

# Malnutrition Among Preschool Children in Karnataka State: A Geographical Analysis

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## Abstract

Malnutrition refers to a condition which results when the diet does not contain the right amount of nutrients. Under nutrition and over nutrition are the types of malnutrition. Over nutrition arises from excessive intake of nutrients while under nutrition is the result of insufficient intake of energy and nutrients. It is one of the most important global health issues as there is a very high prevalence of malnutrition in developing countries. Every year, millions of children are either disabled or killed by under nutrition. Malnutrition also obstructs millions more children from reaching their full physical and intellectual growth. Main reasons for malnutrition are poverty, socio-economic status of the parents. As per UNICEF report (2006) “The causes of childhood malnutrition are the insufficient diet, frequent infections, poor breastfeeding practices, delayed introduction of complementary foods and inadequate protein in the diet”.

Apart from its adverse effects, malnutrition can be treated with identification and proper management. Though there are many specific programmes like Integrated Child Development Services (ICDS) to combat malnutrition, about two third of the under five children in India are malnourished, among them 5 to 8% are severely malnourished. To reduce the prevalence of malnutrition, its magnitude, causes and effects have to be identified promptly. So that the proper measures to control malnutrition can be implemented. Thus, the present paper makes an attempt to highlight the problem of malnutrition in Karnataka state for which the data sources are largely based on secondary data collected from National Family Health Survey (NFHS-5, 2019-2021), Census of India and online sources etc. Simple methods like charts, graphs and maps have been employed to demonstrate the different degrees of malnutrition in the state.

**Keywords:** Malnutrition, Preschool, Stunting, Wasting and Anemia.

## INTRODUCTION

According to the World Health Organisation (2016), malnutrition is a disorder that stems from deficiencies, excesses or imbalances during a person's intake of energy and nutrients. The term ‘Malnutrition’ encompasses two general classes of conditions. One is under nutrition, which incorporates stunting (low height for age), wasting (low weight for height), and underweight (low weight for age) and micronutrient deficiencies or insufficiencies (a lack of important vitamins and minerals). The second one is non communicable diseases which are linked to overweight, obesity and poor dietary conditions. This type of malnutrition finally leads to heart disease, stroke, diabetes and etc.

## Need for Study

One could assert that malnutrition is one of the pervasive conditions affecting children's health in India because approximately 2/3 of the country's under-five population is malnourished. In India, approximately 75% of the population lives in villages. About 50% of the total rural population still lives below the poverty line. The majority of children in India do not have access to proper nutrition due to their families' extremely low-income level. The majority of these children live in discordant socio-economic backgrounds for example poverty, unsanitary conditions, diseases and other issues which deter their physical and mental growth.

## The Study Area

The state of Karnataka was founded on November 1st, 1956. The geographical area of the state lies between latitudes 11°31'00" N to 18°45'00" N and longitudes 74°12'00" E and 78°41'00" E. Its total geographical area is 1,91,791 sq.km and it is situated along Peninsular India's western coast. Karnataka state is bordered by Goa to its north-west, Maharashtra to its north, Telangana to its north-east, Tamil Nadu to its east, Kerala to its southeast and the Arabian Sea to its west. Karnataka state is the 8th densely populated state in India, with a population of 61,095,297 according to the 2011 census. The state's population density is 319 persons per sq.km, and a population growth rate of 15.60 percent in the decade of 2001- 2011. The gender ratio of this state is 973 females for every 1000 males and literacy rate is 75.36%. Karnataka state has been divided into 30 districts in 2020 and which were grouped into four administrative divisions. These divisions are Kalaburagi, Belagavi, Mysuru and Bengaluru.

