VOLUME - 12, ISSUE - 01, JANUARY - 2023 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra Original Research Paper **Community Medicine** NUTRITIONAL STATUS AND ITS DETERMINANTS AMONG UNDER-5 CHILDREN ATTENDING ANGANWADI CENTRES OF RURAL FIELD PRACTICE AREA OF A MEDICAL COLLEGE OF BENGALURU CITY Associate Professor, Department of Community Medicine, Shri Lal Bahadur Nidhi Sharma Shastri Government Medical College & Hospital, Mandi, Himachal Pradesh, India Assistant Professor, Department of Community Medicine, Government Shivesh Devgan* Medical College, Amritsar, Punjab, India *Corresponding Author Statistician, Department of Community Medicine, The Oxford Medical Nandkishor Warbhe College, Hospital & Research Centre, Bengaluru, Karnataka, India

ABSTRACT Introduction: Malnutrition is one of the most important public health problems throughout the world, particularly in developing countries, and has undesirable effects on the mental and physical health of children. Despite enormous economic progress achieved in the past two to three decades, malnutrition among children in both urban and rural India still claims many lives. Hence this study was undertaken to assess nutritional status and its determinants among under-5 children attending anganwadi centres of rural field practice area of our Medical College. Method: A community-based cross-sectional study was conducted among 285 children under 5 years of age attending anganwadi centres of rural field practice area of our Medical College. Information regarding socio-demographic variables, infant feeding practices and immunization was obtained from mothers/guardians of children. Anthropometric measurements, i.e., weight and height were taken following standard techniques. Children were categorized on the basis of their weight-for-age, heightfor-age and weight-for-height as per WHO International Growth Standards 2006 generated for boys and girls aged 0 to 60 months, and below 2 SD of the reference median on any of these indices were considered as underweight, stunted and wasted respectively. Results: The overall prevalence of underweight, stunting and wasting was found to be 42.5%, 38.6% and 28.8% respectively. Significant association was observed between the prevalence of undernutrition and age, gender, type of family, literacy status of mother, birth order, socioeconomic status, infant feeding practices and immunization status. Conclusion: The prevalence of undernutrition was high in the study population thus highlighting yet again that undernutrition continues to be a public health burden.

KEYWORDS : Nutritional status, Under-5 children, Anganwadis

INTRODUCTION:

Malnutrition is a silent emergency.^[11] It is an indicator of poor nutrition, having a major consequence on human health as well as for the social and economic development of a population.^[2] Malnutrition is frequently part of a vicious cycle that includes poverty and disease. These three factors are interlinked in such a way that each contributes to the presence and permanence of the others.^[1]

Malnutrition has long been a major public health concern globally, particularly in developing countries.^[3] Malnutrition contributes to 50% of all child deaths and 11% of the total global disability-adjusted-life-years worldwide.^[4]

Preschool children constitute the most vulnerable segment of any community. Their nutritional status is a sensitive indicator of child health. Growth during childhood is widely used to assess adequate health, nutrition and development of children.^[5]

The health consequences of a prolonged state of malnutrition among children include delayed physical growth and impaired motor and cognitive development, diminished cognitive performance, lower intellectual quotient (IQ), poor social skills, greater behavioural problems and vulnerability to contracting diseases. Moreover, malnutrition also leads to important consequences in adult life in terms of physical growth, work capacity, reproductive performances and risk of chronic diseases.^[2]

In India, malnutrition among children below five years continues to be one of the major human development challenges.^[6] One in every three malnourished children of the world lives in India.^[7] In spite of tremendous economic progress made in the last two to three decades, malnutrition among children in both urban and rural India still claims many lives.^[6] According to National Family Health Survey-4,

conducted in 2015-16, 35.7% children below five years were underweight, 38.4% were stunted and 21% were wasted in the country.^[8] Despite the decrease in the proportion of underweight and stunted under five children over the last decade, these rates are still higher than those of many poorer countries in sub-Saharan Africa.^[9] In Karnataka, 35.2% of children under-5 years were found underweight, 36.2% stunted and 26.1% wasted.^[8]

As a step towards reducing the prevalence, there is need to identify the important determinants of malnutrition and take necessary measures to prevent it. Hence the present study was conducted to assess the nutritional status of under-5 children attending anganwadis in the rural field practice area of our Medical College and to identify the factors influencing their nutritional status.

