were willing to participate in the study and who had been residents of Datia of M.P. for 10 months prior to the study included. Demographic data such as age, education level, parity; morbidity patterns; socioeconomic and socio cultural beliefs &customs and household food security status. **Results:** It was found out that majority of the pregnant women both the malnourished and the normal did not meet the RDAs of the various macro and micronutrients. About 80 percent did not meet the RDAs for Energy and Iron while about 70 percent and 78 percent did not meet the RDAs for protein and Vitamin C respectively. Chi square test did not show significant differences among those that had met the RDAs and those that did not meet RDAs for all the nutrients of interest ($p>0.05$) .A chi square test was performed and no relationship was found between intake of iron and anaemia ($\chi^2=0.787$, df=2, $p=0.269$). When the same test was performed with regard to consumption of Vitamin C and anaemia, no significant relationship was found ($\chi^2=0.500$,df=2, $p=0.310$) (Table 8). **Conclusions:** The mean DDS indicated that dietary diversity among the pregnant women was good as majority had high and medium dietary diversity based on the FAO categorization. The MUAC data indicated that three out of ever are malnourished while the rest have a good nutrition status however; based on dietary intake, the nutrient requirements for both the macronutrients and the micro nutrients for the pregnant women were not being met.
Keywords: Dietary, Nutritional Status, Pregnant, women

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INTRODUCTION

Consuming a wide range of foods from different food categories is what's meant by a "balanced diet." An appropriate diet, both in terms of quantity and quality, is crucial to human health. It has long been known that eating a wide range of meals is the best way to ensure adequate intake of all necessary nutrients. Developing world women of childbearing age are particularly vulnerable to micronutrient deficiencies due to the high dietary needs of pregnancy, since they tend to eat low-quality, repetitive diets. Eating meals from a wide range of categories has been shown to improve health. The variety of a person's diet is widely recognized as an indicator of their nutritional sufficiency because of the evidence showing that it is a component of dietary quality.[1-4] The distribution of food throughout the family has been proven to alter nutritional status of people in terms of both dietary diversity and nutritional adequacy with relation to the major vitamins and minerals. The way in which food is cooked and fed also has an impact on a person's nutritional status and, by extension, their health. This means that a healthy, diverse, and balanced diet is essential for everyone to ensure they get all the nutrients they need. Poor communities in the developing world, whose diets are dominated by starchy staples and seldom include any animal products or seasonal fruits and vegetables, have been shown in previous studies to be especially at risk for a lack of dietary diversification.[1] Babies and young children, teenage females, and women of reproductive age are particularly vulnerable to nutritional deficits

(WRA).[1,2] It has been shown that disadvantaged communities often choose less nutritious but more affordable meals because they provide a sense of satiety.[2] Among people in industrialized nations, there is strong evidence connecting dietary variety to nutrient consumption.[1]

Maternal factors raise the chance of low birth weight in the next generation, and baby nutrition increases the risk of developmental delays, including short height, decreased physical work capacity, impaired cognitive function, and worse educational achievement, in the offspring. Better maternal nutrition has been shown to promote foetal development.[5-7]

Datia is one of the smallest districts of Madhya Pradesh (MP) located in the northern part of the state. It is located 25.67 latitude and 78.46 longitude and it is situated at an average elevation of 249 m above sea level.

MATERIAL AND METHODS

This Clinical study was conducted in Datia M.P. The study was approved by ethical committee of Department of public health JSPH Poornima university Jaipur.. Written informed consent form, explaining the nature of the study and procedure signed by all patients. 10,000 Pregnant women aged 18-49 years, who were willing to participate in the study and who had been residents of Datia M.P. for 11 months prior to the study were included. Demographic data such as age, education level, parity; morbidity patterns; socioeconomic and socio cultural beliefs &customs and household food security status.. The first respondent was selected randomly through balloting from among the first five pregnant women to arrive at the antenatal clinic and thereafter systematic sampling was used. This was done daily during the weekdays for one month until the target sample size was achieved. Data was collected within a month to avoid bias which would be brought in by pregnant women who revisit the clinic for follow up in the following months.