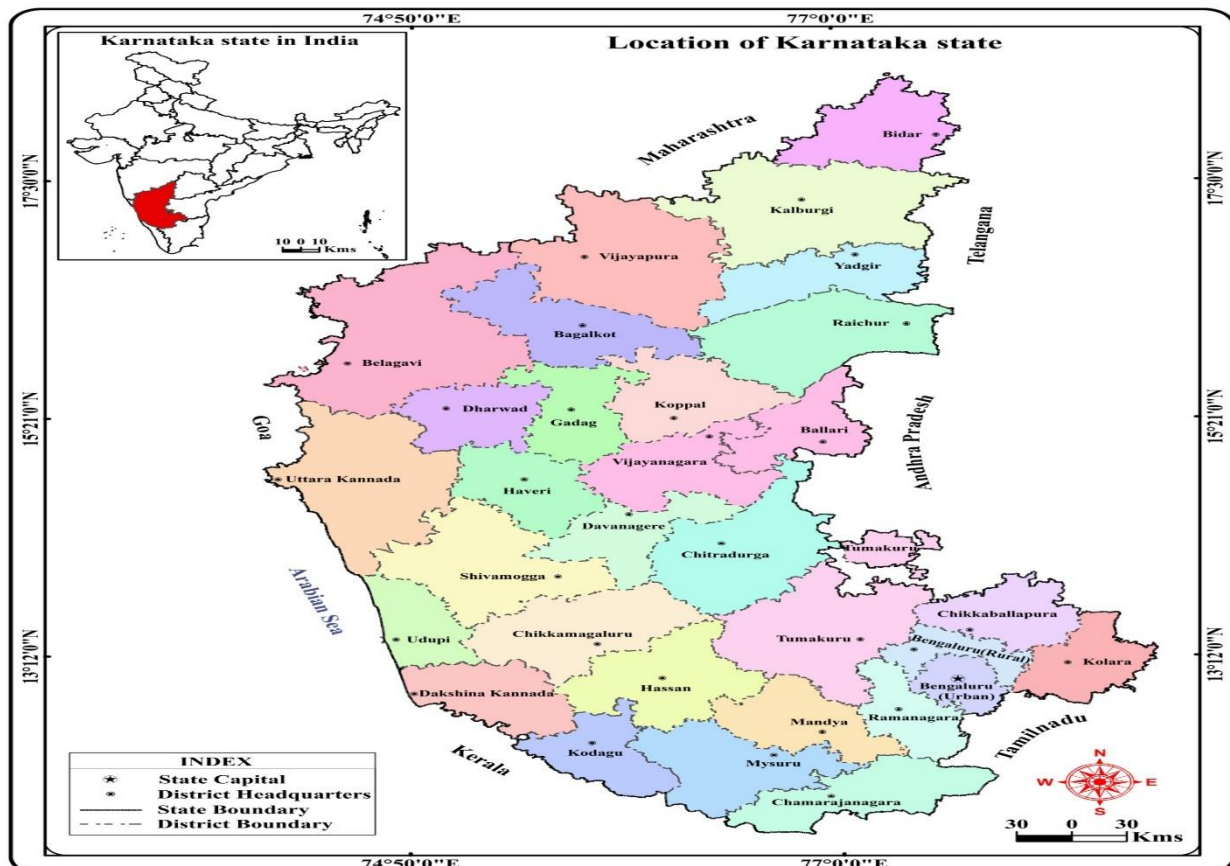


Figure 1 The Study Area

## Objectives

The main objectives of the present study are as follows -

1. To study the issues of malnutrition in Karnataka state.
2. To analyse the malnutrition scenario of under five children in Karnataka state.
3. To focus on the causes and effects of malnutrition in the study area.

## Data and Methodology

In the present paper, data sources are largely based on secondary data collected from National Family Health Survey (NFHS-5,2019-2021), Census of India, Newspaper and online sources to get the latest sources for scientific needs. The Charts, graphs and maps have been employed in this paper to demonstrate the different degree of malnutrition affecting the state.

### Karnataka state: Distribution of Stunted children (<5years)

According to the estimation of UNICEF/WHO/WB Joint Child Malnutrition Estimates (JME) group for 2021. In 2020, 149.2 million children under the age of five were stunted across the world. “Stunting refers to a child who is too short for his or her age. These children can suffer severe irreversible physical and cognitive damage that accompanies stunted growth. The devastating effects of stunting can last a lifetime and even affect the next generation” (UNICEF 2020).

As per the findings based on the National Family Health Survey-5 (NFHS-5) which was conducted in the year 2019-21 by the Ministry of Health and Family Welfare, there are totally 17,99,176 malnourished children who have the problem of stunted growth. Bengaluru Urban district ranks first with the highest percentage (13.4%) of stunted children of the state. It indicates that the number of malnourished children is very high in Bengaluru urban area. Belagavi district with 8.17% of stunted children and Vijayapura district with 5.84 % of the stunted children of Karnataka state are in the second and third places respectively. Districts like Bagalkote (5.06%) and Kalaburagi (5%) also account for a larger portion of malnourished children in the state. Opposite to this, Ramanagara and Kodagu districts account for least number of stunted children in the state as their percentage is only 0.68 and 0.66 respectively. Udupi district (1.00%), Chikkamagaluru (1.17%) and Chamarajanagar (1.28%) are in a better position as they have a lesser percentage of children who have stunted growth. (Table 1 and Figure 2)

**Table 1 Karnataka state: Distribution of Stunted children (<5years)**

Si.No	Name of the District	No of children	%	Rank	Si.No	Name of the District	No of children	%	Rank
1	Bengaluru Urban	2,40,522	13.4	1	16	Gadaga	43,197	2.40	16
2	Belagavi	1,47,004	8.17	2	17	Haveri	41,630	2.31	17
3	Vijayapura	1,03,806	5.77	3	18	Shivamogga	38,106	2.12	18
4	Bagalkote	92,909	5.16	4	19	Kolar	37,837	2.10	19
5	Kalaburagi	89,617	4.98	5	20	Dakshina Kannada	37,559	2.09	20
6	Ballari	88,435	4.92	6	21	Hassan	32,347	1.80	21
7	Raichuru	80,038	4.45	7	22	Uttara Kannada	31,848	1.77	22
8	Tumakuru	76,912	4.27	8	23	Mandya	30,288	1.68	23
9	Yadagiri	75,899	4.22	9	24	Chikkaballapura	29,288	1.63	24
10	Dharwad	71,834	3.99	10	25	Bengaluru Rural	28,532	1.59	25

11	Koppala	69,883	3.88	11	26	Chamarajanagara	23,342	1.3	26
12	Mysuru	60,393	3.36	12	27	Chikkamagaluru	20,717	1.15	27
13	Davanagere	60,259	3.35	13	28	Udupi	17,177	0.95	28
14	Bidar	58,255	3.24	14	29	Ramanagara	12,226	0.68	29
15	Chitradurga	47,476	2.64	15	30	Kodagu	11,840	0.66	30
					Total		17,99,176	100	

