Comparison of Nutritional Status and Factors of Malnutrition among the Tribal and Non-Tribal Children (1-5 Years) Attending ICDS Centers in a Selected District, West Bengal

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***Abstract*: Malnourishment causes nearly half of the deaths of children under five years globally. The objective of this descriptive study was to identify and compare the nutritional status, the factors of malnutrition and the association between the malnutrition and selected demographic variables among 1-5 years tribal and non-tribal children attending ICDS centers in Dakshin Dinajpur district, West Bengal. The conceptual framework was based on Nola Pender's Health Promotional Model. 140 participants, each from tribal and non-tribal population were selected by non-probability purposive sampling technique. Semi-structured interview schedules and anthropometric measurements for children were used for data collection. The study findings showed that malnutrition among tribal under five children (21.43%) was higher than non-tribal under five children (17.86%). Factors such as low socio-economic class, poor child feeding practice, disease conditions within last one month and poor environmental sanitation were directly linked with the child's malnutrition. Statistically significant association was found between nutritional status and age of tribal children (p=0.009), birth weight (p=0.005, p=0.01) and mother's age (p=0.01, p=0.008). The study concluded that malnutrition was more among tribal children when compared to non-tribal children. The study recommended future researches regarding its generalization, assessment of practices of Anganwadi workers and inclusion of over nutrition.**

***Keywords*: Nutritional status, Malnutrition, Comparison, Tribal children, Factors.**

1. Introduction

Nutrition is a critical part that has great influence on health and development. Good nutrition results in improved infant, child and maternal health, stronger immune systems, safe pregnancy and childbirth and other biological functions of the body. Malnutrition presents significant threats to human health. Today the world faces a double burden of malnutrition that includes both under nutrition and overweight, especially in low- and middle-income countries. The tribal population of India as per 2011 census covers 8.6% of the total population in India. Almost 40% of the under-five tribal children are stunted, 16% are severely stunted. Though percentage of mild and moderate stunting are same among tribal and non-tribal children but Stunting is higher among tribal children (16%) than non-tribal children (9%).

The World Bank narrated that India is one of the highest ranking countries in the world for the number of children suffering from malnutrition. According to 2017 Global Hunger Index (GHI) Report by IFPRI ranked India 100th out of 118 countries with a serious hunger situation. The 2019 Global Hunger Index (GHI) report shows India's rank 102nd out of 117 countries with a serious issue of child wasting. At least one in five under 5 children in India are wasted. And a child in India is in risk of malnutrition than some other African countries. Poor sanitation is among the causes of malnutrition in India as per many studies.

2. Research Methodology

A. Setting of the study

The study was conducted at eleven ICDS centres under Tapan Block, Dakshin Dinajpur district.

1) Research variables

- Nutritional Status
- Factors of malnutrition

B. Research Design

1) Descriptive survey research design

Sample

1-5 yrs age group of children of both tribal and non-tribal community attending ICDS centres in Tapan Block of Dakshin Dinajpur district, West Bengal.

2) Sample Size

280 children, 140 tribal and 140 non-tribal 1-5 years children along with their mothers were selected.

Fig. 1. Title of the figure with 8 pt. size

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C. Power Analysis

$$n = t^2 \times \frac{p(1-p)}{m^2}$$

$$= \frac{(1.96)^2 \times 0.164\,(1-0.164)}{(0.05)^2}$$

$$= 210$$

Here,
n= required sample size, t = confidence level at 95% (standard / Z value) = 1.96, p =16.4 % (prevalence of wasting in Dakshin Dinajpur district as per NFHS-4 data, m = margin of error at 5% (standard value = 0.05)

D. Sampling Technique

Non-probability purposive sampling technique was adopted to select the children.

E. Ethical Consideration

- Ethical permission was obtained from the IPGME & R Research Oversight Committee (Institutional Ethics Committee) of IPGME & R and SSKM Hospital.
- Written consent was taken from mothers of each participant.

Table 1
Data collection tools and techniques

Tool No.	Name of the tool	Variables to be measured	Technique
Tool I	Semi structured interview schedule	Demographic variable	Interviewing
Tool II	Nutritional assessment schedule	Nutritional status of children	Anthropometri measurement
Tool III	Semi structured interview schedule	Factors of malnutrition	Interviewing.

F. Validity

The content validity was obtained by giving the tools to 9 experts. The experts were selected on the basis of experience to related fields and interest in the problem area.

G. Reliability

The reliability of Tool II had been established by using Inter-rator reliability method. The inter-rator coefficient was 1 which suggests that the tool is reliable for the study.

