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Impact of socio-economic factors on nutrient intake of rural school going children in Haryana, India

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Abstract
The present study was conducted to determine the impact of socio-economic factors on nutrient intake of 100 rural school going children of Fatehabad district, Haryana. The intake of various nutrients by the rural school going children was significantly lower than respective RDAs. Children who belonged to general category families had significantly higher intake of energy (1631.65 Kcal), protein (27.33 g) and iron (14.36 mg) compared to children who belonged to SC category. The intakes of vitamins like β-carotene (1747.57 µg), thiamine (0.92 mg), niacin (8.73 mg), vitamin C (27.56 mg) and folic acid (101.93 µg) was also higher in general category children as compared to children who belonged to SC category. The children who belonged to nuclear families and whose mothers were educated had highest intake of energy, protein, fat, and iron, vitamins like β-carotene, thiamine, riboflavin, niacin, vitamin C and folic acid.

Keywords: Nutrient intake, Recommended Dietary Allowance, rural, income, family size

1. Introduction
School going children are an important segment of our society. Nutrition plays a vital role in their well-being because inadequate intake of food and nutrients during growing years may lead to malnutrition, growth retardation, reduced work capacity and poor mental and social development (Awasthi *et al.*,2000)[2]. The proper growth, development and body weight of children is of great significance and present the general health status of a community and nation as a whole (Vashisht *et al*., 2005) [32]. The school age period is nutritionally significant and highly demanding because this is period of growth spurt and body stores the nutrients for future use (Kumari and Jain, 2005) [13]. It had been established that school age is dynamic period of growth and development as children undergo physical, mental, emotional and social changes. Thus foundation of good health and sound mind is laid during this period, so, it is a basic milestone in the life of an individual (Suvarana and Itagi, 2009; Sant *et al.*, 2013) [29, 21]. One of the major nutrient deficiencies among school children is that of iron, which is associated with retardation of growth, decreased immunity and poor cognitive development resulting in poor intelligence quotient and behavioural abnormalities (Gawri and Sangunam, 2005; Shivprakash and Joseph, 2014; Awasthi *et al.*, 2000) [4, 24, 2]. Various workers have reported that the health problems due to miserable nutritional status in school age children are among the most common causes of low school enrolment, high absenteeism, early dropout and unsatisfactory classroom performance (Shrivastava *et al*., 2012; Mekonnen *et al*., 2013) [25, 14]. The children living in the backward and drought prone rural areas, urban slums and those belonging to the socially backward groups like scheduled castes are highly susceptible to under nutrition (NIN, 2003) [16]. Inadequate food habits and traditional socio-cultural food fallacies may lead to a high proportion of child under nutrition (Kishore, 2007 and Goel *et al.*, 2007) [11, 6]. In rapidly developing countries like India, there is increasing concern for improving the nutritional and health well-being of school going children especially belonging to low income groups and in remote rural areas. To combat malnutrition among children integrated approach is required that will include assessment of nutritional status, imparting nutrition education, improvement in the socioeconomic conditions, easy access to health facilities and prevention of the gender discrimination (Ramzan *et al*,. 2008) [17]. Keeping this in view the present study was done to assess the impact of socio economic factors on nutritional status of rural school going children in Haryana, India.

2. Materials and methods
2.1 Selection of respondents
The present study was conducted on 100 rural school going children, in the age group 10-12 years, which were selected randomly from the Government Schools of Fatehabad district, Haryana State.

2.1 Socio Economic Variables of respondents
The impact of sex (boy/girl), category (general/scheduled caste/backward class), family type (joint/nuclear), family size (small/medium/large), mother's education, mother's working status, father's education, father's occupation and family income on nutrient intake of respondents was studied.

2.3 Nutrient intake analysis
Dietary intake was recorded using 24 hours recall method for three consecutive days and nutrients intake were calculated using Nutriguide software (Song *et al*., 1992) [27]. Average daily nutrient intake of the respondents was compared with Recommended Dietary Allowance (RDA) (ICMR, 2010) [8].