Source: State Nutrition Profile for Karnataka (NFHS-5) 2019-2021

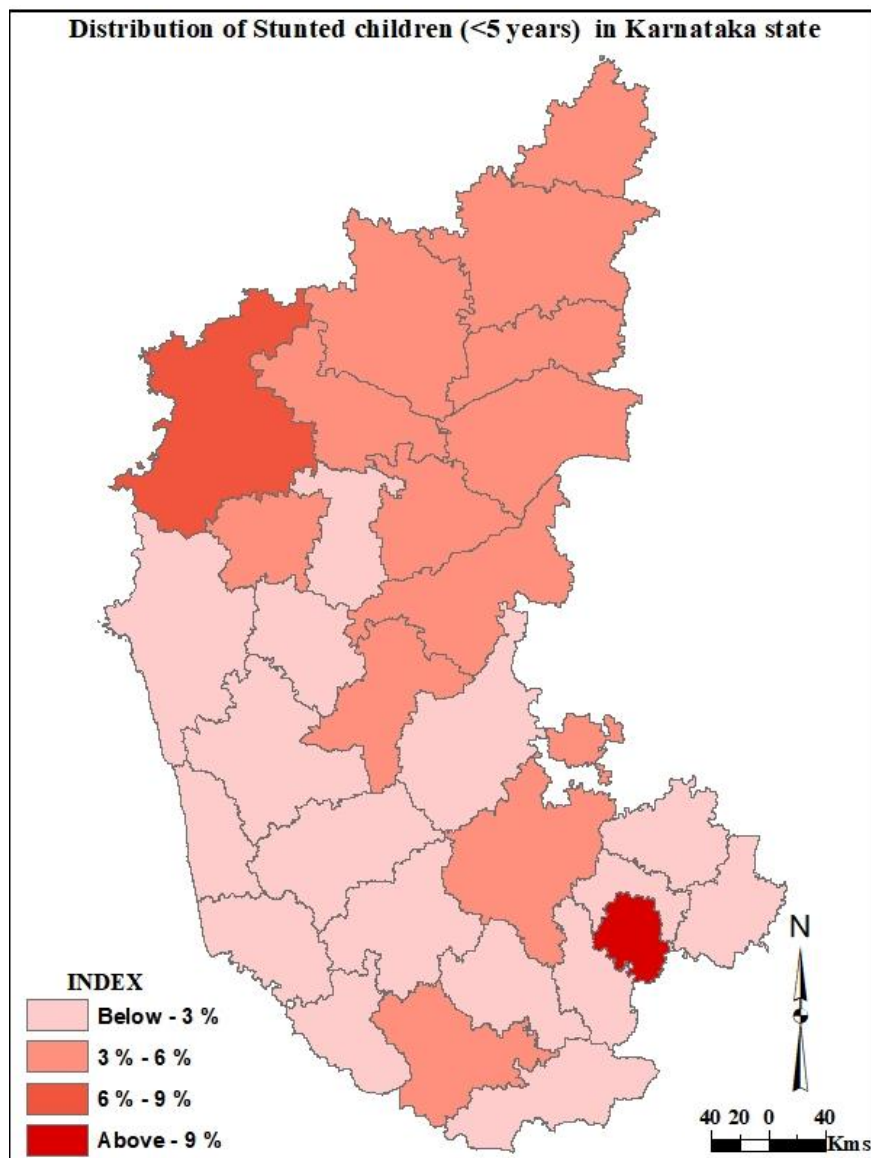


Figure 2 Karnataka state: Distribution of Stunted children (<5years)

## Karnataka state: Distribution of Anemic children (<5 years)

Anaemia may be defined as “a reduction in haemoglobin (Hb) or haematocrit (HCT) or RBC count. It is a presentation of an underlying condition and can be subdivided into macrocytic, microcytic, or normocytic. Patients with anaemia typically present with vague symptoms such as lethargy, weakness and tiredness” (Jake Turner et al, 2022).

**Table 2 Karnataka state: Distribution of Anemic children (<5 years)**

Si.No	Name of the District	No of children	%	Rank	Si.No	Name of the District	No of children	%	Rank
1	Bengaluru Urban	4,06,583	13.5	1	16	Shivamogga	81,329	2.71	16
2	Belagavi	2,92,693	9.74	2	17	Chitradurga	72,384	2.41	17
3	Kalaburagi	1,75,241	5.83	3	18	Dakshina Kannada	68,689	2.29	18
4	Ballari	1,48,540	4.94	4	19	Hassan	68,195	2.27	19
5	Raichuru	1,32,959	4.43	5	20	Uttara Kannada	66,689	2.22	20
6	Vijayapura	1,32,459	4.41	6	21	Mandya	65,164	2.17	21
7	Tumakuru	1,15,894	3.86	7	22	Kolar	63,278	2.11	22
8	Mysuru	1,12,844	3.76	8	23	Gadaga	60,353	2.01	23
9	Bagalkote	1,10,244	3.67	9	24	Chikkaballapura	49,594	1.65	24
10	Davanagere	98,959	3.29	10	25	Chamarajanagara	44,736	1.49	25
11	Bidar	98,546	3.28	11	26	Bengaluru Rural	42,577	1.42	26
12	Dharwad	95,937	3.19	12	27	Ramanagara	42,383	1.41	27
13	Koppala	90,393	3.01	13	28	Udupi	38,944	1.3	28
14	Yadagiri	89,960	2.99	14	29	Chikkamagaluru	36,266	1.21	29
15	Haveri	83,673	2.78	15	30	Kodagu	19,032	0.63	30
							30,04,538	100	

