RESEARCH ARTICLE

Malnutrition Its Determinants And Consequences In Underfive Children Among Urban Areas Of Belagavi, North Karnataka

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ABSTRACT:- **Background:** Malnutrition has become the most common nutritional disorder, and it is one of the main reasons for under-five mortality and morbidity worldwide. In India itself, more than one-third of the global malnourished children are existing. More than half of the children below 3 years are considered underweight among these. It is considered one of the most burning issues, and the common effect of malnutrition is in the form of late physical growth and intellectual development. **Objectives:** to assess the determinants and consequences of malnutrition among under-five children in urban areas. **Methods:** This was a cross-sectional study with a key informant interview to identify the determinant factors of malnutrition. Four hundred and sixty children with their mothers were participated in the study. Odds ratio with a 95% confidence interval was used to identify the determinants of malnutrition among under-five children using multivariate logistic regression. **Results:** Among 460 children, more than half of the children, 249 (54.13%), was malnourished. Of these 249 children, 142 were female, while 107 were male. Religion, family size, type of family and child's age were significantly associated with malnutrition (P < 0.05). **Conclusion:** malnutrition is one of the major public health problems in India, which affects both physical and mental health of children. Some socioeconomic and demographic factors were significantly found to be associated with the high prevalence of malnutrition.

Keywords: Children, determinants, malnutrition, under five, children, urban areas.

INTRODUCTION & BACKGROUND

In India, under-five child malnutrition is a serious public health issue. The nutritional status of children under five is also being impacted by current dietary changes, which is raising the prevalence of adult non-communicable diseases like obesity, diabetes, hypertension, and coronary heart disease.

In 2017, 815 million people worldwide—11 percent of the total population—were undernourished. Since 1990, when 23% of the population was undernourished, there has been a decrease of 176 million people. Although undernutrition is rarely identified as the cause of death, it accounts for about one-third of pediatric fatalities. An estimated 1.5 million women and children died in 2010, though some estimate that figure could be as high as 3 million. In 2020*, 45.4 million children under five had wasting and 149.2 million were stunted.

One of the most prevalent nutritional disorders in developing nations, malnutrition continues to rank among the leading causes of morbidity and mortality among children under five globally. It is frequently an unseen issue. Young children who are malnourished experience delayed motor development and physical growth.

Given that India has the highest rate of undernourished children worldwide, the nation should develop policies that prioritize lowering social

and health disparities.India's infant and under-five mortality rates have generally decreased over the past ten years, but the nation still has roughly 50% of the world's undernourished children.

In India, 48% of children under five suffer from stunting, 19.8% from wasting, and 42.5% are underweight. Additionally, underweight children were more common in rural areas (38%) than in urban areas (29%). Only roughly 10% of children between the ages of 6 and 23 months were found to be fed a sufficient diet. The report claims that India still consumes unbalanced, unnutritious food, either in the form of micronutrient deficiencies, overnutrition, or undernutrition. The availability of wholesome food in marketplaces is equally important in encouraging the populace to make wise decisions.

Economic inequality is one of the main causes of malnutrition in India. Some population groups have low social status, which causes them to eat a diet that is frequently deficient in both quantity and quality. Malnourished women have a lower chance of giving birth to healthy children. Nutritional deficiencies cause long-term harm to people and society. Nutrition-deficient people have a higher mortality rate due to infectious diseases like pneumonia and tuberculosis than their peers who are better fed.

Among the most successful types of development assistance are initiatives to enhance nutrition. Breastfeeding can lower childhood mortality and malnutrition rates, and initiatives to encourage the practice raise breastfeeding rates. Between the ages of six months and two years, feeding young children (in addition to breast milk) improves their results.

Preventing acute malnutrition in children under two, who are the most susceptible, is another strategy to lessen its impact. Despite significant advancements in the treatment of severe acute malnutrition (SAM), prevention has gotten much less research attention, and there isn't much data to support policies and programs aimed at preventing malnutrition.

Undernourishment causes common childhood diseases to become dangerous for children under five, and more than half of them die as a result. According to the World Health Organization (2013), childhood undernutrition is a serious global health issue that increases the risk of diseases in adulthood, reduces adult work capacity, stunts intellectual development, and causes childhood mortality and morbidity. Mild and moderate undernutrition are the most prevalent types. Children aged 6 to 24 months are most at risk for undernutrition.

MATERIALS AND METHODS

Research design
The research design of a study spells out the basic strategies that researcher adopt to develop evidence that is accurate and interpretable. The research design is the plan or blue print the researcher selects to carry out the study.