METHODOLOGY

Completed questionnaires were checked on a daily basis for accuracy and completeness in recoding of responses. Editing and coding was done before data entry. Data were entered and analyzed using SPSS , while dietary intake data from 24 hour recall was entered and analyzed using Nutri- Survey soft ware. For dietary diversity, from the list of 16 food groups which include Cereals; Vitamin A rich vegetables , Dark green leafy vegetables; Other vegetables; Vitamin A rich fruits; Other fruits; Meat; Eggs; Fish; Pulses/Legumes, nuts and seeds; Milk and milk products; Oils and fats; Sweets and sugar and condiments and spices were used as recommended by FAO, however, for analysis purposes, two food groups, sweets and condiments were excluded and thus 14 food groups out of the 16 were used (FAO, 2007). The two food groups were excluded as recommended as they are usually consumed in very small amounts. Dietary diversity was then categorized as follows:- consumption of foods from ≤3 food groups was considered as low dietary diversity; consumption of foods from 4-5 food groups as medium dietary diversity, while consumption of food items from ≥ 6 food groups in 24 hours prior to the interview was considered as high dietary diversity. MUAC and hemoglobin levels were used to assess the nutrition status of the respondents. Based on MUAC measurement, under nutrition among the pregnant women was defined as MUAC of less than 21.0 cm while MUAC equal to or more than 21.0cm was considered normal.

RESULTS

DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

AGE GROUPS OF THE RESPONDENTS

Age was collected in terms of completed years. Though the definition of women of reproductive age includes women in the age category of 15-49 years, data collected had women aged 19-49 years and therefore analysis was restricted to this category. The mean age of the study population was 25 years ± 5 with a range of 19 to 44 years. Of the respondents, 49 percent (n=71) were aged between 15-24 years while those aged 25-34 years and above 35 years were 41(n=60) and 10 percent(n=14) respectively (Table 1).

Table 1: Demographic characteristics of the respondents

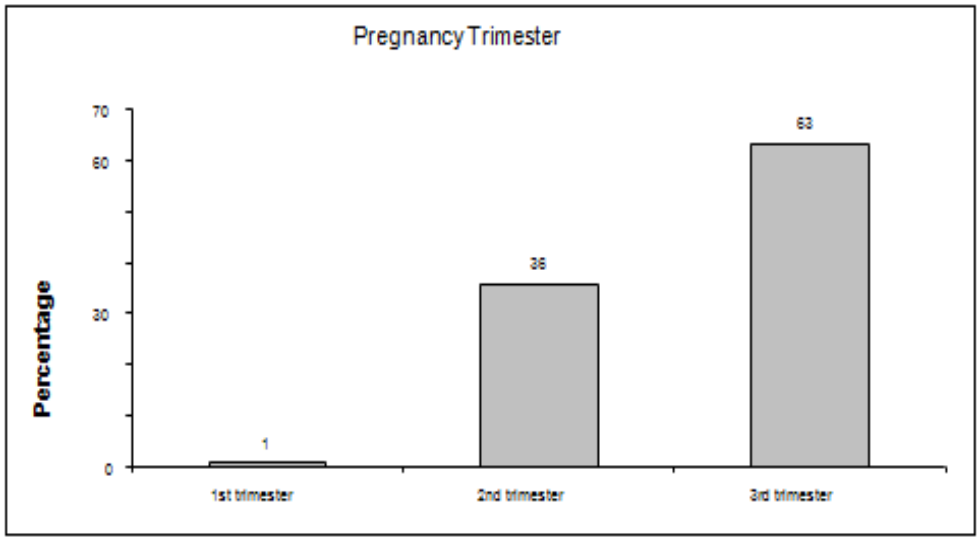
Age in years	Frequency(n)	Percentage
19-24	71	49
25-34	60	41
35-44	14	10
Total	**145**	**100**

GESTATION IN WEEKS OF THE RESPONDENTS

A woman is considered to be in the first, second or third trimester when they are 0-12 weeks, 13-28 weeks and 29-40 weeks pregnant respectively. Data on the gestation in weeks were collected from the ANC book. In this study, more than half of the respondents (63 percent, n=92) were in their third trimester, more than a third (36 percent, n=52) in the second trimester and about one percent (n=2) of the respondents were in their first trimester (Figure 1). Of

those in the third trimester, more than half were already at the 36th week or above.