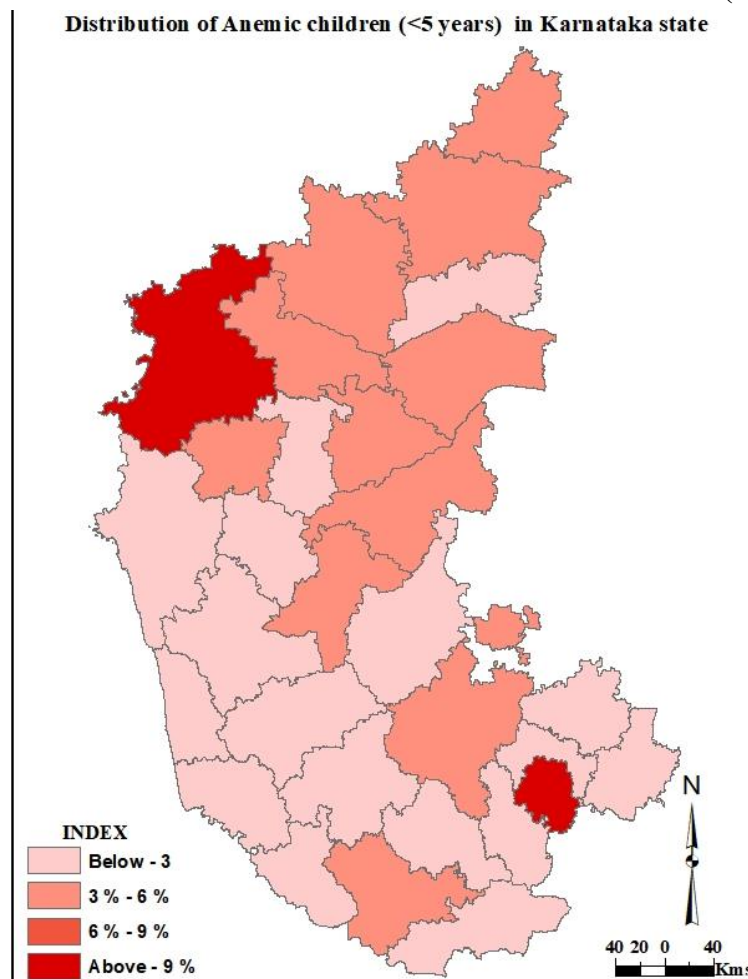
**Source: State Nutrition Profile for Karnataka (NFHS-5)2019-2021**

The ministry of health and family welfare conducted the National Family Health Survey (NFHS-5) in Karnataka in the year 2019-21. Accordingly, state has 30,04,538 malnourished children who have the problem of anaemia. As per its findings, Bengaluru urban stands first with 13.53% of anaemic children of the state followed by Belagavi which is in the second position with 9.74% of anaemic children. Whereas,



Kalaburagi occupies third position with 5.83% of children suffering from anaemia and it is followed by Ballari and Raichur districts with 4.94% and 4.65% of the total anaemic children of the state respectively. All the above districts occupy top five positions with a large number of anaemic children. As far as the districts which are in the lower positions with lesser number of anaemic children are concerned, Kodagu sets an example to all the other districts by standing in the very last position with only 0.63% of the anaemic children of the state. In the same way, Chikkamagaluru and Udupi also stand in an appreciable position as they occupy the second, third positions from the bottom of the list with only 1.21% and 1.30% of the anaemic children of the state respectively. Along with these, Ramanagara with 1.41% and Bangaluru rural with only 1.43% of its children suffering from anaemia are in a better position. (Table 2 and Figure 3)

**Figure 3 Karnataka state: Distribution of Anemic children (<5 years)**



**Karnataka state: Distribution of Wasted children (<5 years)**

According to the estimation of UNICEF/WHO/WB Joint Child Malnutrition Estimates (JME) group of 2021, globally 45.4 million children under the age of five were wasted in 2020. “Wasting refers to a child who is too thin for his or her height. Wasting is the result of recent rapid weight loss or the failure to gain weight. A child who is moderately or severely wasted has an increased risk of death, but treatment is possible” (UNICEF, 2020).

According to the study of National Family Health Survey (NFHS-5,2019-2021), Karnataka state has

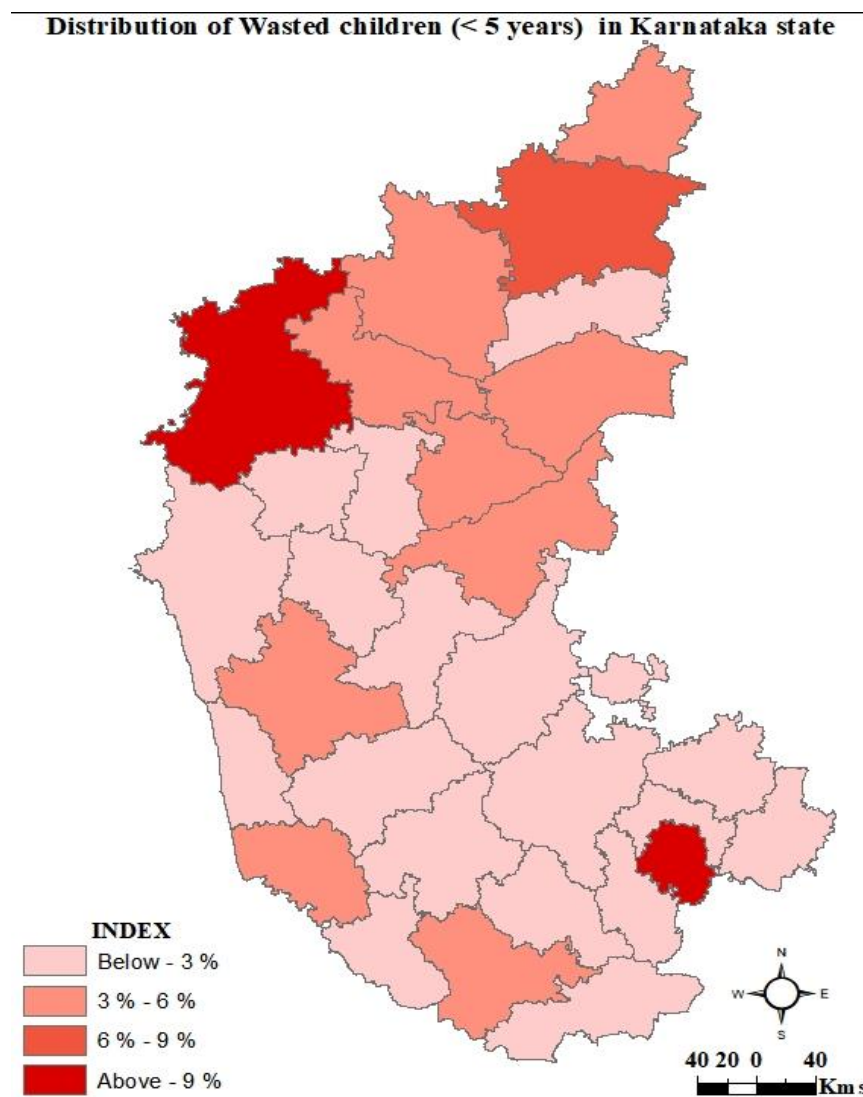
**Table 3 Karnataka state: Distribution of Wasted children (<5 years)**

