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PREVALENCE OF MALNUTRITION AMONG PRE-SCHOOL CHILDREN OF NINE INDIAN STATES

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ABSTRACT **Introduction:** In developing countries, undernutrition is a major health concern among children. Besides this, the coexistence of undernutrition and overnutrition, which is referred to as double burden of malnutrition is well observed among children. **Objective:** This paper investigates the total prevalence of malnutrition (undernutrition+overnutrtion) among preschool children of Empowered Action Group (EAG) states in India using the secondary data, which was extracted from Clinical, Anthropometric and Biochemical (CAB) Survey. **Materials and Methods:** A total of 92444 (43655 females; 48789 males) under 5 years preschool children were included from 165 districts of EAG states and Assam in India. To assess the nutritional status, Z scores for weight-for-height (WHZ), height-for-age (HAZ), weight-for-age (WAZ) were calculated by following WHO standards using AnthroPlus software. Double burden of malnutrition was evaluated using categorical components of rCIAF (revised Composite Index Anthropometric Failure). **Results:** The overall prevalence of UF and OF were 50.48% (47.34% female; 53.29% male) and 3.76% (3.95% females and 3.60% males), respectively. The highest prevalence of UF was observed in Madhya Pradesh (54.47%). Sex-specific highest prevalence in females and males were observed in Jharkhand (51.76%) and Madhya Pradesh (58.91%). **Conclusion:** The outcomes from this study may help the policymakers in ameliorating the problem of malnutrition.

KEYWORDS : Malnutrition, Empowered Action Group, Pre-school children

INTRODUCTION

Over the past decade, the coexistence of the double burden of malnutrition (i.e., both under and over-nutrition) among children at the population level has been increasing appreciably in developing countries [1] including in urban and rural India [2,3]. Unlike morbid symptoms of under-nutrition children, childhood obesity is associated with a higher chance of obesity, hypertension, early markers of cardiovascular disease and insulin resistance [4]. Some international [5] and national [2,3] studies have provided evidence that many countries, including India, are now facing this problem of double burden.

Objective of the Study

Our study mainly focused to investigate the total prevalence of malnutrition (Under-nutrition+Over-nutrition) among preschool rural and urban children in the eight Empowered Action Group (EAG) states (Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, Uttarakhand, and Uttar Pradesh) and Assam in India.

MATERIALS AND METHODS

This work is based on the analysis of the secondary data, extracted from Clinical, Anthropometric and Biochemical (CAB) Survey; supplement the information provided by Annual Health Survey (AHS) conducted by the Ministry of Health and Family Welfare (MoHFW) under the Government of India. A total of 92444 [(43655 (47.22%) females; 48789 (52.78%) males)] children aged under 5 years had been included from 165 districts (approximately half of the total districts) of EAG states and Assam.

Nutritional assessment was done using Z scores for Weight for height (WHZ), height for age (HAZ) and weight for age (WAZ) as per WHO international growth standards using AnthroPlus Software [6]. The overall anthropometric failure or dual-burden of malnutrition (Under-failure + Over-failure) was measured utilizing categorical components of rCIAF (revised Composite Index of Anthropometric Failure) [7].

RESULTS

Age and sex-specific weight-for-height (WHZ), height-for-age (HAZ) and weight-for-age (WAZ) are shown in Table 1 and Characteristics of the studied children including state and sex-specific prevalence of under-failure (UF) and over-failure (OF) are presented in Table 2.

Table 1: Age and Sex-specific Weight-for-height (WHZ), Height-for-age (HAZ) and Weight-for-age (WAZ)

Age group	Total (N= 92444)		Mean (SD) of WHZ		t' value	Mean (SD) of HAZ		t' value	Mean (SD) of WAZ		t' value
	Female	Male	Female	Male		Female	Male		Female	Male	
0-11 months	5828	6755	-0.47(2.59)	-0.66(2.67)	4.00*	-1.56(2.10)	-2.17(2.15)	16.075*	-1.47(1.65)	-1.96(1.76)	16.144*
12-23 months	5933	7012	-0.80(1.57)	-1.13(1.70)	11.373*	-0.46(1.87)	-0.94(1.96)	14.283*	-0.87(1.16)	-1.36(1.16)	23.971*
24-35 months	7845	8568	-0.91(1.62)	-1.19(1.70)	11.02*	-1.28(1.96)	-1.56(2.06)	8.963*	-1.31(1.19)	-1.64(1.15)	17.64*
36-47 months	8839	9805	-0.96(1.70)	-1.20(1.81)	9.175*	-1.43(2.00)	-1.52(2.03)	2.87*	-1.50(1.19)	-1.64(1.17)	8.143*
48-59 months	8253	9227	-0.94(1.50)	-1.01(1.59)	2.633*	-1.38(1.59)	-1.42(1.61)	1.651	-1.47(1.09)	-1.50(1.10)	1.796
≤60 months	6957	7422	-1.58(1.58)	-1.56(1.63)	-0.919	-0.88(1.31)	-0.93(1.33)	2.207*	-1.55(1.05)	-1.53(1.07)	-0.806
ANOVA			F = 274.80*	F = 178.77*		F = 335.93*	F = 425.71*		F = 272.63*	F = 190.06*	

