Nutritional and Socio-Demographic Profile among Gond Tribe of Binouri Village, Bilaspur Chhattisgarh (India)

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Abstract

A cross-sectional study investigated age and sex variations in chronic energy deficiency (CED) among 114 individuals (2-18 years) of Gond population of Binouri village, Bilaspur, Chhattisgarh. The sample was selected randomly to study CED grades using anthropometric indicators. Nutritional status was evaluated in four groups of different age categories- pre-schoolers: 2-5 years (n=16), children: 6-12 years (n=38), adolescents: 13-18 years (n=12) and adults: >18years (n=45) using the age-sex specific cut-off points of body mass index (BMI). Statistical analysis was performed using MS Excel and SPSS software. The considered socio-demographic variables such as age at marriage, educational and occupational status showed significant difference with respect to sex. Majority of the adult population belongs to the lower socio-economic class with few middle classes among the studied population. No significant age-sex specific difference is observed for mean values of anthropometric variables such as height, weight and BMI. The overall frequency of CED among the studied population is 37.83 % (serious stage) with highest among children (50%). Moreover, occurrence of thinness is found to be higher among girls as compared to the boys. The prevalence of Grade III thinness is found to be highest among pre-schooler children (18.75%) followed by children with 2.63%. Whereas Grade I undernutrition is highest among children (34.21%) followed by pre-school children (25.0%), adult (17.78%) and adolescent (16.67%). All the age groups considered in the present study are not statistically significant for the degree of malnutrition except for adults ($p < 0.05$). The result shows that undernutrition is more prevalent among children than their adult counterpart. Similar data from other communities from state(s) should be collected and analyzed for better understanding and to reduce the prevalence of undernutrition in children and women as a whole.

Keywords: Nutritional Status; Socio-Economic; Demographic; Gond; Tribes.

Introduction

Biological anthropologists emphasize the interactions of genetics, physiological processes, population characteristics, and a wide array of nutrition-related diseases. One of the major health determinants is nutrition and the nutritional status of an individual is often the result of many inter-related factors. It is influenced by food intake, quantity and quality, and physical health, however, the spectrum of nutritional status spread from obesity to severe malnutrition. The purpose of nutritional assessment is to identify individuals or population groups who are malnourished. Malnutrition is an imbalance between energy intake and utilization and is one of the major public health problems and accounts for about half of all child deaths worldwide. About 150 million children in developing countries are still malnourished and more than half of underweight children live in South East Asia Region (UNICEF, 2004). India is home to almost one-third of

the world's total malnourished children (UNICEF India, 2014). The consequence of malnutrition also leads to poor physical and intellectual development among children that ultimately lessens their growth and work capacity during adulthood.

The measurement of growth achievement is probably the most widely used and useful method for assessing the nutritional status of children (Jelliffe, 1966). The Gond population is one of the largest tribal groups in central part of India (Census, 2011). Many studies have been carried out in assessing the nutritional status of tribal children in India (Mitra et al., 1993; Kumar et al., 1993; Rao et al., 1994; Mitra and Tiwari, 1997; Rao et al., 2005; Mitra et al., 2007). Populations with low socio-economic conditions tend to have unhealthy dietary habits resulting in low energy consumption (Silventoinen et al., 2012). Therefore, an attempt was made to understand the nutritional and socio-demographic status among the Gonds of Binouri village, Bilaspur, Chhattisgarh (India) with special reference to anthropometric and socio-demographic variables.

Methods

The present study was carried out among a homogenous population of Gonds of Binouri village located in Binouri Gram Panchayat, Takhatpur Tehsil, Bilaspur, Chhattisgarh. A total of 114 individuals (Male=52, Female=62) age ranging from 2-18 years were studied for understanding the nutritional and socio-demographic profile of the village Binouri. Data were collected during the field work conducted in the month of April 2015, as a part of undergraduate degree course. Required permission was taken from village head and concerned authorities prior to carrying the field work.

Socio-Demographic Variables

Data pertaining to socio-demographic profile such as age, sex, marital status, age at marriage, education, occupation and income were collected from all the subjects using a pre-tested interview schedule by surveying different households. Age of the subjects was considered to the nearest whole number.

