Selected Socio-demographic Correlates of Nutritional Status among Bhaina Tribal Female Children and Women of Pendra Block, Chhattisgarh

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ABSTRACT: In India, generally, tribal children and women are more deprived of their basic health and nutritional requirements. The present study attempted to deal with the socio-demographic profile and body mass index (BMI) based nutritional status of the 161 females (children and women) from Bhaina community (A Particularly Vulnerable Tribe or PVT) of Sadhwani village, Bilaspur, Chhattisgarh. Results showed that mean values of height, weight and BMI of the participants increased with age (up to 59 years) and then decreased (≥ 60 years). Significant differences in height, weight and BMI (p=0.001) between age-groups are observed. Significant difference (χ^2= 16.22, df = 08; p = 0.04) in the prevalence of BMI-based nutritional status by age-groups is also noted. Thus, the results show that nutritional stress is highest among the youngest and the oldest individuals. Anthropometric characteristics are related to the socio-demographic parameters like education and occupation of the participants. Similar data from varied ethnic groups from the Indian State(s) should be collected and analyzed to better understand and develop strategies to reduce the prevalence of undernutrition in children and women in the country.

INTRODUCTION

Children and women constitute the most nutritionally vulnerable sections in India and their nutritional status is considered to be a sensitive indicator of community health and nutrition. Infant mortality rate is often used as an indicator of the quality of life and health of people in a country. Maternal malnutrition is one of the significant and interconnected aspects of intrauterine growth retardation (Barker,'95; Black *et al*., 2008), child malnutrition and chronic diseases (Osmani and Sen,

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2003; Victora *et al.* 2008). India's demographic and illness profile and developmental indicators demonstrate the inequality between genders, signifying the subsistence of gender bias (WHO,'98). Gender investigation in health care discovered that males and females had differential health risk, access to the benefits of resources including education, employment etc (WHO,'98).

Poor nutrition severely hinders personal, social and national development (Shafique *et al*., 2007). It has been clear that India has the largest tribal population in the world that consti-tutes 8.6 per cent of the total population of the country. There are 705 Scheduled Tribes (ST) and 75 (approximately) Particularly Vulnerable Tribal Groups (PVTG) in India (Census of India, 2011). Majority of tribal communities in India live in the scattered and small habitats located in remote areas, near forests and hillocks that are dis-tant from the general population. The tribes in India are con-sidered to be the weakest part of the society in view of their socio-eco-nomic conditions (Basu,'94; Thakur *et al*.,'91). Despite sur-plus food grains, a majority of the tribal community people in India suffers from undernutrition since tribal communities are iso-lated from general population and are so-cially and economically vulnerable (Lax-maiah *et al*., 2007). With this background, the present study was undertaken to investigate socio-demographic profile and nutritional status of children and women of Bhaina tribal community in the Sadhwani village from Bilaspur district in Chhattisgarh.

MATERIALS AND METHODS

The research design was cross-sectional. The study was conducted in the year 2013 on a sample size of 161 females aged 2-75 years in Sadhwani village of Pendra block in Bilaspur district of Chhattisgarh. The particular village is located around 220 kilometers from Raipur, the state capital of Chhattisgarh. Age of the children was documented from the official records including birth certificates of children available from the nearest Primary Health Center (PHC) or Polio vaccination card provided by the teachers of *Anganwadi* (Integrated Child Development Services program providing basic health care in the rural areas). Age of the participants for the sample was considered to the nearest whole number.

Height and weight were recorded from each participant from the village by the co-authors (MG and HSS) following standard techniques (Lohman *et al*.,'88). Techni-cal errors of measurement were found to be within reference values (Ulijaszek and Kerr,'99) and thus was not incorporated in statistical analyses. Participants were informed prior to the recording of data from them and were also explained about the objectives. Visits have been made mostly in the day time when most of the respondents (females) were expected to be at home. Ethical approval was obtained from competent authority before commencement of the study. The BMI was computed using the following standard equation: BMI = Weight (kg) / height (m^2) (WHO,'95).

Nutritional status was evaluated using internationally accepted BMI guidelines (WHO,'95). The standard cut-off points of BMI for adult females (WHO,'95) and children (< 18.0 years) (Cole *et al*., 2000, 2007) were used. The appropriate cut-off values (to the nearest whole age) were utilized. We followed the World Health Organization's classification ('95) of the public health problem of low BMI, based on adult populations worldwide: low (5-9%): warning sign, monitoring required; medium (10-19%): poor situation; high (20-39%): serious situation; very high (≥ 40%): critical situation.