2.4 Statistical analysis
The data was analyzed with the help of percentage, mean, standard deviation, one sample t-test and one way ANOVA test using SPSS software.

3. Results and discussions

3.1 Nutrient intake of boys and girls

Mean daily intake of energy by boys and girls were 1637.36 Kcal (74.76% of RDA) and 1393.79 Kcal (69.34% of RDA), respectively, which was significantly ($p \leq 0.01$) lower than RDA (Table 1). The results regarding mean daily intake of protein revealed that mean intake of protein by boys and girls were 27.25 g and 24.26 g, respectively, which were also significantly ($p \leq 0.01$) lower than RDA i.e. 68.29 per cent and 60.05 per cent of RDA, respectively. The mean daily calcium consumption of boys (418.21 mg) and girls (369.68 mg) was also significantly ($p \leq 0.01$) lower than RDA. The intake of iron by boys and girls were 14.44 mg and 12.45 mg, respectively, which was 68.76 and 46.11 per cent of RDA, respectively. The mean daily intake of β- carotene by boys and girls was 1640.98 µg and 1305.79 µg, respectively i.e. only 34.18 and 27.20 per cent of RDA, respectively, which was significantly ($p \leq 0.01$) lower than RDA. The mean daily intake of thiamine was found to be 0.92 mg for boys and 0.8 mg for girls, which were significantly ($p \leq 0.01$) lower than RDA. The daily mean intake of riboflavin of school going children (boys and girls) were 0.60 mg and 0.50 mg respectively which was significantly ($p \leq 0.01$) lower than the RDA. The data on mean daily nutrient intake depicted that the daily intake of niacin by boys and girls (10-12 years) was 8.91 mg (59.40% of RDA) and 7.49 mg (57.61% of RDA), respectively which was significantly ($p \leq 0.01$) less than RDA. The mean daily intake of vitamin C was found to be 26.13 mg by boys and girls consumed 22.61 mg which was 65.32 and 56.52 per cent of the RDA respectively. The mean daily folic acid intake by boys and girls (10-12 years) was 101.69 and 89.22 µg, respectively, which was significantly ($p \leq 0.01$) less in comparison to RDA. The mean daily intake of vitamin B_{12} by boys and girls were 0.18 and 0.15 µg which was only 18.00 and 15.00 per cent of RDA, respectively and significantly ($p \leq 0.01$) lower than RDA.

Table 1: Mean daily intake of nutrients intake by rural school going children (n=100)

Nutrients	RDA	Boys (n=57)	RDA	Girls (n=43)
Energy (Kcal)	2190	1637.36±284.48 (74.76)	2010	1393.79±254.03 (69.34)
Protein (g)	39.9	27.25±4.77(68.29)	40.4	24.26±4.09 (60.05)
Fat (g)	35	22.11±7.44 (63.17)	35	17.41±6.17 (49.74)
Calcium (mg)	800	418.21±106.30 (52.28)	800	369.68±90.78 (46.21)
Iron (mg)	21	14.44±2.60 (68.76)	27	12.45±2.11 (46.11)
β-carotene (µg)	4800	1640.98±577.02 (34.18)	4800	1305.79±425.30 (27.20)
Thiamine (mg)	1.1	0.92±0.17 (83.63)	1.0	0.80±0.14 (80.00)
Riboflavin (mg)	1.3	0.60±0.14 (46.15)	1.2	0.50±0.11 (41.67)
Niacin (mg)	15	8.91±1.95 (59.40)	13	7.49±1.69 (57.61)
Vitamin C (mg)	40	26.13±6.68 (65.32)	40	22.61±5.66 (56.52)
Folic acid (µg)	140	101.69±19.19 (72.63)	140	89.22±18.20 (63.73)
Vitamin B_{12} (µg)	0.2-1.0	0.18±0.13 (18.00)	0.2-1.0	0.15±0.12 (15.00)

Values are mean ±SD

Figures in parentheses indicate percent RDA

RDI- Recommended Dietary Intake (ICMR 2010) [8]

3.2 Association of nutrient intake with socio-economic variables

Data revealed that children who belonged to general category families had significantly higher intake of energy (1631.65 Kcal), protein (27.33 g) and iron (14.36 mg) compared to children who belonged to SC category (Table 2). The intakes of vitamins like β-carotene (1747.57 µg), thiamine (0.92 mg), niacin (8.73 mg), vitamin C (27.56 mg) and folic acid (101.93 µg) was also higher in general category children as compared to children who belonged to SC category.