Si.No	Name of the District	No of children	%	Rank	Si.No	Name of the District	No of children	%	Rank
1	Bengaluru Urban	1,47,541	14.7	1	16	Chitradurga	23,606	2.35	16
2	Belagavi	1,05,771	10.5	2	17	Uttara Kannada	23,563	2.35	17
3	Kalaburagi	64,940	6.47	3	18	Yadagiri	23,323	2.32	18
4	Ballari	56,099	5.59	4	19	Tumakuru	20,803	2.07	19
5	Raichuru	46,655	4.65	5	20	Chikkamagaluru	18,896	1.88	20
6	Dakshina Kannada	45,640	4.55	6	21	Kolar	18,858	1.88	21
7	Bidar	34,985	3.49	7	22	Hassan	18,143	1.81	22
8	Mysuru	34,260	3.41	8	23	Gadaga	17,394	1.73	23
9	Vijayapura	33,924	3.38	9	24	Ramanagara	15,675	1.56	24
10	Koppala	32,878	3.28	10	25	Chikkaballapura	15,065	1.5	25
11	Bagalkote	32,509	3.24	11	26	Mandya	14,708	1.47	26
12	Shivamogga	30,485	3.04	12	27	Udupi	13,088	1.3	27
13	Davanagere	29,502	2.94	13	28	Chamarajanagara	13,048	1.3	28
14	Dharwad	26,223	2.61	14	29	Bengaluru Rural	12,629	1.26	29
15	Haveri	24,644	2.46	15	30	Kodagu	8,451	0.84	30
Total							10,03,306	100	

**Source: State Nutrition Profile for Karnataka (NFHS-5)2019-2021**

10,03,306 children infected with wasting. Bengaluru Urban is in the first position in respect of the children suffering from wasting as it accounts for about 14.71% of the children who are suffering from the wasting in the state. Districts such as Belagavi and Kalaburagi are in the second and third positions with 10.54%, 6.47% of the malnourished children of the state respectively. Further, Ballari (5.59%) and Raichuru

(4.65%) districts are in fourth and fifth positions in this respect. Opposite to this, the following districts are standing in a better position with the lowest number of children suffering from wasting. Percentage of malnourished children, particularly of wasted children in Kodagu district i.e. 0.84 indicates that the number of children suffering from wasting is very low in the district in the entire state of Karnataka. Bangaluru rural occupies the second position with 1.26% of children of the state who are suffering from the wasting. On the same note, districts like Chamarajanagara and Udupi also have a very lesser number of wasted children of the state as they have only 1.30% each. Mandya district is in the fifth position from the bottom of the list with only 1.47% of its children suffering from wasting. (Table 3 and Figure 4)



**Figure 4 Karnataka state: Distribution of severely wasted children (<5 years)**

### **Karnataka state: Distribution of severely wasted children (<5 years)**

“Severe wasting, defined as very low weight-for-height or as very small arm circumference for age, is frequent among under-fives in developing countries, and is an indication for urgent medical attention and intensive nutritional rehabilitation” (Michel Garenne et al, 2022).

According to the estimation of the National Family Health Survey (NFHS-5, 2019-2), within the Karnataka state, the state is estimated to have 4,44,351 children living with severe wasting. Bangaluru



Urban occupies the first position with 19.71% of children having severe wasting which is very high in comparison with all the other districts. Belagavi district is in second place with 10.29% of severely wasted children of the state. It is followed by other districts like Ballari, Kalaburagi which are in the second and third positions with 7.50%, 7.13% respectively. Further, Raichur district is in fifth place as it accounts for about 5.30% of the state's total severely wasted children. Opposite to this, districts like Kodagu (0.82%) and Gadag(0.97%) stand in the last position as they record very less percentage of children suffering from severe wasting. Districts like Udupi, Chamarajanagara and Koppala are performing well as the percentage of severely wasted children of these districts ranges between 1.00 to 1.22 only. (Table 4 and Figure 5)