Socio-demographic criteria in the present study included education, occupation, health services and marital status in women. The participants were either literates or illiterates. Occupation in women was categorized into: housewife, cultivation, wage laborers and others (including small business, service etc.). Health services attended by the individuals included: from the quacks or persons without formal medical education treating people especially in rural areas, the *ojhas* or traditional healers, and the Government public health department (PHC or Primary Health Centre). Marital status included two sections: married and unmarried.

The ANOVA (F-test) was performed to test the age-group differences in the variables. Chi-square (χ^2) test was performed to understand the significant differences in the prevalence of nutritional status between groups. All statistical

analyses were performed using the Statistical Package for Social Science (SPSS Version 11). Statistical significance was set to a value of $p < 0.05$. Microsoft office excel was used for the graphical presentations.

RESULTS

Table 1 shows descriptive statistics of anthropometric characteristics among the studied tribal Bhaina females by age-groups. Mean values of height, weight and BMI show gradual increase with age and then a pattern of decline in elderly women (≥60 years of age). Significant difference in height (F= 111.83; p=0.001); weight (F= 31.42; p=0.001) and BMI (F= 40.30; p=0.001) between age-groups is marked. Prevalence of undernutrition is highest among the 2-6 years (53.8%) and 7-12 years (53.8%) and lowest among 13-18 year-old girl children (18.2%). Significant difference (χ^2= 16.22, df = 08; p = 0.04) in the prevalence of nutritional status between children and adolescent girls and adult women is also marked (Table 2).

TABLE 1

Descriptive statistics of anthropometric characteristics among the tribal females of Pendra block

Variables	Age-groups (years)										
	2-6(n=13)		7-12(n=26)		13-18(n=22)		19-59(n=87)		≥ 60(n=13)		
	M	SD	M	SD	M	SD	M	SD	M	SD	F
Weight (kg)	13.81	2.58	24.40	6.84	44.18	4.90	45.50	6.81	40.42	6.85	111.83*
Height (cm)	92.74	24.94	122.70	25.31	150.33	4.81	147.10	18.78	146.17	4.31	31.42*
BMI (kg/m^2)	13.61	1.05	14.92	1.99	19.54	1.94	20.24	2.60	18.88	2.98	40.30*

* p< 0.001. M: Mean, SD: Standard deviation.

TABLE 2

Prevalence of BMI-based nutritional status among the tribal females of Pendra block

Nutritional status	Age-groups (years)										Chi-Square
	2-6		7-12		13-18		19-59		≥ 60		
	N	%	N	%	N	%	N	%	N	%	
Undernutrition	7	53.8	14	53.8	4	18.2	21	24.1	6	46.2	χ2=16.22 df = 08
Normal	6	46.2	11	42.4	18	81.8	62	71.3	7	53.8	p = 0.04
Overweight	0	0	1	3.8	0	0	4	4.6	0	0	

Table 3 shows the description of the socio-demographic profile and means values (with standard deviation, SD) of height, weight and BMI of the participants (age combined). Educational status shows that majority of the studied tribal females are literate (54%) and a remarkable section is illiterate (46%). Illiterate females were taller, had higher weight and BMI than literate section. Table 3 shows the occupation of the studied tribal females that included 61% housewives. The wage laborers have the greater mean height, weight and BMI than others. Significant difference in mean weight (F= 4.81; p< 0.001) and BMI (F=3.60; p< 0.05) are observed. However, differences in mean values of height between three occupational groups were not significant (p>0.05) even after post hoc test (Tukey HSD). Table 3 also shows that the maximum of the studied females used to go to the PHC and the *ojhas* (48%) for their treatment during ailments. Mean height is highest (146.53 cm) among the females who went to the quacks and *ojhas* for treatment. On the other hand, mean weight (40.74 kg) and BMI (19.05 kg/m^2) are highest among the females treated in PHC and by the *ojhas* (local medicine man). Majority (63%) of the studied females are married.