Table 2: Effect of caste on mean daily nutrient intake of rural school going children (n=100)

Nutrients	Mean daily nutrient intake		
	General (n=25)	BC (n=26)	SC (n=49)
Energy (Kcal)	1631.65^{a}±352.34	1618.28^{a}±271.99	1436.65^{b}±249.17
Protein (g)	27.33^{a}±6.13	27.22^{a}±3.95	24.60^{b}±3.88
Fat (g)	22.34^{a}±8.62	20.79^{a}±6.04	18.57^{a}±6.90
Calcium (mg)	425.52^{a}±123.13	407.03^{a}±79.44	377.83^{a}±99.38
Iron (mg)	14.36^{a}±3.36	14.44^{a}±2.51	12.74^{b}±1.86
β-carotene (µg)	1747.57^{a}±688.38	1494.65^{ab}±528.72	1370.09^{b}±415.21
Thiamine (mg)	0.92^{a}±0.22	0.93^{a}±0.16	0.82^{b}±0.12
Riboflavin (mg)	0.60^{a}±0.18	0.58^{ab}±0.12	0.52^{b}±0.11
Niacin (mg)	8.73^{a}±2.56	8.98^{a}±1.87	7.72^{b}±1.47
Vitamin C (mg)	27.56^{a}±6.67	25.62^{ab}±8.22	22.59^{b}±4.44
Folic acid (µg)	101.93^{a}±25.06	102.54^{a}±19.36	90.18^{b}±14.62
Vitamin B_{12} (µg)	0.19^{a}±0.13	0.17^{a}±0.10	0.16^{a}±0.14

Values with same superscripts are not significantly different ($p \leq 0.05$).

Values are Mean ± SD

The nutrient intake of general category children was also significantly higher than intake of BC category children in respect of β-carotene, riboflavin and vitamin C. However, BC category children consumed significantly ($p \leq 0.05$) higher amount of energy (1618.28 Kcal), protein (27.22 g), iron (14.44 mg), β-carotene (1494.65 µg), thiamine (0.93 mg),

riboflavin (0.58 mg), niacin (8.98 mg), vitamin C (25.62 mg) and folic acid (102.54 µg) than SC category children. The results of present study corroborated with those of Kumar *et al.* (2000)[12] and Craig *et al.* (2010) [3] who also reported intake of higher amounts of food items by general category children than that of BC and SC children thereby resulting in higher intake of nutrients by general category students. The results of present study were in agreement with those of Sati (2012) [20]. The children who belonged to nuclear families had highest intake of energy (1568.81 Kcal), protein (26.21 g), fat (20.76 g), iron (13.86 mg) as well as vitamins like β-carotene (1501.89 µg), thiamine (0.90 mg), riboflavin (0.56 mg), niacin (8.52 mg), vitamin C (24.85 mg) and folic acid (98.36 µg) than joint family children. The intake of calcium (401.41 mg) and vitamin B_{12} (0.18 µg) were highest in children who belonged to joint families.

