Prevalence and Factors Associated with Protein Energy Malnutrition amongPreSchool Children in Rural Areas

Abstract:

Children, particularly those in rural areas, are among the most vulnerable to malnutrition, a silent emergency recognized by organizations such as the United Nations Children's Fund (UNICEF). This study delves into the complexities of undernutrition, specifically Protein Energy Malnutrition (PEM), among pre-school children aged 3-6 years in rural regions. The research aims to estimate the prevalence of PEM, identify associated factors, and analyze various feeding practices contributing to malnutrition. Data collection was conducted through survey methods, encompassing 3-6-year-old children, revealing alarming statistics. Findings from 20 article papers underscored that 27.96% of pre-school children were underweight, with 6.71% severely underweight. Notably, 42.78% of children lacking energy-dense foods, as per Recommended Dietary Allowance (RDA), experienced malnutrition. Additionally, more than one-third of children suffered from underweight due to PEM. The study highlights the elevated risk of malnutrition among children with low birth weights, shorter interpregnancy intervals, higher birth orders, and inadequate breastfeeding and immunization practices. These insights underscore the urgent need for targeted interventions to address the multifaceted challenges contributing to PEM among rural pre-school children.

Keywords: Protein Energy Malnutrition, Rural Children, Pre-School, Undernutrition, Feeding Practices, Associated Factors

1.Introduction

The health of a nation's populace is intricately linked to the well-being of its individuals, with good nutrition standing as a cornerstone of optimal health. Child malnutrition, a pervasive public health issue with far-reaching global implications, underscores the critical need for prioritizing quality nutrition to safeguard the welfare of the youngest members of society. Malnutrition often steals dreams from their young lives and hangs their future in the balance. It remains a major public health concern for children under the age of 5 years in many low- and middle-income countries because it is still the leading underlying cause of child mortality in the countries (Govender et al., 2021).This paper examines the multifaceted dimensions of child malnutrition from diverse disciplinary perspectives, recognizing its profound impact on individual health

outcomes and broader population dynamics. Drawing insights from social scientists, health economists, and public health experts, the discourse delves into the complex interplay of socioeconomic factors, nutritional status, and health outcomes among children. Emphasizing the interconnectedness of nutrition, economic development, and health, the study underscores the pivotal role of nutrition in driving sustained socio-economic progress. Additionally, the paper explores the immunological implications of severe protein-energy malnutrition in children, highlighting the nexus between malnutrition and susceptibility to infectious diseases. Global data on child malnutrition reveal alarming statistics, with millions of children worldwide experiencing stunting, wasting, and underweight conditions, contributing significantly to under-5 mortality rates. The paper concludes with a call to action for concerted efforts at the global, national, and community levels to address the root causes of child malnutrition and implement evidence-based interventions to ensure the well-being of future generations.

2. Literature review

Based on the research aim focused on the nutritional status assessment of under-five children and the impact of Protein Energy Malnutrition (PEM) and its associated risk factors, a comprehensive online search was conducted across reputable databases. The following databases were considered: The Journal of Family Welfare, Australian Medical Journal, Indian Journal of Community Medicine, Indian Journal of Medical Sciences, Bulletin of the World Health Organization, Journal of Youth and Adolescence, Indian Journal Maternal and Child Health, American Journal of Clinical Nutrition, and United Nations Children's Fund (UNICEF) and World Health Organization (WHO).

The search criteria were tailored to retrieve articles published from 2013 onwards, and the search was limited to articles published exclusively in English. Keyword searches were performed in abstracts, titles, and keywords, or under specific topic fields, utilizing the following terms: ‘Children aged 3-6 years with PEM’, ‘protein energy malnutrition survey’, ‘underweight and its associated risk factors’, ‘severe protein energy malnutrition in pre-school children’, ‘recommended dietary allowance (RDA) for pre-school children’, and ‘risk factors associated with PEM in children.’

This systematic search strategy aimed to identify relevant literature pertaining to the nutritional status and prevalence of PEM among under-five children, as well as the associated risk factors contributing to this public health concern.

3. Results

The comparison of findings across 20 articles on the nutritional status assessment of under-five children and the impact of Protein Energy Malnutrition (PEM) revealed significant insights. Firstly, the majority of children studied fell within the age group of 4-5 years, followed closely by those aged 3-4 years and 5-6 years. Among the total children assessed, slightly more than half were males, while the remaining were females. Malnutrition prevalence was notable, with over one-third of children identified as malnourished, including both underweight and severely underweight cases. Interestingly, malnutrition was slightly more prevalent among females compared to males, indicating potential gender disparities in nutritional health.