Table 4 shows the prevalence of BMI-based nutritional status among the studied females by socio-demographic characteristics. Prevalence of undernutrition was high in the occupational group called 'housewife' (28.9%), followed by the cultivators (26.4%), and others including wage laborers and service holders (23.4%). Results show that participants attended by the quacks and the *ojhas*

TABLE 3

Socio-demographic profile and mean (SD) of height, weight and BMI of Pendra females (pooled sample by age) (n=161)

Variables	Variance		N (%)	Mean Height (cm)	Mean Weight (kg)	Mean BMI (kg/m^2)
Education	Literate		82 (54.30)	139.11 (24.63)	38.00 (12.18)	18.29 (3.24)
	Illiterate		69 (45.70)	144.48 (22.23)	43.67 (8.17)	19.79 (2.90)
		T		-1.34	-3.29***	-2.96**
Occupation	Housewife		98 (60.87)	138.37 (23.57)	37.92 (12.55)	18.45 (3.31)
	Cultivation		22 (13.66)	132.68 (32.20)	34.73 (12.55)	17.47 (3.35)
	Wage laborer and services		41 (25.47)	144.45 (22.73)	43.65 (10.09)	19.69 (3.37)
		F	1.75	4.81***	3.60*	
Health services	PHC		56 (34.78)	138.34 (17.32)	35.86 (12.31)	17.93 (3.05)
	PHC and *ojha*		78 (48.45)	143.83 (16.35)	40.74 (12.17)	19.05 (3.36)
	Quack and o*jha*		27 (16.77)	146.53 (5.41)	39.70 (9.02)	18.32 (3.28)
		F	2.68	2.77	1.98	
Marital status	Married		101 (62.73)	138.73 (24.70)	38.16 (12.86)	18.46 (3.38)
	Unmarried		60 (37.27)	139.84 (25.81)	40.27 (11.40)	18.92 (3.34)
		T	-0.27	-1.05	-0.84	

Standard deviation (SD) value is in parenthesis; PHC= Primary Health Centre;
t= Independent sample t-test; F= ANOVA; *** $p<0.001$, * $p<0.05$

TABLE 4

Prevalence of nutritional status of Pendra females based on their socio-demographic characteristics

Variables	Classification	Nutritional status				
		CED III	CED II	CED I	Normal	Overweight
Education	Literate	3.50	7.00	23.30	64.00	2.30
	Illiterate	4.60	12.30	13.80	66.20	3.10
	Chi-square test			χ^2= 3.85; df= 4; p= 0.43		
Occupation	Housewife	3.90	11.80	13.20	68.50	2.60
	Cultivation	0.00	5.30	21.10	73.60	0.00
	Wage laborer and services	2.90	2.90	17.60	70.70	5.90
	Chi-square test			χ^2= 18.50; df= 8; p= 0.02		
Health services	PHC	0.00	7.10	25.00	66.10	1.80
	PHC and *ojhas*	5.10	11.50	14.10	66.70	2.60
	Quack and *ojhas*	11.80	5.90	23.50	52.90	5.90
	Chi-square test			χ^2= 23.20; df= 8; p= 0.003		
Marital status	Married	3.40	11.40	13.60	68.20	3.40
	Unmarried	4.80	6.30	27.00	60.30	1.60
	Chi-square test			χ^2= 6.79; df= 4; p= 0.148		

CED: Chronic Energy Deficiency; PHC: Primary Health Centre.

were suffering from highest degree of undernutrition (41.2%). Marital status shows that unmarried females (38.1%) are more undernourished than married women (28.4%).

DISCUSSION

A high proportion of children in developing countries are already nutritionally depleted especially among the preschoolers. Undernutrition among children and adolescents is a serious public health problem internationally, especially in developing countries (Lancet,'84). Women are generally more vulnerable to nutritional stress. The social and demographic consequences of the lower status in women are found to be reflected through different indicators, like female infanticide, higher death rate in women compared to men, lower sex ratio, lower literacy rate, lower level of employment in the non-agricultural sector, etc as compared to men (Srinivasan and Tara,'89).