METHOD:

Type of study: Community-based cross-sectional study

Place of study:

All Anganwadi Centres in the field practice area of the Rural Health and Training Centre of Department of Community Medicine of The Oxford Medical College, Hospital and Research Centre, Bengaluru

Period of study:

2 months (January 2020 to February 2020)

Study population:

Children under 5 years of age attending anganwadis in the rural field practice area

Sampling:

There are 8 villages under the service area of Rural Health and Training Centre of Department of Community Medicine of The

Oxford Medical College, Hospital and Research Centre, Bengaluru. In these 8 villages, there are total 9 anganwadi centres. All the 9 anganwadis were surveyed and all the children under 5 years of age attending these anganwadis were included in the study.

Inclusion criteria:

All children under 5 years of age attending anganwadis whose parents/guardians gave written informed consent to participate in the study

Exclusion criteria:

- Children whose parents/guardians were not willing to participate in the study
- Children whose parents/guardians were not available for interview on two subsequent visits

Tool:

A pre-designed, pre-tested and semi-structured proforma was used to collect the data. The proforma comprised of four parts:

- a) Socio-demographic variables: age and sex of child, type of family, educational status of mother, birth order and socio-economic status
- b) Infant feeding practices: feeding of colostrum, exclusive breast feeding and complementary feeding
- c) Immunization history of child
- d) Anthropometric measurements of child

Data collection:

All the anganwadis were visited and all the anganwadi workers were informed about the purpose and procedure of the study. Anganwadi workers were asked to inform and motivate mothers/guardians of all the children under 5 years of age attending anganwadis to come on a particular day along with immunization cards of children if there, and the anganwadis were revisited on that day. Mothers/guardians of children were interviewed after taking written informed consent from them after explaining them the purpose of study in local language (Kannada).

Socio-economic status was determined by using modified B.G Prasad's classification. Immunization status of children was assessed after examining the immunization cards where available, otherwise the immunization history obtained from mothers/guardians was cross checked with documents in the anganwadi centre. A child who has taken all the age appropriate vaccines according to the National Immunization Schedule was considered as 'fully immunized'. A child who has taken some of the recommended vaccines but not all, was considered 'partially immunized'.

After taking preliminary information from the mother, every child was subjected to anthropometric measurements, i.e., weight and height, following standard methods, to assess nutritional status. Weight was measured without any footwear and with minimal clothing nearest to 0.1 kg using a standard portable weighing machine. Standing height was measured without any footwear to nearest 0.5 cm using a standard calibrated bar. The children were made to stand straight with heels, buttocks, shoulders and back of head touching the rod. Head was held comfortably erect with the lower border of orbit of the eye in the same horizontal plane as the external canal of the ear and the arms hanging loosely by the sides with palms facing the thigh. The headpiece was then lowered gently making contact with the top of head. Subsequently, the children were categorized on the basis of their weight-for-age, height-for-age and weight-for-height as per WHO International Growth Standards 2006 generated for boys and girls aged 0 to 60 months. Children were considered underweight, stunted and wasted if their weight-for age, height-for-age and weight-for-height z-scores were below -2.0 SD of the WHO standards.

Statistical analysis:

Data was analyzed using Epi Info software version 7. Chi square test was used to test the significance. The level of significance was set at p < 0.05.

Ethical consideration:

Ethical approval was taken from Institutional Ethics Committee to conduct the study.