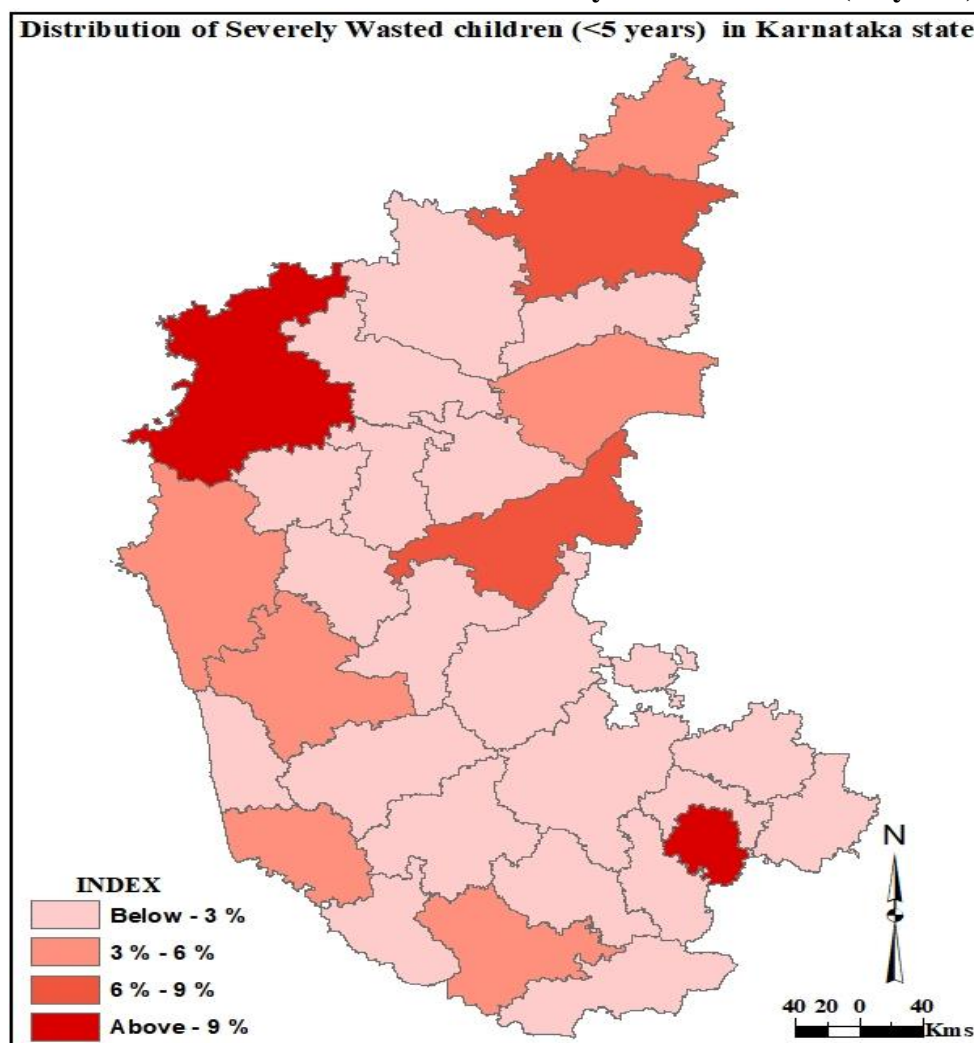
**Table 4 Karnataka state: Distribution of severely wasted children (<5 years)**

Sl.No	Name of the District	Number of children	%	Rank	Sl.No	Name of the District	Number of children	%	Rank
1	Bengaluru Urban	87,602	19.7	1	16	Bengaluru Rural	7,328	1.65	16
2	Belagavi	45,715	10.3	2	17	Dharwad	7,311	1.65	17
3	Ballari	33,316	7.5	3	18	Kolar	7,056	1.59	18
4	Kalaburagi	31,691	7.13	4	19	Mandya	6,606	1.49	19
5	Raichuru	23,529	5.3	5	20	Hassan	6,207	1.4	20
6	Dakshina Kannada	23,493	5.29	6	21	Davanagere	6,120	1.38	21
7	Shivamogga	17,739	3.99	7	22	Ramanagara	6,035	1.36	22
8	Bidar	17,571	3.95	8	23	Tumakuru	5,916	1.33	23
9	Mysuru	15,812	3.56	9	24	Chikkaballapura	5,708	1.28	24
10	Uttara Kannada	14,095	3.17	10	25	Haveri	5,430	1.22	25
11	Chitradurga	10,946	2.46	11	26	Koppala	5,408	1.22	26
12	Vijayapura	9,725	2.19	12	27	Chamarajanagara	4,929	1.11	27
13	Yadagiri	9,487	2.14	13	28	Udupi	4,462	1.00	28
14	Chikkamagaluru	8,727	1.96	14	29	Gadaga	4,301	0.97	29