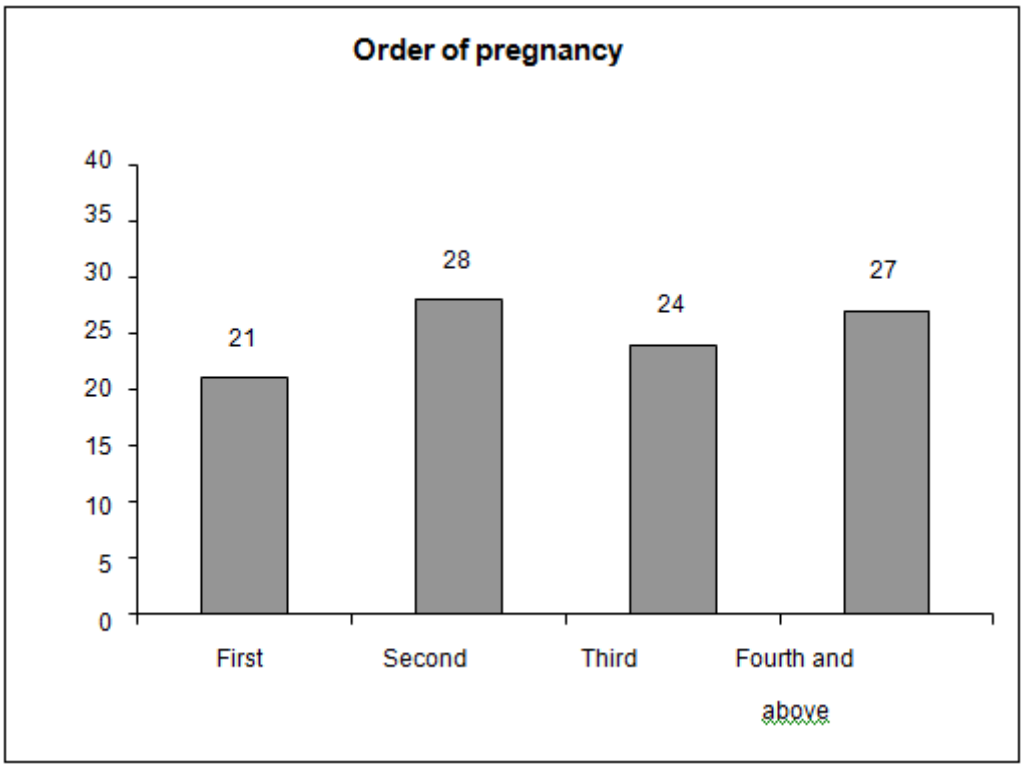
Figure 1: Trimesters of the respondents



PARITY OF THE RESPONDENTS

Mean parity of the pregnant women was 3±2. Findings of the study indicate that majority of the respondents were in their first (21 percent, n=30), second (28 percent, n=41) or third pregnancy (24 percent, n=35). Slightly more than a quarter (27 percent, n=39) of the respondents were in their fourth pregnancy and above (Figure 2).

Figure 2: Parity of the respondents



MICRONUTRIENT SUPPLEMENTATION

Of the pregnant women that were interviewed, 26.9 percent (n=39) had received and were consuming micronutrient supplements with 73 percent (n=106) having not received. Mainly iron and folic pills were the supplements being consumed as reported by17 percent (n=24) of the respondents. Adherence to taking of the micronutrient supplements by those who had received them was high as reported by 90 percent (n=35) of the respondents. Ten percent (n=3) of the women reported that they did not consume the micronutrients on a daily basis due to their bad taste and this implies that they are at nutrition risk especially if they were anaemic.

ANC ATTENDANCE

Those attending the clinic for the first or second time were 40(n=58) and 31 percent (n=45) respectively. About 19 percent (n=27) were attending the clinic for the third time and only 10 percent (n=15) were in their fourth visit (Table 2).

Table 2: ANC attendance of the respondents

Attendance	Frequency	Percentage
Once	58	40.0
Twice	45	31.0
Three times	27	18.6
Four Times	15	10.3
Total	145	100.0

Mean parity of the pregnant women was 3±2. Findings of the study indicate that majority of the respondents were in their first (21 percent, n=30), second (28 percent, n=41) or third pregnancy (24 percent, n=35). Slightly more than a quarter (27 percent, n=39) of the respondents were in their fourth pregnancy and above.

In this study, it was found that majority of the respondents came to the clinic in their third trimester and thus micronutrient supplementation is interfered with or was not feasible at all.

CONSUMPTION OF FOODS BASED ON FOOD GROUPS

A total of 99.3 percent of the study population had consumed cereals in the previous 24 hours. Vegetables form an integral part of the main meal for majority of the population generally. Over 80% (n=125) consume vegetables; with 84.8% (n=123) consuming dark green leafy vegetables and 81.4% (n=118) consuming other vegetables. Fats and oils consumption was reported by 95.9% (n=139) of the population. White tubers and roots were consumed by 13 .8% (n=20) (Table 3).

