Research Paper

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High prevalence of low dietary intake in pregnant women of Kolkata is related with the socioeconomic status

Community Nutrition

KEYWORDS : 24 hour recall method, socioeconomic status, RDA, deficiency of nutrients

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ABSTRACT

The nutritional status of the pregnant women of the lower strata of socioeconomic status of Kolkata has not been assessed in recent times but it is related with the birth weight of babies.

The aims of the study were to evaluate the dietary intake of pregnant women of Kolkata and to assess the association of dietary intake with different anthropometric parameters and the socioeconomic status.

Dietary intake (24-h recall method), anthropometric measurement (height, weight and MUAC) and SES (updated Kuppuswamy's scale) of pregnant women assessed.

Deficiencies of energy (26%), protein (35%), calcium (59%) and iron (55%) during pregnancy with respect to corresponding RDA of ICMR were noted and the deficiencies were increased with lower grade of SES. SES is associated with consumption of energy.

Under nutrition exists in the surveyed pregnant women and it is linked with SES.

Introduction

Low Birth Weight (LBW) remains an important problem of national concern in India. According to National Family Health Survey 3 (NFHS-3) (2005-06) the present proportion of LBW babies in India is estimated to be 28% (1). Twenty nine percent of infant mortality rate is associated with LBW in India (2). Nutritional intake in pregnancy is among one of the many factors associated with LBW in the developing countries (3). Nutritional needs increase during pregnancy, especially in the second and third trimesters (4). The Indian Council of Medical Research (ICMR) constituted an Expert Group in 2008 to revise and update of the nutritional requirements and dietary allowances for Indians (5). According to ICMR, the recommended daily allowances (RDA) for a sedentary Indian pregnant woman should be 2250 kcal energy, 78g protein, 1200mg calcium and 35mg iron. Ramachandran (6) reported that according to the survey by National Nutrition Monitoring Bureau (NNMB), the daily consumption of energy, protein, calcium and iron by the pregnant women in ten states of India including West Bengal during 2005-06 were much lower than the RDA by ICMR. Lower levels of energy, protein, calcium and iron intake are also reported from Bangalore (7), Haryana (8), Rajasthan (9) and Orissa (10). In this regard there is a lack of information about the nutritional status of pregnant women in and around Kolkata. Therefore the present study is undertaken to assess the nutritional status of pregnant women of Kolkata. The "24 hour recall method" (11) was used for the collection of dietary information in the present study. Anthropometric measurements of the subjects were recorded since these are among the most frequently applied methods for assessing nutritional status in pregnant women. Socioeconomic status of the subjects was also determined in this study since many studies demonstrate a relationship between socioeconomic statuses and nutritional status.

Materials and Methods

Study population

The present study was conducted with the pregnant women visiting the antenatal clinic of the Calcutta Medical College during July to September, 2012. A total of 208 subjects were included in the study randomly.

Women with clinical and/or gynaecological problems and those unwilling to participate were excluded from the study.

Socioeconomic status (SES)

A pretested interview schedule was used for collection of general information of the subjects. The SES of the subjects was measured using the updated Kuppuswamy scale (12) which is based on monthly family income, spouse education and spouse occupation. Structured questionnaires were used to collect information on socioeconomic characteristics of the subjects.

Anthropometrics

The height , MUAC and weight were measured by standard techniques (13). Height, MUAC and weight data were recorded to the nearest 0.5 cm, 0.5 cm and 0.5 kg respectively.

Dietary information

24 hour recall method of diet survey (14) was applied for the collection of dietary information. The intake of nutrients by the subjects was calculated by using 'Nutritive Value of Indian Foods' by Gopalan (15).

The dietary information of the subjects immediately before the pregnancy was evaluated by interviewing them about the changes in the food intake they have made after being aware of the pregnant condition.

Recommended Dietary Allowances (RDA) suggested by the ICMR (2010) (16) for normal and pregnant women were utilised as standard values of energy and nutrients under study (protein, iron and calcium) to assess the nutritional status of the subjects.