15	Bagalkote	8,464	1.9	15	30	Kodagu	3,622	0.8 2	30
Total							4,44,351	100	

Source: State Nutrition Profile for Karnataka (NFHS-5)2019-2021

**Figure 5 Karnataka state: Distribution of severely wasted children (<5 years)**



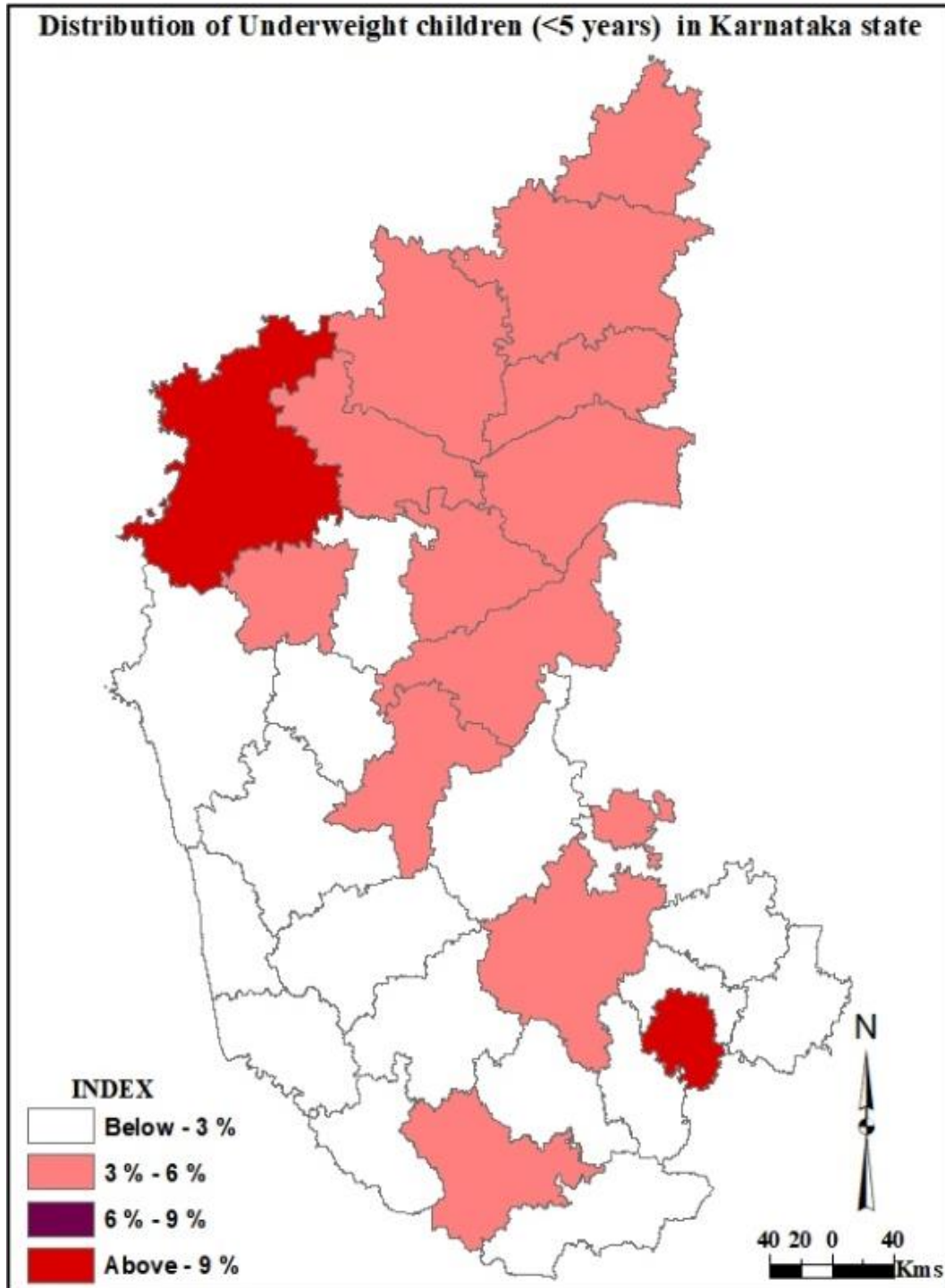
**Karnataka state: Distribution of Underweight children (<5years)**

“Underweight is described as body weight that is too low to be considered healthy for a normal adult, adolescent or a child. It can also occur in the elderly. Underweight can also be described clinically as low BMI-for-age, where BMI (body mass index) is calculated in the metric system as a person’s weight in kilograms (Kg) divided by the height in meter square (m<sup>2</sup>)” (Stella G. Uzogara,2016).

As per the survey, nearly 16,67,140 children in the state are underweight. Bangaluru Urban ranks first in this respect also as it accounts for 12.95% of the underweight children of the state. Belagavi is in second position with 9.92% and Kalaburagi is in third position with 5.64% of the total underweight children of the state. Next to this, Ballari (5.36%) and Vijayapura (5.29%) also have a large number of underweight children. As usual, Kodagu’s performance is appreciable in this regard as it accounts for only 0.53% of

the underweight children of the state. Districts like Ramanagara and Udupi also have the least percentage of children who are underweight as they have only 0.93% and 0.94% of underweight children respectively. Bangaluru rural and Kolar districts are also in a better position as they have less than 1.15% of underweight children of the state. (Table 5 and Figure 6)

