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Burden of Malnutrition in Kerala: A District Wise Analysis among Children under the Age of Five

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Abstract

Malnutrition among children continues to remain a critical public health concern. Despite the advances made in the field of health and education, Kerala is still crippled with the persistent and the emerging forms of malnutrition. This study is an attempt to analyse the burden of malnutrition in Kerala, manifested in the form of stunting, wasting, underweight and overweight among the children under the age of five, with special focus on the district level variation. Understanding the district level variation will help in developing the targeted, locally specific interventions. Understanding these patterns is necessary for designing, planning and implementing effective intervention to improve child nutrition and health outcome. The findings of the study point towards high variability in the nutritional outcome across the districts and presence of double burden of malnutrition, thus calling in for a more multifaceted, integrated, and context specific interventions.

Keyword: Stunting, Wasting, Overweight, Underweight, Kerala, Children

Introduction

Despite significant improvement in health indicators like infant mortality rate, malnutrition among children continues to remain a critical public health concern both at the global and the national level. The term malnutrition comprises of wide spectrum of ill health. It is defined by the WHO as the deficiencies, excesses, or imbalances in a person's intake of energy and/or nutrients^[3]. Hence it contains wide spectrum of conditions like undernutrition manifested in the form of stunting, wasting, underweight, and micronutrient deficiencies; and overnutrition manifested in the form of overweight^[4]. As pointed out earlier, though economic

conditions and many child health indicators have improved, countries around the world regardless of their economic conditions continue to struggle with the problems related to malnutrition in one form or another^[5].

Kerala is considered a role model for other states for the advances it has made on the social sectors, especially in health and education. Still, it is not completely free from the persistent and emerging forms of malnutrition. While the prevalence rate of stunting, wasting, and underweight are lower than the national average, there is considerable variation across districts and across different social strata^[2, 6]. Recent studies have also highlighted the rising trend in

overweight and obesity, pointing toward the potential shift to double burden of malnutrition- which is the coexistence of undernutrition and overnutrition at different levels of population [1, 9, 10]. The possible emergence of the double burden of malnutrition is more concerning as it reflects the complex interplay of the socio, economic, and environmental factors. Analysing them and tackling the problems brings in additional attention from the policy side.

Given this context, this study aims to analyse the burden of malnutrition in Kerala, manifested in the form of stunting, wasting, underweight and overweight among the children under the age of five, with special focus on the district level variation [6]. It also attempts to analyse the prevalence of double burden of malnutrition. Understanding these patterns is necessary for designing, planning and implementing effective intervention to improve child nutrition and health outcome.

Data and Method

1. **Data source:** The study primarily relies on secondary data. Monthly district-level data on the prevalence of stunting, wasting, underweight and overweight among children in the age of 0-5 years was obtained from public dashboard of POSHAN tracker- a mobile-based application developed to report and monitor the nutritional status. These data were utilised to examine the prevalence and distribution of different forms of malnutrition in Kerala.
2. **Variables and concepts:** The key variable considered in the study are the stunting, wasting, underweight and overweight. As per the World Health Organisation (WHO) standards, a child is classified as stunted (Height for age Z score, HAZ) if the HAZ is less than -2 SD of WHO growth median. Wasting is defined as a Weight for Height Z score below the WHO growth median; and underweight is said to be experienced if the weight for age Z score is less than -2 SD of the WHO growth median.

For understanding the variation in the prevalence rate of the above said nutritional conditions, districts were classified based on the intensity of prevalence as - high, moderate, and low. The classification was based on data-driven cut-offs using quantile-based tercile construction. Accordingly:

- District with a stunting, wasting, underweight and overweight prevalence value equal to or less than 31.33 percent, 2 percent, 8 percent, and 5.33 percent respectively were categorised into low prevalence category
- Districts with prevalence values between 31.33-38.33percent (stunting), 2-3percent (wasting), 8-9 percent (underweight) and 5.33- 8 percent (overweight) were categorised into moderate prevalence.
- Districts with prevalence value above 38.33 percent (stunting), 3 percent (wasting), 9 percent (underweight) and 8percent (overweight) were classified as high prevalence category.

Further, a district was considered to experience the double burden of malnutrition if it exhibited undernutrition along with overweight prevalence. Based on the relative intensity of the undernutrition and overnutrition, the presence of double burden was further classified into four categories: pronounced double burden, emerging double burden, undernutrition-only, and overweight-only.