The selection of design depends upon the purpose of the study, and variables to be studied. Since the study undertaken was aimed to study the determinants and consequences of malnourished underfive urban children, the research design used for the present study is a cross sectional study.

Sample and setting
The smallest and most fundamental component of the exploration process is the sample, where the majority of the information is gathered, and they are also most expensive. In nursing research studies, individuals are frequently used as case studies to illustrate points. The sample chosen for the present study is underfive children of urban areas of Belagavi.

Research setting
Settings are the more specific places where data collection occurs based on the nature of the research question and the type of information needed to address it. The setting planned for the present study is urban areas of Belagavi.

The rationale behind for selection of above setting for research study is as follows:
- The researcher's familiarity with the setting;
- The availability of study participants; and
- The expected co-operation of participants from the previously mentioned setting.

Sample size
The sample size was calculated from the formula below.

$$\text{Sample size (n)} = \frac{Z^2_{1-\alpha/2}}{d^2} SD^2$$

Where,

Z Sample size (n) = 1 2-a/2 d2

SD2 n –Sample size, Z1-a/2 is one tail standard normal variate assuming sample size at 95% confidence interval (CI),

standard deviation (SD) – 10% error in estimation of the mean, i.e., 10% of SD

"d" is tolerable error – 20% attrition for lost cases, etc.

Considering the above formula the sample size is calculated as 460.

The sample selection was based on the following inclusion and exclusion criteria.

Inclusion criteria

1. Underfive children of urban areas of Belagavi.
2. Underfive children & their mothers who are willing to participate in the study.

Exclusion criteria

1. Children who are physically handicapped.

Study variables

In quantitative study, concepts are usually referred as variables, which are the central building blocks of the study. A variable is any phenomena or characteristic or attribute under study.

The variables undertaken in the present study were:

Socio demographic variables: Age of the mother, Gender of the child, Head of household, Marital status of mother, Religion, Family size, Type of Family and Family income.

Determinants: As per the literature reviewed the factors considered are characteristics like Age of the child, Birth order, Place of delivery, Gestational of the mother during delivery, Breastfeeding status and Sickness status.

Consequences: Variables like Pneumonia, Diarrhea, Fever and Recurrent respiratory tract infections were undertaken.

Data collection Instrument

A predesigned, pretested and validated questionnaires were used to study the determinants and consequences of malnourished underfive children.

Data collection method

Before enrolling the participants, they were given full subject information sheet on which material was explained. The purpose of the study was explained to mothers and consent was taken from every mother. They were also guaranteed that the information would be kept confidential. Anthropometric measurements were taken and predesigned, pretested and validated questionnaires were used to study the determinants and consequences of malnourished underfive children.

Data Analysis

The data obtained was analysed in terms of the objectives of the study, using descriptive and inferential statistics. Initially master datasheet was prepared according to variables and scores obtained for all variables. Information was analysed in accordance with the investigation's purpose. Frequency distributions scores were computed. Association was checked by using chi square test and p values. Multiple logistic regression analysis was used to find out the significant association of variables to assess the determinants and consequences of malnutrition.

Ethical consideration

The institution's ethics committee gave their approval to the research. Formal administrative permission was obtained from KLE Academy of Higher Education &Research (Ref No. KAHER / EC/ 19-20/ 290619008). A detailed permission letter was written to District H e a l t h Officer (DHO) by explaining in detail about the research study and objectives.

RESULTS

Table1: Prevalence of malnutrition among underfive children

Status of malnutrition	No. of children	% of children
No malnourished	211	45.87
Malnourished	249	54.13
Total	460	100.0

Table (1) reveals that more than half of the children 249 (54.13%) being malnourished.