Table 3: Consumption of the respondents by food groups

Food group	Frequency (N=145)	Percentage
Cereals	144	99
Oils and fats	139	96
Milk and milk products	129	89
Dark green leafy vegetables	123	85
Other vegetables	118	81
Legumes, nuts and seeds	51	35
Other fruits	23	16
Flesh meats	21	15
White tubers and roots	20	14
Vitamin A rich fruits	15	10
Fish	9	6
Eggs	9	6
Organ meat (iron rich)	1	1
Vitamin A rich vegetables and Tubers	1	1

The mean DDS was 7.49±1.43 and this generally, it implies that the pregnant women had a high dietary diversity.

Dietary intake of major macro nutrients (carbohydrates, proteins and fat) and micronutrients of interest that are Vitamin C, and iron was collected. The mean energy daily intake was 1909 Kcal ±630. Protein and fat intake was 60.7g ±24.8 and 28.6g ±15.2 respectively. The mean intake of Vitamin C was 63.2mg ±42.9. Iron intake was low at 13.9mg ±11.3 and did not meet the daily requirement of 30mg (FAO/WHO, 1981) (Table 4).

Table 4: Mean dietary intake of the respondents

Nutrient	Mean	RDA
Energy (kcal)	1909.1±630.3	2400
Protein (g)	60.7±24.8	74
Fat (g)	28.6±15.2	94
Vitamin C (mg)	63.2±42.9	80
Iron (mg)	13.9±11.3	30

DIETARY INTAKE AND GESTATION AGE OF THE RESPONDENTS

The mean energy intake was found to increase with gestation in weeks. Those in the third trimester had the highest intake however; their mean intake was found to be below the Recommended Daily Allowance (RDA) of 2400 Kcals for pregnant women (FAO/WHO, 1981). The finding is in agreement with the fact that chronic energy deficiency and inadequate energy intake have been identified as priority nutritional problems affecting women (GoK, 2008b). There were exceptionally big differences in the consumption in the first trimester compared to the second for both the macro and micro nutrients (Table 4.10). When ANOVA post hoc tests were done, significant differences among the pregnant women were noted in the total energy intake (ANOVA, p=0.024) and the intake of carbohydrates (ANOVA, p=0.008) while there were no significant differences in the other nutrients of interest (Table 4.11). The respondents in their third trimester had a higher mean energy intake compared to those in their first trimester. The intake of carbohydrates was significantly higher for women in their third trimester.

Table 5: Mean dietary intake of the respondents by gestation age

Nutrients (Mean, SD)	0-12 weeks 1st Trimester	13-28 weeks (2nd Trimester)	29-40 weeks (3rd Trimester)	ANOVA test P value
Energy (kcal)	392.9	1831.0±566.3	1971.4±650.7	0.024
Carbohydrates (g)	29.1	327.2±104.4	360.1±122.4	0.008
Protein (g)	20.2	62.3±29.4	60.4±22.0	0.243
Vitamin C (mg)	5.2	67.0±54.8	61.5±35.0	0.312
Iron (mg)	0.3	12.6±7.0	14.8±13.1	0.261

DIETARY INTAKE AND MEAN DDS OF THE RESPONDENTS

When Post hoc tests were done, there were significant differences in the mean macronutrients and micronutrients with regard to the DDS. A high energy, carbohydrates, protein, fat, Vitamin A, C and iron intakes were found to increase with increase in the DDS.

Table 6: Mean dietary intake and dietary diversity of the respondents

DDS	Low DD	Medium DD	High DD	P value
Energy (kcal)	1027.8±595.8[a]	1925.1±613.7[b]	2092.5±507.2[b]	0.000
Carbohydrates (g)	180.2±117.6[a]	354.3±115.4[b]	361.3±99.2[b]	0.000
Protein (g)	34.5±21.8[a]	59.5±24.9[b]	87.9±19.4[b]	0.001
Vitamin. C (mg)	22.6±27.2[a]	59.5±36.6[b]	87.9±54.6[c]	0.000
Iron (mg)	4.9±3.4[a]	13.7±11.8[b]	16.9±9.2[b]	0.027

[a,b] *Means with the same letter are not significantly different*

When cross tabulations were done, it was found out that majority of the pregnant women both the malnourished and the normal did not meet the RDAs of the various macro and micronutrients (FAO/WHO, 2001, FAO/WHO, 1981). About 80 percent did not meet the RDAs for Energy and Iron while about 70 percent and 78 percent did not meet the RDAs for protein and Vitamin C respectively (Table 7).