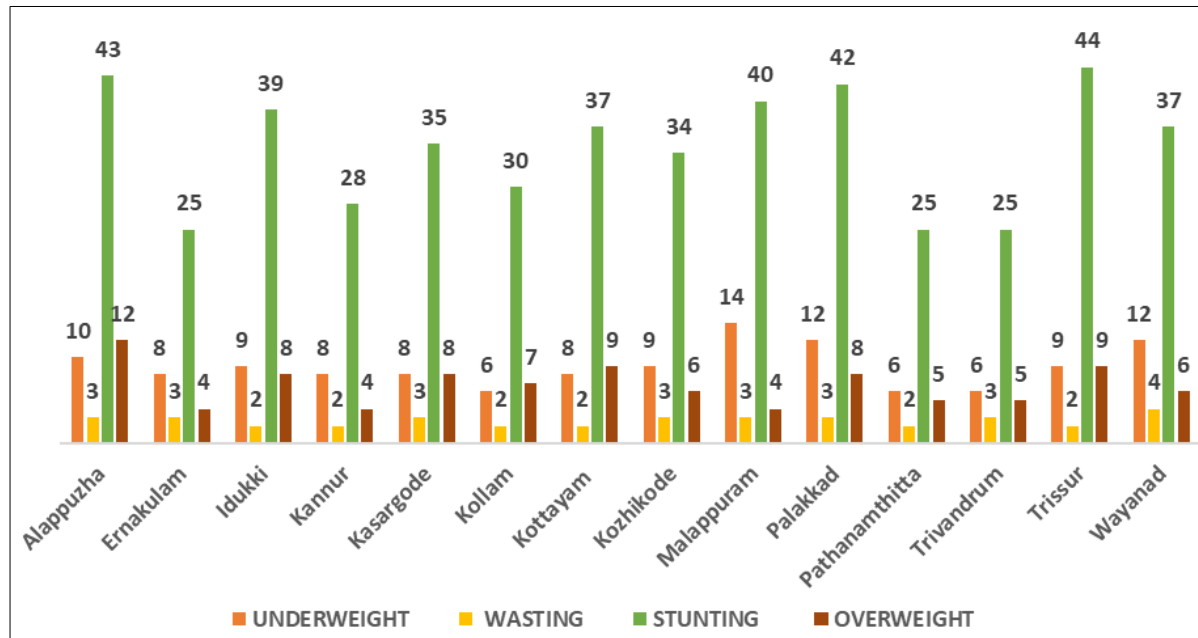
Results

From the data, the stunting prevalence in Kerala ranges from 25 percent (Ernakulam, Pathanamthitta, and Trivandrum) to 44 percent (Trissur). Kerala exhibits a relatively higher stunting prevalence than the national average as reported by the POSHAN tracker. The average stunting prevalence at the national level, based on POSHAN tracker data is, 33 percent. Out of Kerala's 14 districts, nine districts record stunting level above the national average, while seven districts exceed the state average of 35 percent. Using the data-driven quantile based tercile classification, five districts, namely Trissur, Palakkad, Malappuram, Idukki, and Alappuzha fall into the high stunting prevalence category. Four districts- Kasaragod, Kottayam, Kozhikode, and Wayand experience moderate prevalence of stunting, while the remaining five districts- Ernakulam, Kannur, Pathanamthitta, Thiruvananthapuram, and Kollam fall into the low prevalence category.

Wasting is relatively low, with the prevalence rate ranging between 2-4 percent across the districts. These figures are below the typical national average reported by the POSHAN tracker. According to the data from the POSHAN tracker, the average wasting prevalence at the national level is 5 percent, while at the state level is 3 percent. No district in Kerala exhibit wasting above the national average. When compared with the state average Wayanad, however records a slightly higher prevalence than the state average. Based on the quintile classification, six districts- Idukki, Kannur, Kollam, Kottayam, Pathanamthitta, and Trissur fall into the low wasting category, while seven districts- Alappuzha, Ernakulam, Kozhikode, Malappuram, Palakkad, and Trivandrum are classified moderate. Only Wayanad is categorised as the district with high wasting prevalence.