RESULTS:

Table 1 shows that out of total 285 children (aged 2 – 5 years) studied, 134 were males and 151 were females. Maximum children belonged to the age group 3 - 4 years (40.4%), followed by 4 – 5 years (34%), and 2 – 3 years (25.6%). The overall prevalence of underweight, stunting and wasting was found to be 42.5%, 38.6% and 28.8% respectively. Prevalence of all kinds of undernutrition was found to be more among children aged 2-3 years (underweight 61.6%, stunting 52.1% and wasting 48%). Prevalence of underweight, stunting and wasting increased with increasing age in the age group of children 2 - 5 years, and this association was found to be statistically significant (p-value<0.01) in terms of prevalence of underweight and wasting. Prevalence of underweight, stunting and wasting was found to be more among female children (underweight 52.3%, stunting 42.4% and wasting 35.1%) as compared to male children, and the difference between males and females was statistically significant in terms of prevalence of underweight and wasting. Prevalence of all kinds of undernutrition was more among children living in joint families (underweight 65.6%, stunting 61.3% and wasting 45.2%) as compared to children living in three generation and nuclear families and the difference was found to be statistically significant. Significant association was observed between the literacy status of mother and prevalence of all kinds of undernutrition. Prevalence of all kinds of undernutrition was more among children of mothers who were illiterate (underweight 68.8%, stunting 62.5% and wasting 50%). Prevalence of underweight, stunting and wasting decreased as the level of education of the mothers increased. Prevalence of all kinds of undernutrition was more among children having birth order ≥ 3 (underweight 85%, stunting 79.2% and wasting 66%). Prevalence of underweight, stunting and wasting decreased with the decrease in birth order of children and the association was found to be statistically significant (p-value<0.001). The association between socio-economic status and prevalence of all kinds of undernutrition was found to be statistically significant. Prevalence of all kinds of undernutrition was more among children of families belonging to lower socio-economic status (underweight 75%, stunting 75% and wasting 75%) as compared to children of families belonging to higher socioeconomic classes.

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Socio-	Children	Underweight	Stunting	Wasting		
demographic	observed	No. (%)	No. (%)	No. (%)		
characteristics	No. (%)					
Age (in years)						
2 - 3	73 (25.6)	45 (61.6)	38 (52.1)	35 (48.0)		
3 - 4	115 (40.4)	54 (47.0)	41 (35.7)	30 (26.0)		
4 - 5	97 (34.0)	(22.7)	31 (32.0)	17 (17.5)		
Total	285	121 (42.5)	110	82 (28.8)		
	(100.0)		(38.6)			
		χ2=11.6	χ2=4.03-	χ2=10.6		
		p-	P	P-		
		value<0.01	value>0.	value<0.		
			05	01		
Gender						
Male	134 (47.0)	42 (31.3)	46 (34.3)	29 (21.6)		

Table 1: Nutritional status of children in relation to socio-
demographic characteristics(n=285)