Table 2: Association between characteristics with status of malnutrition

Profile	No malnourished	%	Malnourished	%	Total	%	Chi-square	p-value
Gender								
Male	118	45.91	139	54.09	257	55.87	0.0001	0.9830
Female	93	45.81	110	54.19	203	44.13		
Religion								
Hindu	100	38.76	158	61.24	258	56.09	12.1740	0.0070*
Muslim	73	55.30	59	44.70	132	28.70		
Christian	36	53.73	31	46.27	67	14.57		
Others	2	66.67	1	33.33	3	0.65		
Family size								
1-5members	23	18.55	101	81.45	124	26.96	51.0360	0.0001*
>=6members	188	55.95	148	44.05	336	73.04		
Type of Family								
Nuclear	106	52.48	96	47.52	202	43.91	18.7530	0.0001*
Joint	78	35.94	139	64.06	217	47.17		
Extended	27	65.85	14	34.15	41	8.91		
Age of the child								
6-11 mths	24	30.00	56	70.00	80	17.39	32.2760	0.0001*
12-23 mths	54	36.49	94	63.51	148	32.17		
24-35 mths	55	48.67	58	51.33	113	24.57		
36-47 mths	78	65.55	41	34.45	119	25.87		
Birth order								
1st birth	76	41.30	108	58.70	184	40.00	3.7500	0.2900
2nd birth	94	48.21	101	51.79	195	42.39		
3rd birth	37	52.86	33	47.14	70	15.22		
4th birth	4	36.36	7	63.64	11	2.39		
Gestational age								
<37wks	28	18.06	127	81.94	155	33.70	76.2690	0.0001*
37 wks	116	56.31	90	43.69	206	44.78		
> 37 wks	67	67.68	32	32.32	99	21.52		
Breastfeeding status								
Started immediately	93	48.19	100	51.81	193	41.96	75.9280	0.0001
Started within	78	56.93	59	43.07	137	29.78		

30 min								
Not fed as medically advised	24	100.0	0	0.00	24	5.22		
Started very late	16	15.09	90	84.91	106	23.04		
Daily feeding frequency								
< 5 times	15	21.74	54	78.26	69	15.00	22.1130	0.0001*
5 times	65	57.02	49	42.98	114	24.78		
> 5 times	131	47.29	146	52.71	277	60.22		
Exclusive breastfeeding								
Not given for 6 months	144	56.47	111	43.53	255	55.43		
Given for 6 months	67	32.68	138	67.32	205	44.57	25.8980	0.0001*

Table (2) reveals that Malnutrition was significantly associated with Hindu religion (61.24%) (chi square= 12.17 ,p=0.0070), Family size 1-5 members (81.45%) (chi square=51.03 ,p=0.0001),Nuclear family (chi=18.7530,p=0.0001),6=11 months child (chi=32.2760 ,p=0.0001), Gestational age <37wks (chi=76.2690 ,p=0.0001), daily feeding frequency < 5 times (chi=22.1130,p=0.0001) and Exclusive breastfeeding not given for six months (chi=25.8980 ,p=0.0001) whereas malnutrition was negatively associated with gender of the child, birth order and breastfeeding status.

Table 3: Multiple logistic regression analysis of status of malnutrition by characteristics

Variables	Malnourished	%	Adjusted OR	95% CI for OR		p-value
				Lower	Upper	
Gender						
Male	139	54.09	1.31	0.81	2.11	0.2660
Female	110	54.19	Ref.			
Religion						
Hindu	158	61.24	Ref.			
Muslim	59	44.70	0.40	0.23	0.70	0.0010*
Christian	31	46.27	0.53	0.26	1.05	0.0690
Others	1	33.33	0.33	0.00	35.03	0.6400
Family size						
1-5members	101	81.45	Ref.			
>=6members	148	44.05	3.62	1.97	6.65	0.0001*
Type of Family						
Nuclear	96	47.52	Ref.			
Joint	139	64.06	1.88	0.73	4.79	0.1890
Extended	14	34.15	5.42	2.14	13.70	0.0001*
Age of the child						
6-11 mths	56	70.00	Ref.			
12-23 mths	94	63.51	0.67	0.32	1.40	0.2870
24-35 mths	58	51.33	0.43	0.20	0.92	0.0310*

36-47 mths	41	34.45	0.17	0.08	0.39	0.0001*
Birth order						
1st birth	108	58.70	Ref.			
2nd birth	101	51.79	0.25	0.09	0.74	0.0120*
3rd birth	33	47.14	0.19	0.06	0.60	0.0050*
4th birth	7	63.64	0.12	0.04	0.39	0.0001*
Gestational age						
<37wks	127	81.94	8.95	4.23	18.92	0.0001*
37 wks	90	43.69	1.58	0.85	2.95	0.1490
> 37 wks	32	32.32	Ref.			
Breastfeeding status						
Started immediately	100	51.81	Ref.			
Started within 30 min	59	43.07	0.59	0.34	1.04	0.0670
Not fed as medically advised	0	0.00	-	-	-	-
Started very late	90	84.91	4.99	2.39	10.45	0.0001*
Daily feeding frequency						
< 5 times	54	78.26	3.38	1.79	6.37	0.0001*
5 times	49	42.98	0.68	0.44	1.06	0.0860
> 5 times	146	52.71	Ref.			
Exclusive breastfeeding						
Not given for 6 months	111	43.53	2.69	1.86	3.89	0.0001*
Given for 6 months	138	67.32	Ref.			