Table 7: Nutrition status based on MUAC and selected macro and micronutrients

	RDA	Malnourished		Normal		Chi Square 2	p Value
Energy	**2400**	**N=46**	**Percentage**	**(N=99)**	**Percentage**		
Met RDA		9	20	20	20	0.671	0.687
Not met RDA		37	80	79	80		
Protein	74						
Met RDA		14	30	27	27*)*	0.363	0.725
Not met RDA		32	70	72	73		
Iron	30						
Met RDA		5	11	12	12	1.427	0.275
Not met RDA		41	89	87	88		
Vitamin C	80						
Met RDA		10	22	22	22	0.027	0.615
Not met RDA		36	78	77	78		

Chi square test did not show significant differences among those that had met the RDAs and those that did not meet RDAs for all the nutrients of interest (p>0.05) (Table 7)

Table 8: Nutrition status based on Hb levels and selected micro nutrients

	Anaemic		Normal			
	Frequency	**Percentage**	**Frequency**	**Percentage**	**Chi square-2**	**p value**
Iron						
Met RDA	11	10	6	16	0.787	0.269
Not met RDA	95	90	32	84		
Vitamin C						
Met RDA	22	21	10	26	0.500	0.310
Not met RDA	84	79	28	74		

A chi square test was performed and no relationship was found between intake of iron and anaemia (χ^2=0.787, df=2, p=0.269). When the same test was performed with regard to consumption of Vitamin C and anaemia, no significant relationship was found (χ^2=0.500,df=2, p=0.310) (Table 8).

DISCUSSION

Age has been found to be a risk factor for pregnancy where mothers are considered too young. If they are below 15 years and too old if they are 49 years and above. It has been noted that the risk of infant mortality is much greater for children born to mothers who are too young or too old and that mothers that are too young, may experience difficult pregnancies and deliveries because of their physical immaturity. In this study the mean age of the study population was 25 years ± 5 with a range of 19 to 44 years. Of the respondents, 49 percent (n=71) were aged between 15-24 years while those aged 25-34 years and above 35 years were 41(n=60) and 10 percent(n=14) respectively The findings of the study compare well with the findings in the EDHS 2008-09 which found that nine percent were at high risk.[8]

In this study those attending the clinic for the first or second time were 40(n=58) and 31 percent (n=45) respectively. About 19 percent (n=27) were attending the clinic for the third time and only 10 percent (n=15) were in their fourth visit. The findings of this study compare with those of EDHS, 2008-09 in which only 30 percent of women were found to obtain antenatal care in the first trimester of pregnancy.[8] The high percentage of women attending ANC for the first time in their second trimester is a cause of worry as it is a risk factor for both the mother and the unborn infant with chances of mortality for the two which is highly preventable if a mother attends ANC in the first or early in the second trimester.

Parity and has also been found to be a risk factor for pregnancy. We found that the mean parity of the pregnant women was 3±2. Findings of the study indicate that majority of the respondents were in their first (21 percent, n=30), second (28 percent, n=41) or third pregnancy (24 percent, n=35). Slightly more than a quarter (27 percent, n=39) of the respondents were in their fourth pregnancy and above. The finding of this study is similar with others study.[8,9]

Occupation affects the economic status of a person directly and studies have shown that low income is associated with food insecurity.[10] The pregnant woman who may access a diversified diet by virtue of their socio economic status based on occupation was relatively low. Majority would thus be dependent on their partners for money to purchase their preferred foods and dietary diversity. The fact that only a quarter of the husbands/partners were employed and salaried, may explain the reason why there are significant differences in dietary diversity based on the occupation of the father mainly by virtue of the fact that many women would be dependent on their partners financial support for daily food access.[11]

The level of education affects the food choices and also affects the economic status as it is a determinant of the occupation of a person. The number of pregnant women with post- secondary education was generally low while those who did not complete primary school was relatively high. The low levels of education observed may be due to the early marriages for the girls, low literacy levels in the district and also the fact that girl child education until recent times has not been given much importance in this community. This was affirmed in the FGD where one respondent said that.