Table3: Effect of family type on mean daily nutrient intake of rural school going children (n=100)

Nutrients	Mean daily nutrient intake		
	Joint (n=39)	Nuclear (n=61)	t-value
Energy (Kcal)	1476.02±289.08	1568.81±297.66	-1.53^{NS}
Protein (g)	25.58±4.82	26.21±4.66	-0.65^{NS}
Fat (g)	19.05±6.64	20.76±7.63	-1.18^{NS}
Calcium (mg)	401.41±111.16	394.74±97.13	0.31^{NS}
Iron (mg)	13.14±2.66	13.86±2.52	-1.35^{NS}
β-carotene (µg)	1488.96±621.16	1501.89±488.70	-0.11^{NS}
Thiamine (mg)	0.84±0.17	0.90±0.17	-1.25^{NS}
Riboflavin (mg)	0.55±0.15	0.56±0.13	-0.51^{NS}
Niacin (mg)	7.96±1.93	8.52±1.98	-1.41^{NS}
Vitamin C (mg)	24.26±7.12	24.85±6.07	-0.43^{NS}
Folic acid (µg)	93.15±17.72	98.36±20.72	-1.34^{NS}
Vitamin B_{12} (µg)	0.18±0.14	0.16±0.12	0.73^{NS}

Values with same superscripts are not significantly different ($p \leq 0.05$).
Values are Mean ± SD
^{NS} = Non-significant

Table 4: Effect of family size on mean daily nutrient intake of rural school going children (n=100)

Nutrients	Mean daily nutrient intake		
	Small (up to 4 members) (n=20)	Medium (5-7 members) (n=57)	Large (8 & above members) (n=23)
Energy (Kcal)	1571.86^{a}±330.08	1524.21^{a}±304.43	1519.38^{a}±252.05
Protein (g)	26.69^{a}±5.21	25.82^{a}±4.84	25.69^{a}±4.01
Fat (g)	20.09^{a}±6.76	20.03^{a}±7.75	20.24^{a}±6.75
Calcium (mg)	411.08^{a}±113.15	393.82^{a}±99.59	394.14^{a}±102.97
Iron (mg)	14.23^{a} ±2.79	13.41^{a}±2.68	13.45^{a}±2.14
β-carotene (µg)	1683.38^{a}±498.43	1430.37^{a}±558.93	1499.39^{a}±514.92
Thiamine (mg)	0.91^{a}±0.18	0.86^{a}±0.18	0.86^{a}±0.13
Riboflavin (mg)	0.60^{a}±0.14	0.55^{a}±0.14	0.55^{a}±0.12
Niacin (mg)	8.74^{a}±2.16	8.18^{a}±2.04	8.21^{a}±1.58
Vitamin C (mg)	25.76^{a}±5.29	24.12^{a}±6.98	24.86^{a}±6.20
Folic acid (µg)	99.73^{a}±21.27	95.71^{a}±20.94	94.92^{a}±14.94
Vitamin B_{12} (µg)	0.18^{a}±0.14	0.17^{a}±0.12	0.17^{a}±0.13

Values with same superscripts are not significantly different ($p \leq 0.05$).
Values are Mean ± SD

Data in table 4 revealed that children who belonged to small sized families had higher intake of macronutrients like energy (1571.86 Kcal) and protein (26.69 g) as well as micronutrients like calcium (411.08 mg), iron (14.23 mg), β-carotene (1683.38 µg), thiamine (0.91 mg), riboflavin (0.60 mg), niacin (8.74 mg), vitamin C (25.76 mg), folic acid (99.73 µg) and vitamin B_{12} (0.18 µg) as compared to children of medium sized and large sized families. A significant relation between nutritional status and small size of families had been reported by Shahnaz *et al.* (1998) [23] and Rimpi (2002) [19]. The children whose mothers were educated upto intermediate and above had highest intake of protein (26.14 g), calcium (399.75 mg), iron (13.70 mg), β-carotene (1516.47 µg), folic acid (97.19 µg) and vitamin B_{12} (0.18 µg) than other children (Table 5).