Statistical analysis

Descriptive statistics such as mean and standard error of mean (SE) were computed for the sociodemographic, anthropometric and nutritional data of the subjects. Analysis of variances (ANOVA) followed by Tukey HSD post hoc test were used to compare deficiencies of nutrients among various social classes. The relationship between maternal factors and consumption of energy and nutrients were calculated using Pearson's correlation coefficients. Multivariate regression analysis was used to examine the association between energy consumption and SES, maternal weight, family size and parity using five incremental models. The statistical analyses were performed using SPSS 7.5.

Results

Socioeconomic status

The subjects were identified in the three socioeconomic classes according to Kuppuswamy scale. 68.8% belong to upper lower and 27.4% to lower middle classes. Only 3.8% belong to upper middle class.

Anthropometric and other characteristics

The mean height, weight and MUAC of the subjects were found to be 151.6 cm, 54.5 kg and 25.7 cm respectively. The mean age of the subjects were found to be 23.9 years.

Level of education

80.8% of the subjects and 77.8% of the spouses complete school education. Only 9.7% of the subjects could continue in the higher education. However, 9.5% of the subjects and 13.5% of the spouses were found illiterate.

Daily dietary intake

The subjects were found to be suffering from deficiencies of energy (26%), protein (35%), calcium (59%) and iron (55%) during pregnancy with respect to corresponding RDA of ICMR. Deficiencies of energy, protein, calcium and iron show a socioeconomic gradient. The deficiencies were found to be significantly higher in the upper lower social class in comparison to the upper middle social class in the subjects (Table 1).

Nutrient intake and maternal factors

Pearson's correlation coefficients showed that among all the factors, socioeconomic status is significantly correlated to the consumption of energy, protein, iron and calcium (Table 2). The correlation between consumption of energy, protein, iron and calcium and the components of the SES are also computed. The education level of the subjects and family income are significantly correlated with the consumption of energy, protein, calcium and iron. Family occupation is significantly correlated to consumption of energy and iron only.

Association between energy consumption and maternal factors

Stepwise multiple forward regression analysis showed that socio economic status of the subjects is associated with the energy consumption during pregnancy (Table3).

Discussion

The purpose of the present study was to assess the dietary intake of the pregnant women of Kolkata and to evaluate the association of socioeconomic status and other factors to the dietary intake of these women during pregnancy. 96% of the subjects of this study belong to the lower strata of the society namely the upper lower and the lower middle classes.

Although 9.5% of the subjects were found to lack any formal education, about 16% of the subjects completed school education up to class XII. With this educational background the subjects are expected to possess only basic knowledge of health and nutrition and only subjects with higher education (about 10%) may have a concept about the nutritional requirement during pregnancy.

Although the daily intake of energy (1664.2 kcal), protein (50.8 g), calcium (535.1 mg) and iron (14.2 mg) by the subjects of the present study were found to be higher in magnitudes (1654 kcal, 45 g, 352mg and 11.9 mg respectively) than those consumed by the women of nine states of India including West Bengal according to NNMB survey (2005-06) as reported by Rao et al. (6), the subjects were found to be suffering from deficiencies of energy (26%), protein (34%), calcium (55%) and iron (59%) with respect to corresponding RDA of ICMR (5). Lower deficiencies of energy (17%), protein (29%), iron (45%) and a higher deficiency of calcium (59%) were observed in the pregnant women of Rajasthan (9). Much lower deficiency of iron is observed among pregnant women of other regions of India such as Visakhapattanam (17%) (17), Orissa (24%) (10) and Bangalore (46%) (7), but higher iron deficiency is observed in Salem, Tamilnadu (71%) (18). Regarding protein and calcium, greater deficiencies were observed in Salem, Tamilnadu (36% and 56%respectively) (18) but lesser deficiencies persist in Orissa (24% and 31% respectively) (10).