Limitations of the present study is that it represents only the females of the studied Bhaina tribals, and further, the results are based on a relatively smaller sample size from one village (Sadhwani, of Pendra Block of Bilaspur district). However, result of the present study not only revealed the nutritional situation of the studied tribals from Chhattisgarh State but also the age-groups that experienced highest prevalence of undernutrition among them. Nutritional status of the studied females by their socio-demographic characteristics also shows some facts that will definitely help other researchers to compare their findings with present study and the results might help policy makers to think similarly to overcome the situation by giving priority to the most critical group facing the nutritional problem. The study not only provides additional information on the level of undernutrition of the females of the village of Pendra block of Bilaspur district but also gives an overview of the age-group wise weight and height. Figure 1 compares mean BMI (Kg/m^2) between different states among girls (<18 years old) in India (NFHS-III 2007). The girls from Delhi (23.7 kg/m^2) (Northern zone) have the highest and the girls from Chhattisgarh (17.4 kg/m^2) (Present study; Central zone) have the lowest mean BMI. The overall mean BMI of the reported studied female (<18 years) is 20.3 kg/m^2 (NFHS-III, 2007).

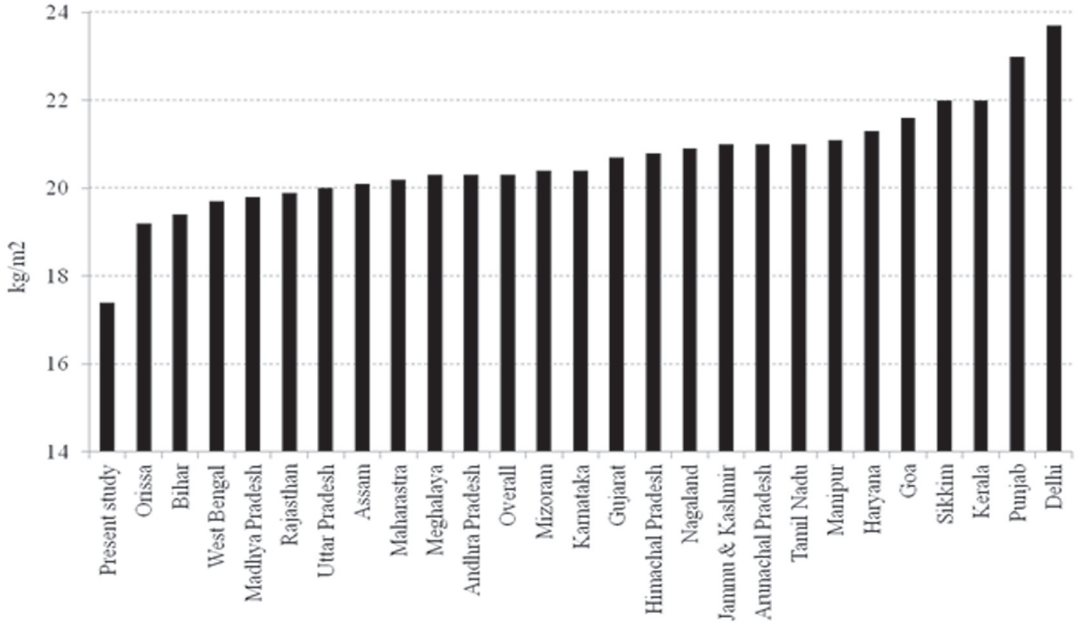

Figure 1: Comparative statement of mean BMI (kg/m^2) in girls (<18 years of age) from different states of India with the present study (based on NFHS-III 2007).

Comparative statement of the prevalence of CED (%) based on body mass index (BMI, kg/m^2) of females (<18 years) of the states from different zones in India (NFHS-III 2007) along with the present study revealed considerable state-wise differences (Figure 2). Wide ranges of state-wise differences in rate of undernutrition were observed. Highest CED was observed from Orissa (48.0%) (Eastern region) and lowest from Arunachal Pradesh (10.7%) (North-eastern region). In a comparative statement of BMI in adult women (Figure 3, based on NFHS-II 2001, cited in Bisai and Bose, 2008) it was observed that women from West Bengal had low BMI (18.2 kg/m^2) and women representing Sikkim State had highest BMI (23 kg/m^2). The women in the present study had moderate BMI (20.05 kg/m^2). Prevalence of CED (BMI-based undernutrition) in adult women was lowest in the State of Sikkim (4.8%) and was highest from West Bengal (64.2%) (Figure 4). The frequency of undernutrition among women in the present study was relatively low (27%) in comparison with that recorded in women from other states in India.