For Tool I and Tool III as the questionnaire items were regarding characteristics of the participants and their dietary habit and sanitary practices, the tools were used to collect observed data. So in practical no reliability or pre-testing of the tools were required as suggested by different experts. The tools were modified with the help of vigorous literature review of studies conducted in the same state having same objectives, results of pilot study and later verified by experts.

3. Results and Interpretations

Data presented in table 2 depicts that most of the tribal children (32.86%) and non-tribal children (38.57%) were from the age group of 12-23 months. Most of the tribal children (60%) and non-tribal children (55.71%) were male. The table also depicts that 40% of the tribal children and 44.29% of the non-tribal children were female.

Table 2
Frequency and percentage distribution of participant according to age and gender

n=280 (140+140)

Variable	Tribal		Non-tribal	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Age in month				
12-23	46	32.86	54	38.57
24-35	16	11.43	28	20
36-47	43	30.71	30	21.43
48-59	35	25	28	20
Gender				
Male	84	60	78	55.71
Female	56	40	62	44.29

Table 3
Frequency and percentage distribution of participant according to religion, birth order and type of birth of the children

n=280 (140+140)

Variable	Tribal		Non-tribal	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Religion				
Hinduism	137	97.86	121	86.43
Islam	nil	-	19	13.57
Christian	03	2.14	nil	-
Birth Order				
1st	81	57.86	73	52.14
2nd	49	35	54	38.57
3rd	07	05	12	8.57
4th and above	03	2.14	1	0.71
Type of Birth				
Single	137	97.86	136	97.14
Multiple	03	2.14	04	2.86

Majority of the tribal children (97.86%) and the non-tribal children (86.43%) were Hindu. Table 4 represents that 13.57% of the non-tribal children were Islam and 2.14% of the tribal children were Christian.

The data presented in the table 3, depicts that most of the tribal children (57.86%) and non-tribal children (52.14%) had 1st birth order. Similarly, 35% of the tribal and 38.57% of the non-tribal children had 2nd birth order. The table also shows that 5% of the tribal and 8.57% of the non-tribal children had 3rd birth order. Only 2.14% of the tribal children and 0.71% of the non-tribal children had birth order of 4th and above. Majority of the tribal (97.86%) and non-tribal (97.14%) mothers had single birth. Only 2.14% of the tribal and 2.86% of the non-tribal mothers had multiple birth.

Table 4
Frequency and percentage distribution of participants according to birth weight, place of delivery and no. of under 5 children in the family

n=280 (140+140)

Variable	Tribal		Non-tribal	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Birth Weight (in K.g)				
<2.5	49	35	43	30.71
2.5-3.5	91	65	97	69.29
Place of delivery				
Home	22	15.7	20	14.29
Institution	118	84.3	120	85.71
No. of under-5 children in the family				
1	101	72.14	109	77.86
2	37	26.43	26	18.57
3 and above	02	1.42	05	3.57

Most of the tribal children (65%) and non-tribal children (69.29%) had birth weight between 2.5-3.5 k.g. The table also depicts that 35% of the tribal children and 30.71 % of the non-tribal children had low birth weight.

Most of the tribal (84.3%) and non-tribal children (85.71) had institutional delivery. The table shows that 15.7% of the tribal children and 14.29% of the non-tribal children delivered at home.

Most of the tribal (72.14) and non-tribal (77.86) children had only one under five children in the family. Data presented in Table 5 shows that 18.57% of the tribal and 26.43% of the non-tribal children had two under five children in their family. For 1.42% of the tribal children and 3.57% of the non-tribal children there were three and above number of under five children in the family.

Table 5
Frequency and percentage distribution of mothers according to socio-economic class of the family

n=280 (140+140)

Variable	Tribal		Non-tribal	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Socio-economic class of the family (According to Modified B G Prasad's Scale 2020)				
I	nil	-	04	2.86
II	nil	-	03	2.14
III	11	7.86	16	11.43
IV	32	22.85	42	30
V	97	69.29	75	53.57

Most of the tribal families (69.29%) and non-tribal families (53.57%) belonged to lower socio-economic class (class V). Only 2.86 % and 2.14% families of the non-tribal children belonged to socio-economic class I and class II respectively. The table also shows that 7.86% of the tribal families and 11.43% of the non-tribal families belonged to socio-economic class III. Among all 22.85% of the tribal families and 30% of the non-tribal families belonged to socio-economic class IV.