Table 5: Effect mother's education on mean daily nutrient intake of school going children (n=100)

Nutrients	Mean daily nutrient intake		
	Up to primary (n=59)	Up to matric (n=32)	Intermediate & above (n=9)
Energy (Kcal)	1549.98^{a}±295.89	1521.00^{a}±263.22	1460.17^{a}±418.56
Protein (g)	25.29^{a}±6.21	25.83^{a}±4.75	26.14^{a}±4.51
Fat (g)	20.21^{a}±7.43	19.94^{a}±6.56	19.83^{a}±9.34
Calcium (mg)	391.59^{a}±127.58	394.53^{a}±113.23	399.75^{a}±93.60
Iron (mg)	12.57^{a}±3.10	13.64^{a}±2.24	13.70^{a}±2.69

β-carotene (µg)	1324.53[a]±544.81	1509.13[a]±601.36	1516.47[a]±510.51
Thiamine (mg)	0.88[a]±0.18	0.87[a]±0.15	0.82[a]±0.21
Riboflavin (mg)	0.53[a]±0.16	0.56[a]±0.15	0.56[a]±0.13
Niacin (mg)	8.39[a]±2.08	8.33[a]±1.55	7.58[a]±2.55
Vitamin C (mg)	24.99[a]±6.58	24.88[a]±6.49	21.29[a]±5.32
Folic acid (µg)	94.15[a]±27.60	95.36[a]±17.38	97.19[a]±19.81
Vitamin B_{12} (µg)	0.17[a]±0.11	0.17[a]±0.14	0.18[a]±0.17

Values with same superscripts are not significantly different ($p \leq 0.05$).
Values are Mean ± SD

Table 6: Effect of mother's working status on mean daily nutrient intake of school going children (n=100)

Nutrients	Mean daily nutrient intake		
	Working (n=31)	Non-working (Housewife) (n=69)	t-value
Energy (Kcal)	1541.41±326.80	1528.68±284.12	0.19^{NS}
Protein (g)	25.82±4.48	26.28±5.24	-0.42^{NS}
Fat (g)	19.86±7.55	20.61±6.71	-0.50^{NS}
Calcium (mg)	391.64±96.58	410.04±114.76	-0.78^{NS}
Iron (mg)	13.52±2.43	13.74±2.94	-0.36^{NS}
β-carotene (µg)	1576.43±673.93	1461.09±471.01	0.86^{NS}
Thiamine (mg)	0.88±0.19	0.87±0.16	0.29^{NS}
Riboflavin (mg)	0.55±0.13	0.57±0.16	-0.56^{NS}
Niacin (mg)	8.25±1.90	8.41±2.15	-0.35^{NS}
Vitamin C (mg)	25.19±7.77	24.36±5.84	0.52^{NS}
Folic acid (µg)	96.29±21.03	96.35±19.21	-0.13^{NS}
Vitamin B_{12} (µg)	0.16±0.13	0.18±0.13	-0.63^{NS}

Values are mean ±SD
Figures in parentheses indicate percent RDA

This may be due to the reason that the educated mothers were more conscious and aware of their children's requirement. The results of present study are in agreement with the findings of Abbi *et al.* (1988) [1], Susheela (1992) [28] and Sethi (2012) [22]. It can also be interpreted that as mothers' education level increased there may be an increase in the consumption of protein rich foods like pulses and milk and milk products and protective foods like green leafy vegetables and fruits thus resulting in increased intake of various nutrients. Similar findings have been reported by several other workers (Thane *et al.*, 2003 and Mukherjee *et al.*, 2008) [30, 15] who reported that mother's educational status was positively associated with health and nutritional status of children. The children whose mothers were non-working (housewives) had higher intake of protein (26.28 g), fat (20.61 g), calcium (410.04 mg), iron (13.7 mg) and their intake of vitamins like riboflavin (0.57 mg), niacin (8.41 mg), folic acid (96.35 µg) and vitamin B_{12} (0.18 µg) was also higher than children whose mothers were working (Table 6). Negative effect of mother's working status on mean daily food intake of respondents had also been reported by the several workers (Sati, 2012 and Hans, 2014) [20, 7]. However Thimmayamma *et al.* (1982) [31] reported minor influence of mother's working status on diet and nutrition of school children.