10101111 110,	10001 01, 3			
Female	151 (53.0)	79 (52.3)	64 (42.4)	53 (35.1)
Total	285(100.0)	121 (42.5)	110 (38.6)	82 (28.8)
		$\chi 2 = 5.24$	χ2=0.87	χ2=3.5
		p-	p-	p-
		value<0.05	value>0.05	value<0.01
Type of fam	ily			
Nuclear	76 (26.7)	17 (22.4)	16 (21.1)	9 (11.8)
Three	116 (40.7)	43 (37.1)	37 (31.9)	31 (26.7)
Generation				
Joint	93 (32.6)	61 (65.6)	57 (61.3)	42 (45.2)
Total	285	121 (42.5)	110 (38.6)	82 (28.8)
	(100.0)	$\gamma 2 = 13.97$	$\gamma 2 = 14.16$	$\gamma 2 = 3.5$
		p-	p-	p-
		value<0.00	value<0.001	value<0.01
		1		
Education of	of mother	1	1	1
Illiterate	16 (5.6)	11 (68.8)	10 (62.5)	8 (50.0)
Primary	55 (19.3)	34 (61.8)	31 (56.4)	26 (47.3)
Middle	89 (31.2)	46 (51.7)	48 (54.0)	38 (42.7)
High	121 (42.5)	30 (24.8)	21 (17.4)	10 (8.3)
Diploma	4 (1.4)	0 (0)	0 (0)	0 (0)
Total	285	121 (42.5)	110 (38.6)	82 (28.8)
	(100.0)	$\sqrt{2-19.9}$	$\sqrt{2-215}$	$\sqrt{2-27.8}$
	(,	χ2-19.9	$\chi^2 = 21.5$	χ2-27.8 D-
		value < 0.01	$v_{\alpha} = 0.001$	
			Value (0.001	1
Birth order				-
1	87 (30 5)	17(195)	12 (13.8)	8 (9 2)
2	145 (50.9)	59 (40 7)	56 (38 6)	39 (26 9)
~ 3	53 (18 6)	45 (85.0)	42 (79.2)	35 (66 0)
Total	285(100.0)	121 (42 5)	110 (38.6)	82 (28.8)
10101	200(100.0)	121(42.5)	110(30.0)	$\frac{02}{2}$
		χ2-21.2 4	χ2-24.04 D-	$\chi 2 - 20.10$
			p^{-}	
		01	Value <0.001	1
Serie eren				-
Jocio-econo	$\frac{1}{21} \frac{1}{7} \frac{1}{4}$	1 (1 9)	1 (1 0)	1 (1 9)
upper	21 (7.4)	1 (4.0)	1 (4.0)	1 (4.6)
Upper	110 (38.6)	28 (25.5)	21 (19.1)	21 (19.1)
middle	1 40 440 1	00 (50 0)	F0 (F0 ()	50 (05 0)
Lower	140 (49.1)	83 (59.3)	79 (56.4)	53 (37.9)
middle	10 (0 5)	0 (00 0)	0 (00 0)	4 (40, 0)
Upper	10 (3.5)	ь (р.п)	ь (ьџ.џ)	4 (40.0)
lower	4 (1 4)	0 (75 0)	0 (75 0)	0 (75.0)
Lower	4 (1.4)	3 (/3.0)	3 (75.0)	3 (75.0)
Total	285 (100.0)	121 (42.5)	110 (38.6)	82 (28.8)
		$\gamma 2 = 19.6$	$\gamma 2 = 24.4$	$\gamma 2 = 11.9$
		p-	p-	p-
		value<0.01	value<0.001	value<0.05

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Table 2 shows that children who were not colostrum fed showed high prevalence of all kinds of undernutrition (underweight 56.4%, stunting 41% and wasting 39.1%) as compared to children who received colostrum, and this association was found to be statistically significant in terms of prevalence of underweight and wasting. Exclusive breast feeding for six months has a definite role in undernutrition as children who received exclusive breast feeding for six months showed low prevalence of all kinds of undernutrition as compared to children who did not receive exclusive breast feeding for six months (p-value<0.001). Prevalence of all kinds of undernutrition was found to be more among children who were initiated on complementary feeds inappropriately i.e. at less than 6 months of age (underweight 51.4%, stunting 52.1% and wasting 34.1%) as compared to children who were initiated on complementary feeds appropriately i.e. at ≥ 6 months of age, and the difference was found to be statistically significant in terms of prevalence of underweight. Prevalence of all kinds of undernutrition was found to be more among

children who were partially immunized (underweight 70.7%, stunting 83% and wasting 70.7%) as compared to children who were completely immunized and the difference was found to be statistically significant.