Table (3) reveals that Multiple regression analysis which shows that Religion,Family size,Type of family, Age of the child, Birth order, Gestational age, Breastfeeding started very late ,Feeding frequency less than 5 times and Exclusive brestfeeding not given for 6 months are found to be positive and significant, means malnutrition is positively influenced by these variables and these are the determinants of malnutrition.

Table 4: Association between effects of malnutrition with status of malnutrition

Effects of Malnutrition	No malnourished	%	Malnourished	%	Total	%	Chi-square	p-value
Diseases occurring commonly								
Pneumonia	50	59.52	34	40.48	84	18.26	41.7090	0.0001*
Diarrhoea	46	26.59	127	73.41	173	37.61		
Fever with infections	115	56.65	88	43.35	203	44.13		
Presence of illness in last two weeks								
Yes	60	31.75	129	68.25	189	41.09	25.7730	0.0001*
No	151	55.72	120	44.28	271	58.91		
Diarrhoeal episode								
Frequently	53	32.32	111	67.68	164	35.65	18.8530	0.0001

								*
Not frequently	158	53.38	138	46.62	296	64.35		
RTI frequency								
Once a month	111	50.68	108	49.32	219	47.61	33.1710	0.0001*
Twice/thrice a month	16	18.39	71	81.61	87	18.91		
Not frequently	84	54.55	70	45.45	154	33.48		
Total	211	45.87	249	54.13	460	100.00		

Table (4) Malnutrition was significantly associated with Pneumonia (chi=41.7090,p=0.0001), Presence of illness in the last two weeks (chi=25.7730,p=0.0001),Frequent diarrheal episode (chi=18.8530,p=0.0001) and RTI once in a month (chi=33.1710,p=0.0001) at 0.05 level of significance.

Table 5: Multiple logistic regression analysis of status of malnutrition by effects of malnutrition

Effects of Malnutrition	Malnourished	%	Total	95% CI for OR		p-value
				Lower	Upper	
Diseases occurring commonly						
Pneumonia	34	40.48	2.63	1.51	4.59	0.0010*
Diarrhoea	127	73.41	0.88	0.53	1.45	0.6050
Fever with infections	88	43.35	Ref.			
Presence of illness in last two weeks						
Yes	129	68.25	2.19	1.44	3.33	0.0001*
No	120	44.28	Ref.			
Diarrhoeal episode						
Frequently	111	67.68	1.32	0.84	2.07	0.2310
Not frequently	138	46.62	Ref.			
RTI frequency						
Once a month	108	49.32	1.15	0.76	1.74	0.5180
Twice/thrice a month	71	81.61	4.20	2.19	8.05	0.0001*
Not frequently	70	45.45	Ref.			

*p<0.5

Table (5) represents Multiple logistic regression analysis. It showed that Pneumonia, Presence of illness in last two weeks and Occurrence of RTI Twice/thrice a month are found to be positive and significant. It means that Malnutrition is positively influenced by these variables. It concludes that these variables are the consequences of Malnutrition.

DISCUSSION

RESEARCH ARTICLE

The study was conducted in a rapidly expanding metropolis in Karnataka. Despite having access to urban amenities like clean water, electricity and easy access to the media, the respondents still faced a number of issues, including poor water supply, limited electricity, and some environmental pollution.

In the present study 55.87% children were Males and 44.13% children were females. In the and it is also found that 54.09% (OR=1.31,p=0.2660) male children were malnourished, which is not significantly associated. In the present study it is shown that 44.70% (OR=0.40,p=0.0010) Muslim children are malnourished as compared to other religion children and also showed significant association. A study done by Chukwuma et al, in Nigeria states that underweight children (28.6%) in 406 participants are malnourished more as compared with other children.(p=0.835) The same study also depicted that 68 (34.3%) male children are malnourished as compared with female children.($x2=$ 23.2 p=0.000) which was found significant.[70] A case control study done by Ahmad Hossain et al in Nepal on 256 participants which states that male children (AOR = 0.50, 95% CI = 0.27–0.92) are malnourished more as compared to female children.[28] A cross sectional study done in Islamabad reported that gender of the child (30%,) p=0.0001) was significantly associated with nutritional status of the underfive children.[5]A study done in Bone regency states that 53.94% male children are malnourished.[61]A study done by Sakisaka K et al, in Nicaragua states that female gender of the child (OR=1.884, P<0.05) are malnourished more. A study done Daudi et al, reported that female children (49.6%) are less likely to be experience malnutrition as compared to male children [42]