Table 7: Effect of father's education on mean daily nutrient intake of rural school going children (n=100)

Nutrients	Mean daily nutrient intake		
	Upto primary (n=52)	Upto matric (n=29)	Intermediate & above (n=19)
Energy (Kcal)	1526.60[a]±289.51	1482.06[a]±303.86	1576.55[a]±307.84
Protein (g)	25.75[a]±4.47	25.39[a]±4.63	26.72[a]±5.22
Fat (g)	20.08[a]±7.08	20.73[a]±7.43	19.16[a]±7.82
Calcium (mg)	392.89[a]±93.05	411.69[a]±123.30	387.63[a]±94.45
Iron (mg)	13.43[a]±2.51	13.16[a]±2.24	14.14[a]±2.91
β-carotene (µg)	1444.39[a]±490.24	1619.79[a]±678.42	1452.77[a]±423.82
Thiamine (mg)	0.86[a]±0.17	0.90[a]±0.18	0.85[a]±0.15
Riboflavin (mg)	0.55[a]±0.12	0.59[a]±0.17	0.54[a]±0.12
Niacin (mg)	8.24[a]±1.98	8.66[a]±2.09	7.91[a]±1.72
Vitamin C (mg)	23.90[a]±5.84	26.38[a]±8.30	23.90[a]±4.42
Folic acid (µg)	95.49[a]±19.96	99.18[a]±19.96	94.27[a]±19.03
Vitamin B_{12} (µg)	0.16[a]±0.11	0.18[a]±0.16	0.16[a]±0.12

Values with same superscripts are not significantly different ($p \leq 0.05$).
Values are Mean ± SD
^{NS} = Non-significant

Table 7 depicted the effect of father's education on nutrient intake of rural school going children. The data revealed that the school children whose fathers were educated upto intermediate and above had highest intake of energy (1576.55 Kcal), protein (26.72g) and iron (14.14 mg). The results of present study corroborated with those of Katyal (2014) [9] who

observed that consumption of cereals, pulses, milk and milk products, roots and tubers, green leafy vegetables, other vegetables and fruits were slightly higher in the children whose fathers were educated up to intermediate and above thereby resulting in higher intake of different nutrients.

Table 8: Effect of father's occupation on mean daily nutrient intake of school going children (n=100)

Nutrients	Mean daily nutrient intake				
	Business (n=7)	Caste occupation (n=14)	Cultivation/Agriculture (n=49)	Labour (n=19)	Service (n=11)
Energy (Kcal)	1480.33^{a}±333.65	1537.29^{a}±323.17	1647.06^{a}±257.14	1423.21^{a}±264.65	1588.45^{a}±207.35
Protein (g)	25.56^{a}±5.01	27.59^{a}±4.35	26.01^{a}±5.16	24.66^{a}±4.02	26.21^{a}±3.96
Fat (g)	17.33^{b}±6.70	23.26^{a}±7.46	21.15^{ab}±7.71	16.44^{b}±6.00	19.42^{ab}±4.86
Calcium (mg)	382.16^{a}±76.12	441.03^{a}±102.85	407.89^{a}±107.67	357.16^{a}±99.30	373.83^{a}±77.35
Iron (mg)	13.49^{a}±2.55	14.14^{a}±2.25	13.46^{a}±2.96	12.98^{a}±2.28	14.53^{a}±1.52
β-carotene (µg)	1298.17^{a}±178.86	1634.18^{a}±545.63	1569.69^{a}±598.59	1306.54^{a}±538.19	1452.72^{a}±317.98
Thiamine (mg)	0.87^{a}±0.19	0.92^{a}±0.15	0.86^{a}±0.19	0.84^{a}±0.15	0.92^{a}±0.12
Riboflavin (mg)	0.54^{a}±0.12	0.56^{a}±0.16	0.61^{a}±0.14	0.51^{a}±0.12	0.56^{a}±0.13
Niacin (mg)	8.36^{a}±2.07	8.83^{a}±1.79	8.15^{a}±2.17	7.92^{a}±1.81	8.89^{a}±1.35
Vitamin C (mg)	22.38^{a}±3.01	24.69^{a}±5.84	25.26^{a}±6.91	22.28^{a}±6.80	27.15^{a}±5.47
Folic acid (µg)	94.00^{a}±21.60	100.07^{a}±18.55	95.33^{a}±21.21	94.73^{a}±17.70	100.28^{a}±18.28
Vitamin B_{12} (µg)	0.15^{a}±0.10	0.23^{a}±0.16	0.18^{a}±0.12	0.12^{a}±0.20	0.13^{a}±0.10