Furthermore, the incidence of malnutrition showed significant associations with dietary habits. Children who did not consume energy-dense foods as per Recommended Daily Allowance (RDA) had a substantially higher prevalence of malnutrition compared to their counterparts who adhered to RDA guidelines. This underscores the critical role of diet in combating malnutrition among young children. Moreover, various demographic factors exhibited correlations with malnutrition prevalence. Children from lower socioeconomic backgrounds experienced higher rates of malnutrition, as did those from nuclear families and overcrowded households. Maternal literacy and occupation also played significant roles, with malnutrition prevalence higher among children of illiterate or laborer mothers.

Additionally, the timing of breastfeeding initiation and complementary feeding had implications for malnutrition prevalence. Children breastfed for 6 to 12 months showed lower rates of malnutrition compared to those breastfed for shorter or longer durations. Similarly, children with complementary feeding initiated at or after 6 months had lower malnutrition prevalence compared to those with earlier

initiation. Immunization status emerged as another critical factor, with partially immunized children exhibiting significantly higher rates of malnutrition compared to fully immunized counterparts.

Overall, these findings highlight the complex interplay of socio-economic, dietary, and healthcare factors in determining the nutritional status of under-five children. Addressing malnutrition effectively requires multifaceted interventions that encompass dietary improvements, socio-economic support, maternal education, and healthcare access to ensure the well-being of young children in communities worldwide.

4. Discussion

The findings from the National Family Health Survey (NFHS) – 4 revealed alarming rates of underweight and severe underweight among pre-schoolers below 5 years of age, with 35.7% and 11% affected, respectively. These results were consistent with the current study's findings, indicating a persistent challenge of malnutrition among young children in the population. NFHS – 4 further highlighted disparities in malnutrition prevalence based on socio-economic status, with the lowest wealth quintile experiencing a significantly higher incidence of underweight compared to the highest quintile.

However, the current study identified slightly different trends compared to NFHS – 4. One notable difference was the higher prevalence of malnutrition among children from nuclear households. This discrepancy was attributed to factors such as lack of knowledge regarding proper feeding habits or the absence of parental supervision due to working parents. Similar findings were reported by Mahendraker et al. (2015), who observed higher morbidity rates among children in overcrowded households.

Furthermore, the influence of maternal education and occupation on child malnutrition was evident in the current study. Children of illiterate mothers exhibited a significantly higher incidence of malnutrition compared to those with more educated mothers, as reported by A. Mittal and S. K. Ahluwalia (2017). Similarly, children of working mothers were more prone to

malnutrition compared to those with mothers who were homemakers, as found by A. Mittal and J. Singh (2017).

These consistent findings across multiple studies underscore the complex interplay of socio-economic factors, parental education, and household dynamics in shaping child malnutrition outcomes. Addressing these underlying determinants through targeted interventions and educational programs is essential to effectively combatting the prevalence of malnutrition among young children.

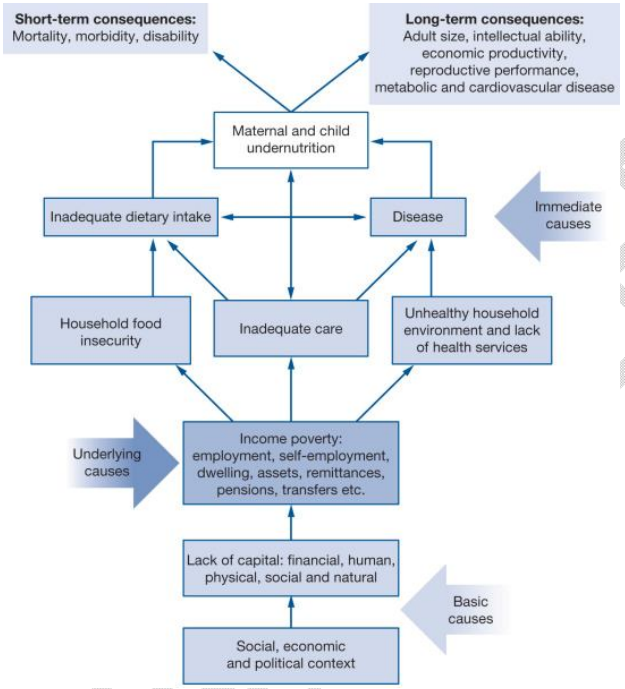

Fig 1. Maternal and child undernutrition

Several studies, including those by M. Shafiqur Rahman et al. (2016), J. Lakshmi A and K. Begum (2018), Victora CG et al. (2016), Anita Khokhar and S. Singh (2018), and S. N. Dwivedi et al. (2017), have provided corroborating evidence regarding factors influencing the prevalence of malnutrition among children.