Anthropometric Variables

Anthropometric measurements including height and weight were measured and recorded from different schools and households only after obtaining

prior oral consent from all the subjects. Studied population were categorized into four age-groups for assessing the nutritional status. It includes pre-schoolers of 2-5 years (n=16), children between 6-12 years (n=38), adolescents between 13-18 years (n=12) and adults >18 years (n=45). The body mass index (BMI) was computed following internationally accepted standard equation as BMI = weight (kg)/ height (m^2). Further, nutritional status was evaluated using the age-sex specific cut-off points of BMI for children and adolescents (Cole et al., 2000, 2007) and for adults (WHO, 1995). The Chronic Energy Deficiency (CED) Grades III, II and I of thinness refer to severe, moderate and mild undernutrition respectively.

Statistical Analysis

In the present study, only adult population were considered for analysing the demographic and socio-economic profile. Moreover, an attempt was also made to understand the socio-economic status of the studied population using Kuppuswamy's socio-economic status scale (Mishra and Singh, 2003; Kumar et al., 2007). Statistical analysis was performed using MS-Excel and SPSS software (15.0 Version). Statistical significance was set at p < 0.05.

Results and Discussion

The demographic and socio-economic profile of the Gond adult population is presented in table 1. Results show that the mean age group among male (38.75years) and female (38.30years) population exhibits no statistical significant difference (p>0.923). Age at marriage shows significant differences between males (22.8 years) and females (17.75 years). It further suggests that the Gond females got married slightly earlier when compared with the general population of India. About 8.69% of females are experiencing widowhood; however, they are not practicing widow re-marriages. Both the sexes have more or less similar primary education (approximately 4%) but only males found to have continued or higher frequency for secondary education (25%), higher secondary education (33.33%) and University education (20.83%). This shows that males have attained relatively higher education than females (p=0.006). The occupation of the Gond population found that 20.83% of males and 30.43% of females are wage laborers indicating that more females are employed as wage laborers than males in this category. However, 69.56% of females are unemployed doing household work and

Karri Bharathi et. al. / Nutritional and Socio-Demographic Profile among Gond Tribe of Binouri
Village, Bilaspur Chhattisgarh (India)

117

unemployment is also found among males (29.17%). The practice of cultivation was mostly done by males (41.67%) and only 8.33% of males are employed in

services. Findings of the present study revealed significant difference in occupational status among male and females (p=0.001).

Table 1: Demographic and Socio-Economic profile of the studied adult population

Characteristics	Category	Male	Female	p-value
Age, Mean±SD		38.75±15.92	38.30±15.64	0.923[a]
Age at Marriage, Mean±SD		22.8±2.83	17.75±2.29	0.0001[a]
Marital Status, n (%)	Married	18 (75.00)	18 (78.26)	0.225[b]
	Unmarried	6 (25.00)	3 (13.04)	
	Widow or Widower	0 (0.00)	2 (8.69)	
Education, n (%)	Illiterate	4 (16.67)	16 (69.56)	0.006[b]
	Primary	1 (4.17)	1 (4.35)	
	Secondary	6 (25.00)	1 (4.35)	
	Higher Secondary	8 (33.33)	3 (13.04)	
	University education	5 (20.83)	2 (8.69)	
Occupation, n (%)	Unemployed	7 (29.17)	16 (69.56)	0.001[b]
	Wage Laborer	5 (20.83)	7 (30.43)	
	Cultivator	10 (41.67)	0 (0.00)	
	Service	2 (8.33)	0 (0.00)	

[a]Unpaired t-test
[b]Likelihood ratio X^2 (chi-square) test (P-value).

Table 2: Classification of Parent's Socio-economic Status among the studied population (according to Kuppuswamy's Socio-economic Status Scale)

Socioeconomic Class		Total Score	Male, n (%)	Female, n (%)	Total, n (%)
Upper		26-29	0 (0.00)	0 (0.00)	0 (0.00)
Middle	Upper Middle	16-25	4 (16.67)	0 (0.00)	4 (8.51)
	Lower Middle	11-15	7 (29.17)	0 (0.00)	7 (14.89)
Lower	Upper Lower	5-10	12 (50.00)	10 (43.48)	22 (46.81)
	Lower	<5	1 (4.17)	13 (56.52)	14 (29.79)
	Total		**24 (100.01)**	**23 (100.0)**	**47 (100.0)**

An attempt has been made to classify the socio-economic status of the Gond population as per Kuppuswamy's socio-economic status scale presented in Table 2. The broad classification shows the socio-economic status of persons into upper, middle and lower categories. It is observed that about 56.52% of females fall under the lower (<5 score) and 50% of males followed by 43.48% of females belong to upper lower (5-10 score) sub-categories fall under lower socio-economic status. It is also observed that among middle category 29.17% of males (11-15 score) belong to lower middle sub-category and 16.67% of males with 16-25 score points belong to upper middle sub-category. This indicates that females possess low socio-economic status relatively when compared with males in the present studied society. The Gonds is an agricultural community living with meagre earns does not fall under upper socioeconomic status and have not attained any score points which may be due to their low levels of education and occupation status.