Table 2: Nutritional status of children in relation to infant feeding practices and immunization status (n=285)

	Children	Underweight	StuntingNo.	Wasting No.				
	observed	No. (%)	(%)	(%)				
	No. (%)							
I. Infant feeding practices								
Colostrum feeding								
Yes	129 (45.3)	33 (25.6)	42 (32.6)	21 (16.3)				
No	156 (54.7)	88 (56.4)	68 (43.6)	61 (39.1)				
Total	285 (100.0)	121 (42.5)	110 (38.6)	82 (28.8)				
		χ2=11.46	χ2=1.62 p-	χ2=10.88				
		p-value<0.001	-value>0.05	p-value<0.01				
Exclusive breast feeding								
Given	176 (61.8)	31 (17.6)	42 (23.9)	32 (18.2)				
Not	109 (38.2)	90 (82.6)	68 (62.4)	50 (45.9)				
given								
Total	285 (100.0)	121 (42.5)	110 (38.6)	82 (28.8)				
		χ2=44.38	χ2=17.83 p-	χ2=13.4 p-				
		p-value<0.001	value<0.001	value<0.001				
Initiation of complementary feeding								
Appr	112 (39.3)	32 (28.6)	39 (34.8)	23 (20.5)				
opriat								
Inapp	173 (60.7)	89 (51.4)	71 (41.0)	59 (34.1)				
ropri			•					
ate								
Total	285 (100.0)	121 (42.5)	110 (38.6)	82 (28.8)				
		$\gamma 2 = 6.13$	γ2=0.49 p-	$\gamma 2 = 3.46$				
		p-value < 0.05	value > 0.05	p-value>0.05				
II. Immunization status								
Partia	41 (14.4)	29 (70.7)	34 (83.0)	29 (70.7)				
1								
Com	244 (85.6)	92 (37 7)	76 (31-1)	53 (21 7)				
plete	211 (00.0)	02 (07.77)	, 0 (01.1)	00 (21.77				
Total	285 (100.0)	121 (42.5)	110 (38.6)	82 (28.8)				
		$x^2 = 5.46$	$\gamma^2 = 14.09 \text{ p}_{-1}$	$\gamma^2 = 18.16 \text{ p}_{-1}$				
		$n_{value} < 0.05$	$v_{\alpha} = 1.00 p^{-1}$	value < 0.001				
		P 10100 \0.00	, and < 0.001	, and < 0.001				

DISCUSSION:

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The Integrated Childhood Development Services (ICDS) Scheme developed with the concept of providing a package of services is based primarily on the consideration that the overall impact will be much larger if the different services develop in an integrated manner as the efficacy of a particular service depends upon the support it receives from related services delivered through public health infrastructure mainly in the anganwadi centres under the Ministry of Health and Family Welfare. This is at present India's response to the challenge of breaking the vicious cycle of malnutrition, morbidity, reduced learning capacity and mortality. Services include supplementary feeding, growth monitoring, prophylaxis against vitamin A deficiency, immunization, referral services and non-formal pre-school education.[10] The present study has focussed on under 5 children in such anganwadi centres and thereby strives to study the impact of ICDS services in the rural community.

In the present study, the overall prevalence of underweight, stunting and wasting was found to be 42.5%, 38.6% and 28.8% respectively. According to a study of Murarkar S et al in urban slums and rural area of Maharashtra, 35.4% under-five children were underweight, 45.9% were stunted and 17.1% were wasted.⁽¹¹⁾ Prevalence of all kinds of undernutrition was found to be more among children aged 2 – 3 years. Prevalence of underweight, stunting and wasting increased with