Table 6
Frequency and percentage distribution of participants according to nutritional status

n=280 (140+140)

Variable	Tribal		Non-tribal	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Normal anthropometric measurement	110	78.57	115	82.14
Malnutrition	30	21.43	25	17.86

The above table depicts that only 78.57% of the tribal and 82.14% of the non-tribal children had normal anthropometric measurement.

The table also represents that 21.43% of the tribal children and 17.86% of the non-tribal children were suffering from malnutrition.

Table 7
Frequency and percentage distribution of children according to type of malnutrition

n_1= 55 (30+25)

Nutritional status	Tribal		Non-tribal	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Wasted only	08	26.68	05	20
Stunted only	07	23.33	03	12
Underweight only	03	10	04	16
Wasted and underweight	04	13.33	04	16
Stunted and underweight	07	23.33	06	24
Wasted, stunted and underweight	01	3.33	03	12

The above table depicts that 26.68% of the tribal children and 20% of the non-tribal children were only wasted.

Table 7 also shows that 23.33% of the tribal children and 12% of the non-tribal children were only stunted.

Similarly, 10% of the tribal children and 16% of the non-tribal children were only underweight.

Data presented in above table also shows that 13.33% of the tribal children and 16% of the non-tribal children were wasted and underweight both.

The table also shows that 23.33% of the tribal and 24% of the non-tribal children were stunted and underweight both.

Only 3.33% of the tribal children and 12% of the non-tribal children were wasted, stunted and underweight altogether.

Table 8
Frequency and percentage distribution of participants according to nutritional status measured by mid upper arm circumference

n=280 (140+140)

Nutritional status	Tribal		Non-tribal	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Normal (>13.5cm)	99	70.7	112	80
At risk of acute malnutrition (12.5-13.5cm)	41	29.3	28	20

Data presented in above table shows that 70.7% of the tribal and 80% of the non-tribal children had normal nutritional status.

The above table also shows that 29.3% of the tribal and 20% of the non-tribal children were at risk of acute malnutrition.

Table 9
Percentage distribution of length/height of male tribal and non-tribal children based on their mean

n= 280 (140+140)

Age	Tribal length/ height			Non-tribal length/ height		
	Mean	≥ Mean (%)	<Mean (%)	Mean	≥ Mean (%)	<Mean (%)
12-23 months	77.31	6.43	14.28	76.79	15	10
24-35 months	85.72	4.29	3.57	87.18	4.29	4.29
36-47 months	94.5	9.29	7.85	96.64	05	7.85
48-59 months	100.35	6.43	7.86	102.15	3.57	5.71

The above table represents that 14.28% of the tribal male children of 12-23 months' age group had length which was below the calculated mean (77.31) and 6.43% of the male tribal children of the same age group had length which was at and above the mean. Similarly, 15% of the male non-tribal children had length at and above the calculated mean (76.79) and 10% of them had length below the calculated mean.

Data presented in above table shows that 4.29% of the male tribal children of 24-35 months had height at and above the mean (85.72) and 3.57 % of them had height below the mean. Percentage of male non-tribal children of 24-35 months' age group was equal in both below the mean and at and above the mean category which was 4.29%.

Heights of 9.29 % of the tribal male children of 36-47 months' age group were at and above the calculated mean (94.5). About 7.85% of non-tribal male children of 36-47 months' age group had height which was below the mean (96.64).

Heights of 7.86% of the tribal male children and 5.71% of the male non-tribal children of 47-59 months' age group were lower than the calculated mean (100.35 and 102.15 respectively).

Table 10
Percentage distribution of length/height of female tribal and non-tribal children based on their mean

n= 280 (140+140)

Age	Tribal Length/ height			Non-tribal Length/ height		
	Mean	≥ Mean (%)	<Mean (%)	Mean	≥ Mean (%)	<Mean (%)
12-23 months	75.88	5.71	6.43	77.60	5.71	7.86
24-35 months	87.2	1.43	2.14	86.2	5.71	5.72
36-47 months	93.4	6.43	7.14	92.08	2.14	6.44
48-59 months	99.73	6.43	4.3	99.93	5.71	05

The above table represents that 6.43% of the tribal female children and 7.86% of the female non-tribal children of 12-23months age group had lengths which were below the calculated means (75.88 and 77.60 respectively). Heights of 5.71% of the tribal and 5.71% of the non-tribal children of the same age group were at and above the calculated means.