Age group wise and sex specific anthropometric measurements of the Gond population are presented

in Table 3. The highest mean age was found to be highest among adults (males-38.75years, females-38.30years) followed by adolescents (Boys-15.6years, girls-15.14years) and children (Boys-7.53years, girls-8.10years). The preschool children, however, recorded least mean age 4years and 4.54years among boys and girls respectively. The p-value for mean age when compared for all the groups is not statistically significant. The mean weight and mean height increases as the age advances. The mean weight is found to be higher among girls (pre-schoolers-13.92kg; children-21.32kg; adolescents-40.57kg; and adults-45.83kg) than boys (pre-schoolers-13.25kg; children-20.10kg; adolescents-39kg; and adults-42.46kg). Similarly, the mean height is recorded to be higher among girls (pre-schoolers-98.21cm; children-122.23cm; adolescents-142.38cm; adults-150.49cm) than boys (pre-schoolers-96cm; children-117.1cm; adolescents-140.82cm; adults-132.02cm). However, both the mean values of weight (t=0.26; *p*=0.79) and height (t=0.31; *p*=0.76) were not found to be significantly different between sexes of pre-school children and adult (t=0.75; *p*=0.46) and (t=1.51; *p*=0.14). Further, it is found that the mean

BMI values are also not significantly different between both the sexes of pre-school children (t=0.26; *p*=0.80) and adults (t=1.90; *p*=0.06).

In order to assess the age and sex specific energy deficiency, CED grades with cut off points for body mass index are presented in the Table 4. The BMI categories for each age group i.e. among pre-schoolers (2-5 years), children (6-12 years), adolescents (13-18 years) and adults (>18 years) were considered to know the prevalence of severe, moderate and mild undernutrition among the present population. Only three individuals (one pre-school child and two adults) were found to be obese in the present studied population. Overall distribution of malnutrition in the present study exceeds the serious stage (37.83%). However, patterns of thinness distribution among sex shows statistical significant difference with higher frequency among girls (25.22%) followed by boys (12.61%).

Table 3: Anthropometric measurements of the studied population by age-group and sex specific

Groups	Sex	Age Mean±SD	Range	Weight (Kg) Mean±SD	Range	Height (cm) Mean±SD	Range	BMI (Kg/m²) Mean±SD	Range
Pre-School (2-5 Yrs)	Boys (n=4)	4±2.93	3-5	13.25±7.24	10-16	96±14.66	83.8-106.0	14.37±2.74	12.46-15.98
	Girls (n=13)	4.54±1.54	3-5	13.92±3.38	10-17	98.21±11.83	69.0-107.2	14.70±2.10	11.84-25.20
	t (p-value)	0.50 (0.63)		0.26 (0.79)		0.31 (0.76)		0.26 (0.80)	
Children (6-12 Yrs)	Boys (n=19)	7.53±3.74	6-11	20.10±10.16	17-29	117.1±14.99	107.3-130.0	14.56±2.82	12.76-17.40
	Girls (n=19)	8.10±3.76	6-12	21.32±10.07	14-35	122.23±14.95	109.0-143.9	14.06±2.78	11.78-16.90
	t (p-value)	0.47 (0.64)		0.37 (0.71)		1.06 (0.29)		0.55 (0.58)	
Adolescent (13-18Yrs)	Boys (n=5)	15.6±4.00	13-18	39±10.93	33-46	140.82±16.30	130.0-149.2	19.66±2.99	16.16-22.18
	Girls (n=7)	15.14±4.10	13-17	40.57±11.08	25-53	142.38±16.81	126.7-153.0	19.76±2.90	15.57-22.64
	t (p-value)	0.19 (0.85)		0.24 (0.81)		0.16 (0.87)		0.06 (0.95)	
Adult (>18 Yrs)	Male (n=24)	38.75±15.92	20-83	42.46±15.94	37-75	132.02±44.13	147.4-168.2	16.85±6.42	16.10-27.89
	Female (n=23)	38.30±15.64	19-75	45.83±14.70	35-70	150.49±39.56	143.0-167.3	20.27±5.90	16.01-30.90
	t (p-value)	0.10 (0.92)		0.75 (0.46)		1.51 (0.14)		1.90 (0.06)	