**Figure 6 Karnataka state: Distribution of Underweight children (<5years)**



**Table 6 Karnataka state: Distribution of average Malnourished children (<5 years)**

Sl.No	Name of the District	Stunted Children	Anemic Children	Wasted Children	Severely Wasted	Underweight children	Average
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		%	%	%	%	%	%
1	Bagalkote	5.16	3.67	3.24	1.90	4.88	3.8
2	Ballari	4.92	4.94	5.59	7.50	5.36	5.7
3	Belagavi	8.17	9.74	10.54	10.29	9.92	9.7
4	Bengaluru Rural	1.59	1.42	1.26	1.65	1.11	1.4
5	Bengaluru Urban	13.37	13.53	14.71	19.71	12.95	14.9
6	Bidar	3.24	3.28	3.49	3.95	3.43	3.5
7	Chamarajanagara	1.30	1.49	1.30	1.11	1.25	1.3
8	Chikkaballapura	1.63	1.65	1.50	1.28	1.41	1.5
9	Chikkamagaluru	1.15	1.21	1.88	1.96	1.16	1.5
10	Chitradurga	2.64	2.41	2.35	2.46	2.56	2.5
11	Dakshin Kannada	2.09	2.29	4.55	5.29	2.37	3.3
12	Davanagere	3.35	3.29	2.94	1.38	3.09	2.8
13	Dharwad	3.99	3.19	2.61	1.65	3.85	3.1
14	Gadaga	2.40	2.01	1.73	0.97	2.28	1.9
15	Hassan	1.80	2.27	1.81	1.40	1.70	1.8
16	Haveri	2.31	2.78	2.46	1.22	2.92	2.3
17	Kalaburagi	4.98	5.83	6.47	7.13	5.64	6.0
18	Kodagu	0.66	0.63	0.84	0.82	0.53	0.7
19	Kolar	2.10	2.11	1.88	1.59	1.15	1.8
20	Koppala	3.88	3.01	3.28	1.22	3.91	3.1
21	Mandya	1.68	2.17	1.47	1.49	1.25	1.6
22	Mysuru	3.36	3.76	3.41	3.56	3.71	3.6
23	Raichuru	4.45	4.43	4.65	5.30	4.91	4.7
24	Ramanagara	0.68	1.41	1.56	1.36	0.93	1.2
25	Shivamogga	2.12	2.71	3.04	3.99	2.71	2.9
26	Tumakuru	4.27	3.86	2.07	1.33	3.06	2.9
27	Udupi	0.95	1.30	1.30	1.00	0.94	1.1
28	Uttara Kannada	1.77	2.22	2.35	3.17	2.15	2.3
29	Vijayapura	5.77	4.41	3.38	2.19	5.29	4.2
30	Yadagiri	4.22	2.99	2.32	2.14	3.57	3.0
	Total	100	100	100	100	100	100.0

**Source: Personal Computation**

## Causes of Malnutrition

Malnutrition is the result of nutrition deficiency and this deficiency may be caused by many reasons. The following are the major causes of under nutrition among the children.

### Poverty

One of the major causes of malnutrition is the poor family background of the children and it cannot be easily eradicated. Poverty does not cause malnutrition on its own, but it has a significant impact on the availability of appropriate nutrition food for the most vulnerable groups. As stated by new Multidimensional Poverty Index (MPI) released by the United Nations Development Programme (UNDP)

“The population living below the poverty line in India reduced by 415 million between 2005-06 and 2019-21. However, MPI has estimated that India still has the world's largest number of poor at 228.9 million”. As the poor people cannot afford nutritious food, the number of malnourished children remains high in poor families.

#### Shortage of Food

Shortage of food is another major cause of malnutrition. Acute food and nutrition crises may not emerge because of a lack of food every time, but sometimes it may be because of a person's inability to access adequate food. Inadequate supply of food in markets and inadequate financial resources are the key factors influencing the food insecurity of the most vulnerable groups.

#### Diseases

Certain illnesses and infections, namely tuberculosis, measles and diarrhoea etc. lead directly to malnutrition. The combined effect of disease and malnutrition weakens the metabolic activity in human beings. Further, formation of the acute cycle of infection and undernourishment leads to severe illness. In most of the developing countries children with HIV and AIDS have become a major cause of acute malnutrition.

#### Unsafe water

A joint report by WHO and UNICEF has stated that in 2030 billions of people around the globe will lack access to clean drinking water, sanitation and hygiene. Inadequacy of clean water combined with problems of poor sanitation and hygienic practices increase the prevalence of infectious and waterborne diseases which in turn lead to a worrying rise in levels of acute malnutrition among the children.

### Effects of Malnutrition

Malnutrition is cause of many diseases in turn it is the result of many other diseases. If a person does not have a balanced diet with proper nutrition, he becomes highly susceptible for diseases. Even, it may lead to life threatening condition. Some of the negative impacts of malnutrition on the body are as follows

**Weakens immunity system:** By weakening the immunity system, malnutrition increases the risks of infection. For stunted children less than five years, threat of death is five times more. Further, infectious diseases like diarrhea, measles or malaria etc. may lead even to death of severely malnourished children.

**Reduction in muscle strength and fatigue:** Muscular fatigue is increased by malnutrition and may change the pattern of muscle contraction and relaxation. Muscle's structural activities as well as its metabolic processes are affected by the malnutrition. If not treated in time, under nutrition can have a substantial impact on muscle health.

**Reduced respiratory muscle function:** Malnutrition can also have a negative impact on lung function, by decreasing ventilatory drive, lower respiratory muscle performance and weakened lung defense mechanisms. Because of these malfunctions, breathing become more difficult and it may lead chest infection and respiratory failure.

**Impaired thermoregulation:** Malnutrition causes hypothermia. It has a negative impact on malnourished children as it causes a reduction in cardiac output and reduced cerebral perfusion. Thus, in children with severe malnutrition, hypothermia is a high-risk factor for increased death. Apart from these, malnutrition can also lead sexual dysfunction and poor pregnancy outcomes, such as obstructed labour or birth of low weight babies. Severe anaemia during pregnancy has a higher risk of death during delivery.



**Conclusion**

The present study has concluded that the huge number of malnourished children within 5 years in Karnataka state is a matter of concern as it is a hindrance to socio-economic development of a state. Number of malnourished children is higher in the backward districts of the state. However, the highest number of under nourished children is found in Bangaluru urban district. Thus, the state government has to focus on the effective implementation of various schemes which are aiming to improve the condition of poor people, so that malnutrition can be eradicated completely from the state.

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