In the present study, Prevalence of Malnutrition among underfive children was more in extended families (34.15%) (OR=5.42, p=0.0001, 95% CI) as compared to nuclear and joint families, were shown to have the strongest association. Similarly children between 24-35 months (51.33%) (OR=0.43,p =0.0310,95%CI) and 36-47 mths (34.45%)

(OR=0.17,p=0.0001) are malnourished more comparatively to other age groups and also shown the significant association. A cross sectional study done by Khan et al, from Pakistan supported that malnutrition was also observed more in children between 2-5 years.[72] (48%) (OR=2.30, p= 0.029) similarly a study done by Ole Tankoi et al also depicted that 24-35 months (OR= 2.22; 95%CI: 0.22-22.3) children experience malnutrition more which supported our study.[18] Our study found that higher the birth order, malnutrition is positively found significant and a community based cross sectional study done in Maharashtra by Purohit et al and others supported this which showed strong statistical significant association.[22] with chi square value 18.5 and p=0.05 level of significance.

It is also found in the current study that breastfeeding started very late after birth is found to be positive and significant. Study done by Abate Awoke et al, in Ethiopia which shows that late initiation of breastfeeding has identified as one important determinant of Malnutrition. [23]

Furthermore, gender inequality within the family and community is a significant socio-cultural factor that contributes to the unequal feeding of female children in these households. A number of studies have contributed to the inequality that demonstrates the reasons behind starvation. Boys are often fed more nutrient-dense food than girls in Indian households, yet our research indicates that boys are nonetheless more likely than girls to be malnourished.

The data from the research suggest that frequent diarrheal episodes (32.32%) (p=0.0001, 0.05 level) are common in children with malnutrition.The present study results also shows that children who are malnourished, tend to experience Frequent RTI's (81.61%) (OR=4.20 ,p=0.0001,95% CI) which is found positive and significant. A study done on 102 cases and 201 controls in North west Ethiopia by Bantamen G et al, represents that 39 (38.23%) of cases and 44(21.89%) of controls had history of diarrheal episode.[49]

Also a study done by Maurice Mhango et al in Zambia depicts that history of Diarrhoea (OR=4.20, 95% CI [1.77,9.95] was significantly associated with Malnutrition.[53]Similarly a case control study in public hospitals of Ethiopia by Adonia Damtew Nebro et al, depicts that history of diarrhea two weeks prior to study survey ((AOR 3.2, 95%CI:1.4-7.2) are more likely to suffer with malnutrition.[24] Similarly a community based cross sectional study done by Sujata Murarkaret al, in Maharashtra also represents that diarrhea (p = 0.001) was associated with malnutrition.[31]

A similar study done by Tomas Zaba et al, in Mozambique also states that Experiencing diarrhoea [(OR) = 4.54; P = 0.001] was the only variable associated with acute malnutrition.[63] A cross sectional study done among 182 malnourished underfive children in Shivamogga by Ravindra B. Patil et al, represents that Malnutrition was responsible for respiratory tract infection (44%) and which was equally distributed in both boys and girls and but the difference was not significant.[51]Similarly a study done by ShailenNandy et al, found that Malnutrition has the impact on development of Respiratory tract infections (OR = 1.39, 95% CI = 1.23–1.58).[75]

CONCLUSION

The aforementioned results of the study indicate that malnutrition affects child's physical and mental health and is a serious public health concern in India. There is a strong relationship between a high prevalence of malnutrition and a few socioeconomic and demographic factors. Male children are slightly more likely than female children to suffer from malnutrition, thus mothers and other caregivers should be made aware of the importance of providing for their children as well as how adopting healthy eating habits can help fight the problems caused by hunger. A mother in good health can give birth to a healthy child. This point of view states that mothers ought to get dietary counseling and have their diets properly assessed on a regular basis. Malnutrition is directly impacted by the creation and enhancement of government policies, with socioeconomic status being viewed as a key determinant. Since children under five are the most weak and underprivileged group policymakers and health programmers need to alter child nutrition policies and interventions to place a greater emphasis on this age group. Policy makers and community leaders can be involved in the development and implementation of health education programs for mothers based on the study's findings.

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