Table 2: State and Sex Specific Prevalence of Malnutrition Among Under 5 Children of Nine Indian States

States Name	Total (N)		rCIAF								
			Under Failure (%)			Only Normal (%)			Over Failure (%)		
	Female	Male	Female	Male	Total	Female	Male	Total	Female	Male	Total
Assam	3888	4286	42.62	45.61	44.19	55.14	51.49	53.23	2.24	2.89	2.58
Bihar	6962	7688	40.00	52.93	46.78	57.94	44.95	51.13	2.05	2.12	2.09
Chhattisgarh	3389	3866	49.63	53.88	51.90	46.56	42.65	44.48	3.81	3.47	3.63
Jharkhand	3294	3472	51.76	54.18	53.00	45.63	44.10	44.84	2.61	1.73	2.16
Madhya Pradesh	6207	7245	49.28	58.91	54.47	42.44	35.72	38.82	8.28	5.37	6.71
Odisha	3556	3923	45.44	47.80	46.68	52.78	50.40	51.53	1.77	1.81	1.79
Rajasthan	3565	4069	50.38	54.04	52.33	45.69	42.25	43.86	3.93	3.71	3.81
Uttar Pradesh	11444	12738	50.19	54.25	52.33	45.19	41.05	43.01	4.62	4.70	4.66
Uttarakhand	1350	1502	46.15	50.60	48.49	51.41	45.14	48.11	2.44	4.26	3.40
Combined	43655	48789	47.34	53.29	50.48	48.71	43.11	45.76	3.95	3.60	3.76

rCIAF: revised Composite Index of Anthropometric Failure.

The overall prevalence of UF and OF were 50.48% (47.34% female; 53.29% male) and 3.76% (3.95% females and 3.60% males), respectively. The prevalence of UF was higher in males. However, the prevalence of OF among females was slightly higher. The highest prevalence of UF was observed in Madhya Pradesh (54.47%). Sex-specific highest prevalence in females and males were observed in Jharkhand (51.76%) and Madhya Pradesh (58.91%). Madhya Pradesh also had the highest (6.71%) prevalence (female = 8.28%; male = 5.37%) of OF. Analysis of proportional differences of total rCIAF (UF+OF) between this study and a recent report on Argentinean children [8] showed a significant difference ($z = 76.954$, $p < 0.0001$).

CONCLUSION

Malnutrition is a major health burden among pre-school children in India. This brief communication highlights age and sex specific as well as state and sex specific variations in malnutrition among under 5 children of eight Empowered Action Group (EAG) states and Assam in India. The results presented here may be useful for policymakers in ameliorating the problem of malnutrition. Also, the results and interpretations of this paper may be useful for Indian government policymakers as well as researchers in achieving the Sustainable Development Goals (SDG-2 and 3).

REFERENCES

1. Caleyachetty R, Rudnicka AR, Echouffo-Tcheugui JB, Siegel KR, Richards N, Whincup PH. Prevalence of overweight, obesity and thinness in 9–10 year old children in Mauritius. Globalization and Health. 2012; 8(28), 1-6.
2. National Family Health Survey-3. International Institute of Population Science, Mumbai, 2005-06.
3. Annual Health Survey: Clinical, Anthropometric and Biochemical (CAB). Ministry of Health & Family Welfare, Government of India, 2014.
4. Reilly, J.J., & Kelly, J. Long-term impact of overweight and obesity in childhood and adolescence on morbidity and premature mortality in adulthood: Systematic review. Int J of Obes. 2010; 35(7), 891-898.
5. The United Nations Children's Fund, the World Health Organization and the World Bank Group. Levels and trends in child malnutrition: Key findings of the 2017 Edition of the Joint Child Malnutrition Estimates. New York/Geneva/Washington DC, 2017.
6. Blossner, M., Siyam, A., Borghi, E., Onyango, A., de Onis M. (2011). Software for assessing growth and development of the world's children and adolescents. Department of Nutrition for Health and Development, Geneva, World Health Organization, 2012.
7. Kuiti, B.K., & Bose, K. The concept of composite index of anthropometric failure (CIAF): Revisited and revised. Anthropol Open J. 2018; 3(1), 32-35.
8. Bejarano, I.F., Oyhenart, E.E., & Torres, M.F. Extended composite index of anthropometric failure in Argentinean preschool and school children. Public Health Nutr. 2019; 22(18), 3327-3335.