Height of 2.14% of the female tribal children of 24-35 months was below the mean (87.2) and 1.43% of the female tribal children had height which was at and above the mean. Percentage of female non-tribal children of 24-35 months' age group was equal (5.72%) in both below the mean and at and above the mean category (86.2).

Heights of 6.43% and 2.14% of the tribal and non-tribal female children of 36-47 months' age group were at and above their calculated means (93.4 and 92.08 respectively). Heights of 7.14% of the female tribal children and 6.44% of the female non-tribal children of 36-47 months' age group were below the calculated means.

Data presented in Table 13 shows that 6.43% of the tribal female children and 5.71% of the female non-tribal children of 47-59 months' age group had height which were at and above the calculated mean. For 4.3% of the tribal and 5% of the non-tribal children heights were below their calculated mean.

Table 11
Percentage distribution of weight of male tribal and non-tribal children based on their mean

n= 280 (140+140)

Age	Tribal Weight			Non-tribal Weight		
	Mean	≥ Mean (%)	<Mean (%)	Mean	≥Mean (%)	<Mean (%)
12-23 months	8.91	7.86	12.86	9.18	9.29	15.71
24-35 months	10.75	3.57	4.3	10.88	4.3	4.3
36-47 months	12.80	10.71	6.43	13.24	7.85	05
48-59 months	13.76	5.71	8.57	14.11	3.56	5.70

The above table represents that 7.86% of the tribal and 9.29% of the non-tribal children of 12-23 months' age group had weights which were at and above the calculated means (8.91 and 9.18 respectively). Weights of 12.86% of the tribal male children and 15.71% of the non-tribal male children of 12-23 months' age group h were below the calculated means.

For 4.3% of the male tribal children of 24-35 months' weight was below the calculated mean (10.75). Percentage among male non-tribal children of 24-35 months' age group was equal in both below the calculated mean (10.88) weight and at and above the mean weight category which is 4.3%.

For 10.7% of the tribal male children and 7.85% of the male non-tribal children of 36-47 months' age group weights were at and above the calculated mean (12.81 and 13.24 respectively). Similarly, 6.43% of the male tribal children and 5% of the male non-tribal children had weights which were below their

calculated means.

Data presented in the above table reveals that 5.71% of the tribal male children and 3.56% of the male non-tribal children of 47-59 months' age group had weights which were at and above the calculated means (13.76 and 14.11 respectively). Similarly, 8.57% of the tribal children and 5.7% of the non-tribal children had weights which were below their calculated means.

Table 12
Percentage distribution of weight of female tribal and non-tribal children based on their mean

n= 280 (140+140)

Age	Tribal			Non-tribal		
	Weight			Weight		
	Mean	≥ Mean (%)	<Mean (%)	Mean	≥ Mean (%)	<Mean (%)
12-23 months	8.42	6.43	5.71	8.7	05	8.57
24-35 months	10.2	2.14	1.43	10.79	4.29	7.14
36-47 months	12.23	7.14	6.43	12.13	2.86	5.71
48-59 months	13.33	05	5.71	13.33	7.14	3.58

The above table represents that 6.43% of the tribal and 5% of the non-tribal female children of 12-23 months' age group had weights which were at and above the calculated mean (8.42 and 8.7 respectively). For 5.71% of the tribal female children and 8.57% of the non-tribal female children of 12-23 months' age group weights were below their calculated means.

Data presented in the above table shows that 1.43% of the female tribal children of 24-35 months had weights which were below the calculated mean (10.2). For 7.14% of the female non-tribal children of the same age group had weights which were below the calculated mean (10.79). Similarly, 2.14% of the tribal and 4.29% of the non-tribal female children had weights which were at and above their calculated means.

Weights of 7.14% of the tribal male children and 2.86% of the female non-tribal children of 36-47 months' age group were at and above the calculated mean (12.23 and 12.13 respectively). Similarly, 6.43% of the female tribal children and 5.71% of the female non-tribal children had weights which were below their calculated means.

The above table represents that 5% of the tribal female children and 7.14% of the female non-tribal children of 47-59 months' age group had weights which were at and above the calculated means (13.33 and 13.33 respectively). For 5.71% of the tribal children and 3.58% of the non-tribal children weights were below their calculated means.

Table 6 represents that for 10% of the tribal children breast feeding was initiated after 60 minutes of birth.

Only 6.67% of the tribal children and 8% of the non-tribal children were given honey as pre-lacteal feed.