Table 4: Distribution of Chronic Energy Deficiency (CED: Grade I, II, III) using age and sex specific cut-off point

To understand the different distribution pattern of CED, further analysis was performed among different age-sex specific categories. Almost 50% of the preschoolers are suffering from undernutrition categorized under different grades, out of which 25% of them fall under Grade I followed by Grade III (18.75%) category i.e. 25% of boys and 16.67% of girls are suffering from Grade III under nutrition (underweight). Both sexes are not statistically significant for chronic energy deficiency (*p*=0.931). Among children, 42.1% of girls and 26.32% of boys fall under Grade I underweight category followed by 10.53% of both the sexes under Grade II category. However, both the sexes are not statistically significant for CED (*p*=0.477). Among adolescents, 20% of boys and 14.28% of girls are observed to be considered under Grade I and are not statistically significant (*p*=0.793). Approximately 13% males and females fall under Grade II category and are statistically significant (*p*=0.048) for underweight category. Further, the combined CED grades show that preschool children under Grade III (18.75%) are most sufferers followed by adults (13.33%) under Grade II and later by children (34.21%) and preschool children (25%) under Grade I category. However, Grade I malnutrition was observed to be high among all age group especially among 6-12 years children (34.21%). This study shows a similarity in malnutrition grades among Gond tribals from Melnadih village, Chhattisgarh (Singh et al., 2015).

Occurrence of high rate of thinness particularly among girls in the present study suggests serious situation of nutritional status among the studied Gond population. Girls at the age of pre-school and children are seems to be more vulnerable group for malnutrition than its counterpart boys. Occurrence of such high frequency of thinness (37.83%) may directly or indirectly affect the structure of the studied population which may further leads to higher rate of morbidity and mortality (Singh et al., 2014).

Karri Bharathi et. al. / Nutritional and Socio-Demographic Profile among Gond Tribe of Binouri Village, Bilaspur Chhattisgarh (India)

119

Table 4: Distribution of Chronic Energy Deficiency (CED: Grade I, II, III) using age and sex specific cut-off point

BMI Categories	Pre-School (2-5 Yrs)			Children (6-12 Yrs)			Adolescent (13-18 Yrs)			Adult (>18 Yrs)		
	Boys, n (%)	Girls, n (%)	Total, n (%)	Boys, n (%)	Girls, n (%)	Total, n (%)	Boys, n (%)	Girls, n (%)	Total, n (%)	Male, n (%)	Female, n (%)	Total, n (%)
Normal	2 (50.00)	6 (50.00)	8 (50.00)	12 (63.16)	8 (42.10)	20 (52.63)	4 (80.00)	6 (85.71)	10 (83.33)	19 (82.61)	12 (54.54)	31 (68.89)
Grade I	1 (25.00)	3 (25.00)	4 (25.00)	5 (26.32)	8 (42.10)	13 (34.21)	1 (20.00)	1 (14.28)	2 (16.67)	1 (4.35)	7 (31.82)	8 (17.78)
Grade II	0 (0.00)	1 (8.33)	1 (6.25)	2 (10.53)	2 (10.53)	4 (10.53)	0 (0.00)	0 (0.00)	0 (0.00)	3 (13.04)	3 (13.64)	6 (13.33)
Grade III	1 (25.00)	2 (16.67)	3 (18.75)	0 (0.00)	1 (5.26)	1 (2.63)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Total	4 (100.0)	12 (100)	16 (100)	19 (100.01)	19 (99.99)	38 (100.00)	5 (100.0)	7 (99.99)	12 (100.0)	23 (100.0)	22 (100.0)	45 (100.0)
χ^2 (p-value)	0.44 (0.931)			2.47 (0.477)			0.69E-01 (0.793)			6.06 (0.048)		

Conclusion

Food insecurity, food inadequacy, low socio-economic status and uncertain earnings among Gond tribals might be the causative factors leading undernutrition. Mothers and pregnant women are not well nourished and insufficient supplement to children could be the potential factors causing them to suffer from critical to severe malnutrition. However, effective implementation of nutrition programmes has to be scrutinized from time-to-time for better outcomes among children. Anti-poverty programmes have to be implemented to outreach the low socio-economic status of the people especially women to avail the services and consequently bring awareness of the consequences of malnutrition among children.

Acknowledgement

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