M. Shafiqur Rahman et al. (2016) observed a higher incidence of malnutrition among children with low birth weight compared to those with normal birth weight, aligning with similar findings reported by other studies. Additionally, J. Lakshmi A and K. Begum (2018) identified a trend of increased malnutrition prevalence with higher birth order, with the highest rates observed in children born fourth or later. Victora CG et al. (2016) highlighted the importance of breastfeeding duration, noting that while malnutrition prevalence was lowest among children breastfed for 3 to 6 months, it increased thereafter. This trend was attributed to inadequate complementary feeding practices after 6 months of age, a finding supported by Anita Khokhar and S. Singh (2018), who reported higher malnutrition prevalence among children weaned early compared to those breastfed exclusively for up to 6 months.

Furthermore, S. N. Dwivedi et al. (2017) emphasized the protective effect of immunization against malnutrition, with immunized children experiencing lower rates of malnutrition compared to unimmunized children. These findings underscore the multifaceted nature of malnutrition and highlight the importance of addressing factors such as birth weight, birth order, breastfeeding practices, and immunization status in efforts to reduce malnutrition prevalence among children.

5. Conclusion

Protein Energy Malnutrition (PEM) poses a significant health challenge among children, with more than one-third experiencing underweight, and some facing severe underweight. Interestingly, the incidence of malnutrition tends to be slightly higher in female children compared to males. Moreover, malnutrition rates vary across age groups, with the highest prevalence observed in children aged 5 to 6 years and the lowest in those aged 4 to 5 years.

Dietary habits also play a crucial role, as children who fail to consume the recommended calories according to their age are more likely to experience malnutrition. Additionally, socio-economic factors contribute significantly, with higher rates of malnutrition observed among children from

social class I, nuclear families, and overcrowded households. Maternal education and occupation further impact malnutrition prevalence, with higher rates found among children of illiterate mothers or those engaged in labor or agricultural work.

Furthermore, certain maternal and child health factors are associated with increased malnutrition risk. Children with low birth weight, shorter interpregnancy intervals, higher birth orders, or longer durations of breastfeeding without adequate complementary feeding are more prone to malnutrition. Additionally, partially immunized children exhibit higher malnutrition rates compared to fully immunized ones.

These factors collectively contribute to the development of micro and macro nutrient deficiencies, ultimately leading to the onset of PEM among children. Addressing these underlying determinants through comprehensive interventions targeting dietary practices, socio-economic inequalities, and maternal and child health services is crucial for combating the prevalence of malnutrition and improving child well-being.

Recommendations

Maternal literacy plays a crucial role in shaping child rearing practices and the utilization of child health services. Therefore, there is a pressing need to expand literacy programs for girls to promote toddler health, prevent malnutrition, and enhance the utilization of health services. Mothers should receive counseling on optimal infant feeding practices, including the importance of colostrum, initiation of breastfeeding, and exclusive breastfeeding during the antenatal period.

Nutritional education and counseling sessions should be conducted regularly to educate mothers on the initiation of complementary feeding and the quality and quantity of foods suitable for infants after six months of age. Health care providers such as anganwadi workers, ASHA

workers, and Female Health Workers need to be sensitized and trained periodically on infant and young child feeding practices.

Immunization is vital in protecting children against common vaccine-preventable diseases and reducing the risk of stunting. Therefore, efforts should focus on maintaining high routine immunization coverage and strengthening immunization services.

Regular growth monitoring of every child by trained healthcare providers is essential for early detection of growth faltering and nutritional deficiencies. Monitoring activities should be strengthened at the regional level, and factors contributing to malnutrition should be closely supervised and addressed. By implementing these measures, we can effectively combat malnutrition and promote the overall health and well-being of children.

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