Table 13
Frequency and percentage distribution of practices related to child feeding

n_1=55 (30+25)

Variable	Tribal		Non-tribal	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Time of initiation of Breast Feeding (in minute)				
≤ 30	02	6.67	03	12
30-60	25	83.33	22	88
>60	03	10	nil	-
Pre-lacteal Feed				
No	28	93.33	23	92
Honey	02	6.67	02	08

Table 14
Frequency and percentage distribution of practices related to child feeding

n_1=55 (30+25)

Variable	Tribal		Non-tribal	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Exclusive breast feeding given				
Yes	22	73.33	18	72
No	08	26.67	07	28
Duration of breast feeding				
4-6 months	01	3.33	nil	-
6 months-1 year	03	10	01	04
> 1 year	26	86.67	24	96
Age of weaning				
<6 months	05	16.67	05	20
6-8 months	24	80	19	76
> 8 months	01	3.33	01	04

The table also reveals that 26.67% of the tribal children and 28% of the non-tribal children were not given exclusive breast feeding.

Only 3.33% of tribal children had 4-6 months of breast feeding. Breast feeding duration of 6 months to 1 year was continued for 10% of the tribal and 4% of the non-tribal children.

Weaning at less than 6 months' age was started for 16.67% of tribal children and 20% of the non-tribal children. For 3.33% of the tribal and 4% of non-tribal children the weaning was started after 8 months of age.

Table 15
Frequency and percentage distribution of presence of disease among children in last 1 month

n1=55(30+25)

Presence of disease	Tribal			Non-tribal		
	Response			Response		
	Frequency	Percentage (%)	Percentage of respondents (%)	Frequency	Percentage (%)	Percentage of respondents (%)
Absent	03	6.25	10	nil	-	-
Worm infestation	20	41.67	66.67	12	41.38	48
Recurrent diarrhoea	10	20.83	33.33	07	24.14	28
Recurrent common cold and cough	15	31.25	50	10	34.48	40
Total response	48	-	-	29	-	-

(Multiple response table)

Table 16
Chi- square showing association between malnutrition and selected demographic variables of tribal and non-tribal children
n=280(140+140)

n=280(140+140)

	Tribal					Non-tribal				
Variable	Normal	Malnutrition	Total	X^2	P	Normal	Malnutrition	Total	X^2	p
	f	f				f	f			
Age (in months)										
12-23	39	07	46	11.46**	0.009	49	05	54	7.33	0.06
24-35	08	08	16			18	10	28		
36-47	39	04	43			26	04	30		
48-59	24	11	35			22	06	28		
Total	110	30	140			115	25	140		
Birth Weight (in kg.)										
<2.5	32	17	49	7.88**	0.005	30	13	43	6.48*	0.01
2.5-3.5	78	13	91			85	12	97		
Total	110	30	140			115	25	140		
Mother's Age (in years)										
<20	25	15	40	9.17*	0.01	16	10	26	10.74**	0.008
20-25	50	07	57			52	05	57		
>25	35	08	43			47	10	57		
Total	110	30	140			115	25	140		

X^2 (3) =11.34, p<0.01; X^2 (3) =7.815, p>0.05; X^2 (1) = 6.64, p<0.01; X^2 (1) = 3.841, p<0.05; X^2 (2) = 5.99, p<0.05; X^2 (2) = 9.21, p<0.01

Data presented in above table showed that most (20) of the responses of tribal children were regarding worm infestation followed by 15 and 10 responses regarding recurrent common cold and cough and recurrent diarrhoea respectively.

Maximum tribal respondents (66.67%) had suffered from worm infestation followed by recurrent common cold and cough (50%) and recurrent diarrhoea (33.33%).

Most (12) of the responses of non- tribal children were regarding worm infestation followed by 10 and 7 responses regarding recurrent common cold and cough and recurrent diarrhoea respectively.

Maximum non-tribal respondents (41.38%) had suffered from worm infestation followed by recurrent common cold and cough (34.48%) and recurrent diarrhoea (24.14) respectively.

4. Conclusion

On the basis of the data analyzed, it can be concluded that the nutritional status of tribal children was poor than non-tribal children. Identified factors for malnutrition were lack of exclusive breast feeding, delayed weaning, less number of meal and fruit intake etc. Some demographic variables like age of tribal children, birth weight and mother's age had significant association with malnutrition.

5. Implications

A. Nursing research

This study will be a valuable reference material for future research. Research helps the nurses to build up the existing knowledge regarding malnutrition and implement their findings in their day to day life.

As the base of nursing is broadening, its horizon is increasing, so prevention is the best choice and early diagnosis should be done promptly and should have in depth knowledge about malnutrition

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