Underweight prevalence ranges between 6 percent (Kollam, Pathanamthitta, and Trivandrum) to 14 percent (Malappuram). The national and state average, based on the data from POSHAN tracker are 14 and 10 percent respectively. While most districts perform relatively better, Malappuram is the only district which exceeds the national average. Alappuzha, Malappuram, Palakkad and Wayanad are the districts with high underweight prevalence. Idukki, Kozhikode, and Trissur fall into the moderate prevalence category, while the remaining seven districts are placed into the low prevalence category.

Indicators like stunting, wasting and underweight provides with a comprehensive picture of the undernutrition among the children. From the data, districts with highest burden of chronic undernutrition- Trissur, Alappuzha, Palakkad, and Malappuram also report relatively high underweight prevalence- suggesting the prevalence of combined chronic and acute nutritional deficits.



Source: Ministry of Women and Child Development, Government of India. POSHAN Tracker Dashboard

Fig 1: Prevalence of Stunting, Wasting, Underweight, and Overweight in Kerala

Rising prevalence of overweight and obesity is another nutritional concern. The state and the national average of the overweight prevalence are 6 percent. In Kerala, nearly all districts report rising overweight prevalence, with six districts – Alappuzha, Idukki, Kasargod, Kottayam, Palakkad, and Trissur, already exceeding the state and the national averages. From the quintile-based classification, Ernakulam, Kannur, Pathanamthitta, and Thiruvananthapuram fall in the low prevalence category; Wayanad, Palakkad, Kozhikode, Kollam, Kasargod, and

Idukki are placed in the moderate prevalence category, while Trissur, Kottayam, and Alappuzha fall into the high prevalence category.

Double Burden of Malnutrition

The data also reflects the emerging issue of double burden of malnutrition (DBM) as almost all districts suffer from the issue of being overweight along with the conditions of undernutrition.

Table 1: Classification of districts based on the intensity of Double Burden of Malnutrition

Pronounced DBM (High undernutrition and High Overweight prevalence)	Emerging DBM	Others (Low Undernutrition and Medium Overweight prevalence)
Alappuzha Idukki Palakkad Trissur	Kasaragod (Medium undernutrition and High Obesity) Kottayam (Medium undernutrition and High obesity) Kozhikode (Medium undernutrition and medium obesity) Malappuram (High undernutrition and medium obesity) Wayanad (Medium undernutrition and medium obesity)	Ernakulam Kannur Kollam Pathanamthitta Trivandrum

Source: Authors classification

Districts like Alappuzha, Palakkad, Idukki, and Trissur exhibit pronounced double burden. Additionally, Kasargod, Kottayam, Kozhikode, Malappuram, and Wayanad exhibit signs of emerging double burden. Even the districts with a low prevalence of stunting and underweight report moderate level of overweight, highlighting the rising risk of the non-communicable diseases.

Discussion

The nutritional landscape of Kerala is highly complex exhibiting regional variation. Even within the regions, we could observe the heterogeneity in the prevalence of malnutrition among various social groups. In districts like, Wayanad and Malappuram, the rates of undernutrition are alarmingly high among the marginalised communities, highlighting the nutritional vulnerability faced by them [6]. The study by confirming the heterogeneity in the malnutrition

indicators across districts calls in for localised intervention for dealing with the issue.

There is an important role for the complex interplay of the socio-economic determinant for worsening the nutritional outcomes and therefore contributing to the disparity in the nutritional outcome. Spatial studies point that the clustering in districts and among communities can be mostly associated with poverty, sanitation and maternal education [8, 11]. The coexistence of stunting alongside underweight, signals overlapping acute and chronic malnutrition. Literature have also pointed out the rising trend in obesity and the emerging challenge of double and triple burden of malnutrition. This reflects the possible nutritional transition and the need for adopting an integrative, and multifaceted approach focussing on all the angles of the situation than to look issue separately [8].

Conclusion

Despite the positive performance in the field of social sector, Kerala do face regional variability in the nutritional outcomes. The Nutritional profile in Kerala, among children represent a complex and multi-angled challenge marked by high prevalence of stunting, moderate levels of wasting and varying underweight prevalence across the districts. Also, the rising trend in the overweight and obesity rates reflects the nutritional transition experienced by the state resulting in double burden of malnutrition. Curbing these issues needs an integrated, equity oriented, and context specific intervention.

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