Therefore, our study illustrates that there exists high prevalence of thinness (among children from 2 to 12 years) and chronic energy deficiency or CED (≥60 years) in girls/females from the studied ethnic group. To obtain a better picture of the prevalence of undernutrition, we suggest that more studies have to be undertaken using different estimates of nutritional status viz. BMI, MUAC (mid-upper arm circumference) etc. among different age-groups. Moreover, since India is a land of ethnic diversity, other community people should also be studied for similar purpose to get an overall picture of nutritional status among tribes in the country so as to implement appropriate nutritional intervention programs with an objective of reducing the rates of nutritional stress.

CONCLUSION

The present study revealed that the Bhaina females of Sadhwani village of Pendra block, Bilaspur, Chhattisgarh experienced high prevalence of undernutrition (thinness and CED) among preschooler and other children (<13 years) and among

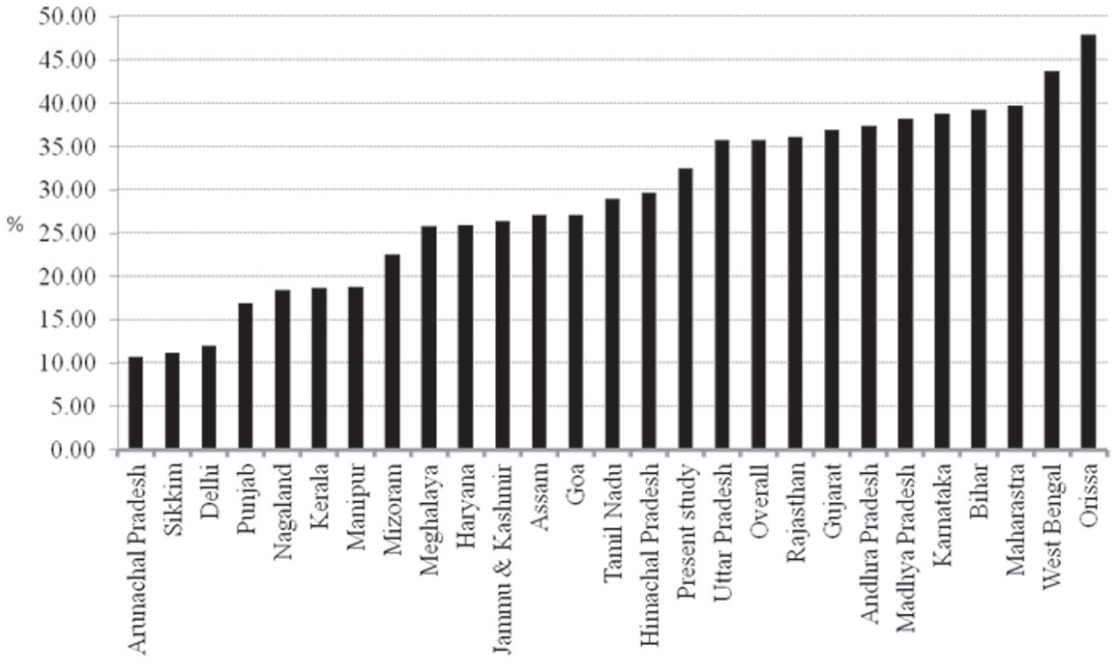

Figure 2: Prevalence of BM-based undernutrition (%) in girls (<18 years of age) from different states in India and in the present study (Based on NFHS-III 2007).