It is also evident from the present study that the subjects were deficient in energy, protein, calcium and iron during the period immediate before pregnancy. The extent of deficiencies is also seen to vary among the socioeconomic classes. Subjects belonging to lower most SES are found to be more deficient in the nutrients than those in the upper SES. The contribution of social class in the nutritional status of the subjects during pregnancy is reflected in the correlation and regression results that suggest an association between the socioeconomic status of the subjects and the consumption of energy during pregnancy. Similar result was found in a study with pregnant women of Bangladesh where Islam et al. (19) found a socioeconomic difference in the dietary intake and meal pattern. In Europe, Northstone et al (20) studied the association between sociodemographic and life style factors and diet pattern during 3rd trimester pregnancy in the women of south west England and found a strong association between sociodemographic variables and all dietary components. He also concludes that a health conscious diet was positively associated with increasing education and age. In India Hira et al. (21) concluded that energy and protein intake by the Punjabi pregnant women significantly increase with improvement in educational status, whereas protein and calcium intake were significantly affected by economic status. In the present study the education of the subjects and the family economy are found to correlate significantly with the consumption of energy, protein, calcium and iron.

Table 1 Deficiencies of energy and some nutrients among social classes during pregnancy

Deficiency	Social Class			F ratio	Post-hoc results (Tukey HSD method)
	Upper lower (UL)	Lower Middle(LM)	Upper Middle(UM)		
Energy	653.1±28.1	455.5±41.1	262.8±115.9	10.836	**UL>LM,UM***
Protein	29.6±1.5	22.8±2.1	12.0±5.4	5.951	**UL>LM,UM***
Calcium	704.3±26.6	611.4±47.7	290.2±208.0	5.925	**UM<LM,UL***
Iron	21.8±0.5	18.5±1.3	17.1±3.3	4.580	**UL>LM***

Data presented as mean ± standard error of mean. *p <0.05

Table 2 Correlation between nutrient intake and maternal factors.

Consumption	SES	Height	Weight	AGE	Family Size	Parity
Energy	**0.288****	0.070	**0.120***	0.081	-0.030	-0.066
Protein	**0.206****	-0.001	0.051	0.075	-0.080	-0.042
Calcium	**0.191****	0.079	0.071	**0.155***	-0.034	-0.083
Iron	**0.182****	-0.018	-0.038	0.019	0.031	-0.034

Values are expressed as Pearson correlation coefficients.
** Correlation is significant at the 0.01 level (1-tailed),
* Correlation is significant at the 0.05 level (1-tailed)

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Table 3 Stepwise regression models for the association between energy consumption and SES, maternal weight, height,MUAC, family size, parity and age.

Model	Predictors	Beta (95% Confidence Interval)		P Value	R^2	Changes in R^2 previous model
		Unstandardised	Standardised			
1	SES	179.647	0.288	0.000	0.083	0.083
2	SES	174.326	0.280	0.000	0.092	0.009
	Maternal weight	3.867	0.095	0.155		
3	SES	175.786	0.282	0.000	0.094	0.002
	Maternal weight	2.087	0.051	0.576		
	MUAC	7.040	0.064	0.487		
4	SES	175.018	0.281	0.000	0.095	0.001
	Maternal weight	1.992	0.049	0.598		
	MUAC	6.778	0.061	0.509		
	Age	1.013	0.013	0.859		
5	SES	176.622	0.284	0.000	0.095	0.000
	Maternal weight	2.165	0.053	0.578		
	MUAC	6.765	0.061	0.511		
	Age	0.970	0.012	0.865		
	Height	-1.004	-0.014	0.840		
6	SES	174.929	0.281	0.000	0.103	0.008
	Maternal weight	1.940	0.048	0.617		
	MUAC	8.491	0.077	0.411		
	Age	3.236	0.041	0.585		
	Height	-1.497	-0.022	0.763		
	Parity	-54.586	-0.098	0.170		
7	SES	176.868	0.284	0.000	0.104	0.001
	Maternal weight	1.941	0.048	0.618		
	MUAC	8.213	0.074	0.429		
	Age	2.800	0.035	0.642		
	Height	-1.452	-0.021	0.770		
	Parity	-51.935	-0.093	0.197		
	Family Size	-4.308	-0.029	0.670		

Note: Dependent Variable= consumption of energy. SES=socioeconomic status

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