Values with same superscripts are not significantly different ($p \leq 0.05$).
Values are Mean ± SD

The data in table 8 depicted that there was non-significant difference of father's occupation on intake of different nutrients among respondents except for fat intake. The intake of pulses, green leafy vegetables, roots and tubers, milk and milk products, fats and oils and sugar and jaggery were higher among children whose fathers were engaged in agriculture while intake of cereals, other vegetables and fruits was higher in children whose fathers were doing service (Rani 2015) [18]. Data in Table 9 revealed that rural school children belonging to families having high income had highest intake of energy (1649.66 Kcal), protein (27.55 g), fat (23.06 g), calcium (439.27 mg) and iron (14.15 mg) followed by children of medium and low income group. George *et al.* (2003) [5] emphasized that purchasing power is obviously a major determinant of food intake. The findings of the present study were in agreement with those of Skinner *et al.* (2000) [26] and Kikafunda and Walker (2000) [10].

Table 9: Effect family income on mean daily nutrient intake of rural school going children (n=100)

Nutrients	Mean daily nutrient intake		
	Low income (up to Rs. 5000) (n=27)	Middle income (Rs. 5001-10,000) (n=50)	High income (Rs. 10,001 & above) (n=23)
Energy (Kcal)	1394.73^{b}±265.18	1553.25^{a}±277.46	1649.66^{a}±319.54
Protein (g)	24.15^{a}±4.41	26.22^{a}±4.37	27.55^{a}±5.24
Fat (g)	16.52^{b}±6.44	20.61^{a}±6.02	23.06^{a}±8.51
Calcium (mg)	362.10^{a}±110.19	397.09^{ab}±85.93	439.27^{a}±113.85
Iron (mg)	12.78^{a}±2.26	13.76^{a}±2.41	14.15^{a}±3.15
β-carotene (µg)	1398.75^{b}±502.88	1434.43^{ab}±473.96	1747.70^{a}±657.53
Thiamine (mg)	0.82^{b}±0.15	0.88^{ab}±0.16	0.91^{a}±0.20
Riboflavin (mg)	0.52^{b}±0.12	0.55^{ab}±0.13	0.61^{a}±0.16
Niacin (mg)	7.68^{a}±1.78	8.47^{a}±1.81	8.65^{a}±2.38
Vitamin C (mg)	23.41^{a}±6.13	24.49^{a}±6.36	26.31^{a}±7.03
Folic acid (µg)	89.92^{b}±17.71	97.53^{ab}±19.02	101.25^{a}±22.08
Vitamin B_{12} (µg)	0.13^{a}±0.14	0.16^{ab}±0.11	0.22^{a}±0.14

Values with same superscripts are not significantly different ($p \leq 0.05$).
Values are Mean ± SD

Conclusions

Socio-economic variables such as caste, family type, family size, mother's education, mother's working status, father's education, father occupation and family income had varying effect on mean nutrient intake of the rural school going children. The results of the present study showed that intake of nutrients were higher in children who belonged to families with high income group. Similar types of effects of socio-economic variables were observed on mean daily intake of various nutrients like energy, protein, fat, calcium, iron, β-carotene, B-complex vitamins, vitamin C, folic acid and vitamin B_{12} by the respondents. The findings of this study would help the policy makers, economists, nutritionists, scientists and doctors to plan for the well-being of our future generations.

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