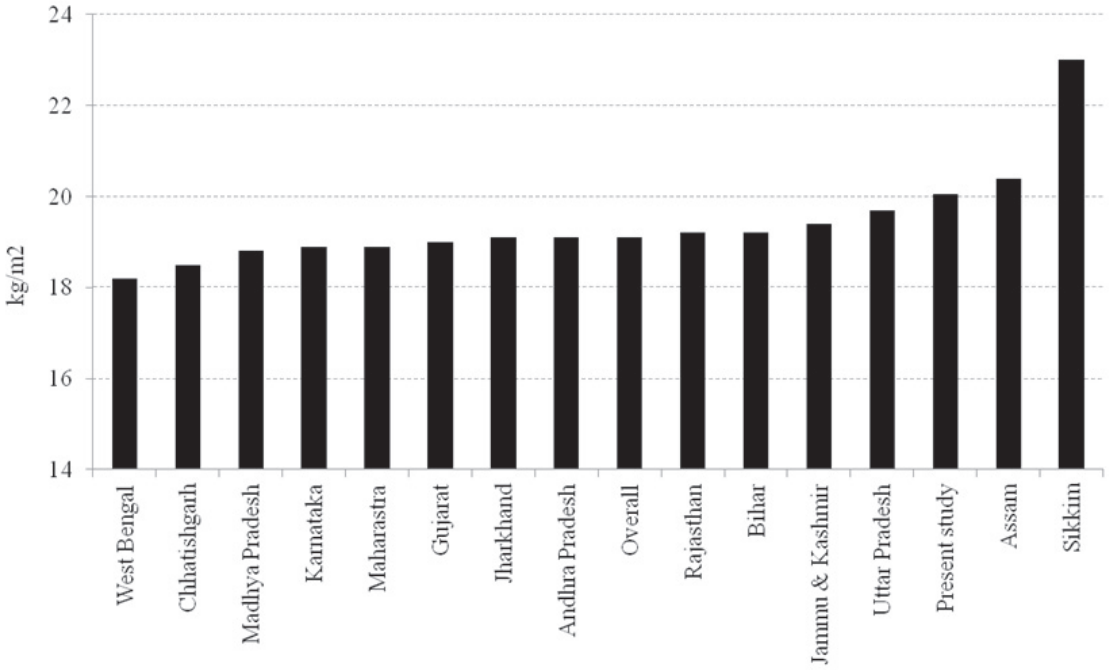

Figure 3: Comparative statement of mean BMI (kg/m^2) in women (15 to 49 y years of age) from different states of India (Based on NFHS-II 2001) with the present study (19 to 75 years).

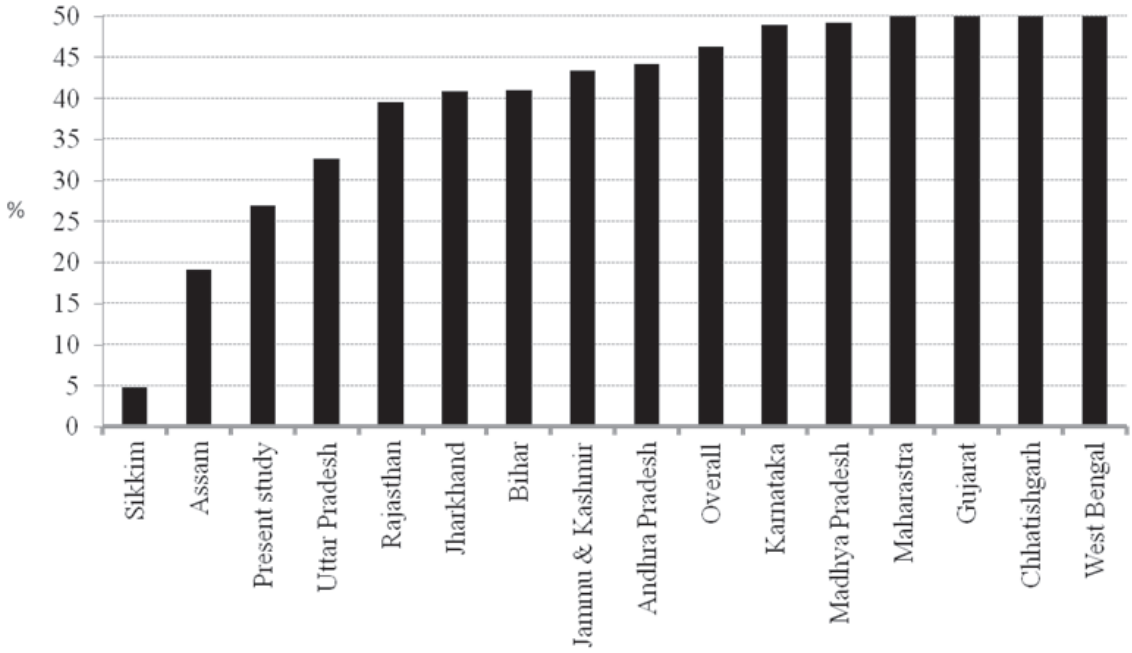

Figure 4: Prevalence of CED (%) in women (15 to 49 y years of age) from different states of India (based on NFHS-II 2001) and in the present study (19 to 75 years).

females of advance age (≥ 60 years). However, we can say that the younger children and old-age people who depend more on their adult counterpart for livelihood have poor nutritional status. Similar data in varied ethnic groups from this state and of other states should be collected and analyzed so as to get a better understanding of the burden of undernutrition in our country.

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