In the study, those women of higher education level were more likely to have higher energy intake and intake of the specific nutrients of interest which included carbohydrates, protein, and iron and Vitamin C. This finding is in agreement with a study done in Japan which found that education was positively associated with favourable dietary intake patterns among pregnant women.[11,12]

In our study a total of 99.3 percent of the study population had consumed cereals in the previous 24 hours . Vegetables form an integral part of the main meal for majority of the population generally. Over 80% (n=125) consume vegetables; with 84.8% (n=123) consuming dark green leafy vegetables and 81.4% (n=118) consuming other vegetables. Fats and oils consumption was reported by 95.9% (n=139) of the population. White tubers and roots were consumed by 13 .8% (n=20). The findings of this study also agree with another study done in by other authors which found that the common diet included cereals (98.6%), leafy vegetables (87.1%) and condiments (100%).[13]

The nutrition status of a pregnant woman is important as it not only affects her health but also that of her infant. The main maternal nutritional problems that were identified in the study included inadequate energy intake as shown by the low dietary intake and

micronutrient deficiencies as evidenced by the high prevalence of anaemia.[14]

When cross tabulations were done, it was found out that majority of the pregnant women both the malnourished and the normal did not meet the RDAs of the various macro and micronutrients (FAO/WHO, 2001, FAO/WHO, 1981). About 80 percent did not meet the RDAs for Energy and Iron while about 70 percent and 78 percent did not meet the RDAs for protein and Vitamin C respectively.

CONCLUSIONS

The mean DDS indicated that dietary diversity among the pregnant women was good as majority had high and medium dietary diversity based on the FAO categorization. The MUAC data indicated that three out of ever are malnourished while the rest have a good nutrition status however; based on dietary intake, the nutrient requirements for both the macronutrients and the micro nutrients for the pregnant women were not being met. Requirements for energy, carbohydrates, protein; and micronutrients of interest- iron and Vitamin C were below the RDAs for majority of the women.

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REFERENCES

1. Arimond, M., and Ruel, M. T. (2004). Dietary diversity is associated with child nutritional status: Evidence from 11 Demographic and Health Surveys. The Journal of Nutrition, 134, 2579-2585
2. Brinkman, H.-J., de Pee, S., Sanogo, I., Subran, L., and Bloem, M. W. (2009). High food prices and the global financial crisis have reduced access to nutritious food and 86
3. Mpontshane, N., den Broeck, J. V., Chhagan, M., Luabeya, K. K. A., Johnson, A., and Bennish, M. L. (2008). HIV Infection is associated with decreased dietary diversity in South African children. The Journal of Nutrition, 138(9), 1705–1711.
4. FAO/WHO. (2001). Human Vitamin and Mineral requirements: Report of a joint FAO/WHO expert consultation; Bangkok, Thailand
5. Conceição, P., Fuentes-Nieva, R., Horn-Phathanothai, L., and Ngororano, A. (2011). Food security and human development in Africa: strategic considerations and directions for further research. African Development Review, 23(2), 237–246.
6. Savy, M., Martin-Prével, Y., Sawadogo, P., Kameli, Y., and Delpeuch, F. (2005). Use of variety/diversity scores for diet quality measurement: relation with nutritional status of women in a rural area in Burkina Faso. European Journal of Clinical Nutrition, 59, 703-716. doi: 10.1038/sj.ejcn.1602135
7. Fall., C., (2009). Maternal nutrition: Effects on health in the next generation. Indian Journal of Medical Research, 130, 593-599
8. Ethiopia National Bureau of Statistics (ENBS) and ICF Macro. (2010). Ethiopia Demographic and Health Survey 2008-09. Calverton, Maryland: ENBS and ICF Macro
9. Kalaivani, K. (2009). Prevalence and consequences of anaemia in pregnancy. Indian Journal of Medical Research, 130, 627-633
10. Ivers, L. C., and Cullen, K. A. (2011). Food insecurity: special considerations for women. American Journal of Clinical Nutrition, 94(6), 1740S-1744S
11. Murakami, K., Miyake, Y., Sasaki, S., Tanaka, K., Ohya, Y., and Hirota, Y. (2009). Education, but not occupation or household income, is positively related to favorable dietary intake patterns in pregnant Japanese women: the Osaka Maternal and Child Health Study. Nutrition Research, 29(3), 164-172. doi: 10.1016/j.nutres.2009.02.002.
12. Muthayya, S. (2009). Maternal nutrition and low birth weight - what is really important? Indian Journal of Medical Research, 130, 600-608.
13. Becquey, E., and Martin-Prevel, Y. (2010). Micronutrient adequacy of women's diet in Urban Burkina Faso is low. The Journal of nutrition, 140(11), 2079S–2085S
14. Muthayya, S. (2009). Maternal nutrition and low birth weight - what is really important? Indian Journal of Medical Research, 130, 600-608