increasing age in the age group of children 2 - 5 years, and this association was found to be statistically significant (pvalue<0.01) in terms of prevalence of underweight and wasting. According to a study conducted by Islam S et al among under-5 children belonging to tribal population of Assam, prevalence of underweight was highest in the age group 48-60 months, stunting was also highest among the children aged 48-60 months, and wasting was found to be most prevalent in the age group 24-36 months, and the difference in prevalence of all kinds of malnutrition in the various age groups was found to be statistically significant (p < 0.05).^[12] Prevalence of underweight, stunting and wasting was found to be more among female children as compared to male children, and the difference between males and females was statistically significant in terms of prevalence of underweight and wasting. A study conducted by Joshi HS et al in rural community of Bareilly found high prevalence of undernutrition in female children as compared to male children.^[13] Prevalence of all kinds of undernutrition was more among children living in joint families as compared to children living in three generation and nuclear families and the difference was found to be statistically significant. According to a study conducted by Nayak RK et al, prevalence of stunting and wasting was found to be high among children living in joint families as compared to children of nuclear families.^[14] Prevalence of all kinds of undernutrition (underweight, stunting and wasting) was more among children of mothers who were illiterate. Significant association was observed between the literacy status of mother and prevalence of all kinds of undernutrition. Similarly, according to a study conducted by Sonkaria L et al in rural field practice area of Jaipur, undernutrition was found maximum in illiterate mothers and difference in proportion of undernourished children as per maternal educational level was found significant (p < 0.05).^[15] Prevalence of all kinds of undernutrition was more among children having birth order \geq 3. Prevalence of underweight, stunting and wasting decreased with the decrease in birth order of children and the association was found to be statistically significant (pvalue<0.001). A study of Baranwal K et al in urban slum area of Varanasi reported that prevalence of Protein Energy Malnutrition increased with the increase in birth order.¹⁷ According to a study of Shukla N et al in rural area of Madhya Pradesh, prevalence of underweight and wasting was significantly higher among children belonging to higher birth order i.e. ≥ 4 .^[17] The association between socio-economic status and prevalence of all kinds of undernutrition was found to be statistically significant. Prevalence of all kinds of undernutrition was more among children of families belonging to lower socio-economic status as compared to children of families belonging to higher socio-economic classes. A statistically significant association between low socio-economic status and underweight was found in a study conducted by Purohit L et al.[18] A study conducted by Chakravarthy K et al in South India revealed that children belonging to low socio-economic status were more malnourished.[19]

In the present study, children who were not colostrum fed showed high prevalence of all kinds of undernutrition as compared to children who received colostrum, and this association was found to be statistically significant in terms of prevalence of underweight and wasting. Children who received exclusive breast feeding for six months showed low prevalence of all kinds of undernutrition as compared to children who did not receive exclusive breast feeding for six months (p-value<0.001). A study conducted by Meena S et al in anganwadi centres of Madhya Pradesh reported that children who received colostrum showed low prevalence of malnutrition (p-value<0.001) and children who received exclusive breast feeding for six months showed low prevalence of malnutrition as compared to children who did

not receive exclusive breast feeding for six months (pvalue<0.001).[20] Prevalence of underweight, stunting and wasting was found to be more among children who were initiated on complementary feeds inappropriately i.e. at less than 6 months of age as compared to children who were initiated on complementary feeds appropriately i.e. at or immediately after 6 months of age, and the difference was found to be statistically significant in terms of prevalence of underweight. A study done in 4 selected anganwadi areas in Uttar Pradesh by Kumar D et al found improper complementary feeding to be a significant (p<0.05) risk factor for underweight.^[21] A study of Shukla N et al in rural area of Madhya Pradesh reported significantly higher proportion of malnutrition among children in whom weaning was started either very early or very late.[17] Prevalence of all kinds of undernutrition was found to be more among children who were partially immunized as compared to children who were completely immunized and the difference was found to be statistically significant. According to a study of Shukla N et al, the proportion of children with partial immunization were also found to be more malnourished.[17] Mishra K et al also found incomplete immunization as significant risk factor for malnutrition.[22]

CONCLUSION:

The prevalence of undernutrition was high in the study population thus highlighting yet again that undernutrition continues to be a public health burden. Multi-pronged approaches like maternal and child health care, nutrition education, growth monitoring will be beneficial to combat this problem. The practice of exclusive breast feeding, the introduction of timely complementary feeding, standard case management of diarrhoea and acute respiratory infections (ARIs) are required to reduce malnutrition of under-five children.

Declaration:

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Conflict of Interest: Nil

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