NUTRITIONAL STATUS OF PRESCHOOL CHILDREN:
A SOCIO-ECONOMIC STUDY OF RURAL AREAS OF
KASARAGOD DISTRICT IN KERALA

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Introduction

Child malnutrition is a widespread public health problem having international consequences because good nutrition is an essential determinant for their well-being. The most neglected form of human deprivation is malnutrition, particularly among preschool children. India is one of the few countries in the world where poor nutritional status among preschool children is detrimental to their health outcome. Nutritional status indicators like wasting, stunting, low birth weights, breast feed availability and vitamin A deficiency are also still high in India compared to the USA and China. Child malnutrition reflects a number of intermediary processes such as household access to food, access to health services and caring practices.

Kerala’s health care system is moving through a very turbulent period. In spite of having the best indicators on child development, certain disturbing trends have emerged in the state in recent years affecting this status. This includes low birth weight, stunting of growth, wasting, increasing trends of underweight, poor maternal nutritional status and high rate of anaemia among women and children, etc (NFHS-3, 2005-06). Though Kerala known world over for its high human development achievements attained without much rural-urban disparities and caste-class differentiation, the State is now facing serious threats, especially in the field of nutritional status among rural preschool children.

Various NFHS rounds and District level household survey (DLHS-3, Kerala) sweeps light on not so rosy picture of child nutritional status in Kerala compared to all India. All India child nutritional status reveals that there are 38 percent of stunted, 19 percent of wasted and 46 percent of underweight children whereas Kerala accounts for 21 percent of stunted, 16 percent of wasted and 29 percent of underweight children. These reports also reveals that rural preschool children have more difficulty in coming out of ‘undernutrition trap’ when they enter into the stages of adolescent and adulthood in contrast to the urban children. Several previous studies concluded prevalence of large disparities in district wise analysis of child nutritional status in Kerala. Though Kerala has been successfully implementing all nutrition oriented programmes and related programmes of housing, sanitation and potable drinking water, the state could not achieve the nutritional level of best performing states.

In this context, the present study focuses its attention on rural areas of Kasaragod district. Kasaragod district is a true representation of the rural picture of Kerala having 80.58 percent of population living in rural areas. Though Kerala is in
the forefront of all health and nutritional indicators compared to other states in India, the rural areas of Kasaragod district suffers severe handicaps in the health and nutritional arena. Kasaragod is the only district in the state where two taluks have the lowest health infrastructure facilities. Preschool children constitute the most vulnerable segment of any community. Their nutritional status is a sensitive indicator of community health and nutrition. Rural preschool children will be a disadvantageous position to their urban counterparts regarding nutritional achievements. Nutritional indicators are measured in terms of stunting, wasting and underweight. DLHS-RCH survey (2002-04) reveals, 13.1 percent preschool children are under severe malnutrition category and 35.2 percent are moderate malnutrition category in Kasaragod district. The ICDS coverage is not effective in rural areas of Kasaragod. Similar studies are not available in rural areas of Kasaragod district; by considering all of these, the present study aims to measure socio-economic study on the nutritional status of preschool children of rural areas of Kasaragod district in Kerala.

Objectives of the study

1. to analyze and evaluate the trends and patterns of malnourishment among preschool children in Kerala.
2. to analyze the inter-relationship between household deprivation and family profile of the households of preschool children in the study area.
3. to examine the linkage of socio-economic status and extend of malnourishment among preschool children in rural areas of Kasaragod district in Kerala.
4. to suggest the cross-cutting strategies for combating malnutrition among preschool children in rural Kerala.

Hypothesis of the study

1. Environmental, maternal and individual factors are influencing nutritional status of preschool children in rural areas of Kasaragod district.
2. There is a strong correlation between household deprivation status and nutrition status of the preschool children in study area.

Review of Literature

The health and nutrition status of children is one of the crucial elements in the assessment of quality of life of the people. Access to healthy diet and optimum nutrition is key to good health. Following reviews focus its attention on the health consequences of malnutrition among children. Vinod K. Mishra et al (1999) examines
the multivariate analysis of the effects of selected demographic and socioeconomic factors on child malnutrition indicates that the strongest predictors of child nutrition in India are child’s age, child’s birth order, mother’s education, and household standard of living.

Susmita Bharati et al (2001) are to assess the spatial distribution of nutritional status of Indian children, the study shows that there are gender differences and spatial variations in the nutritional status of children in India. The weight-for-age and height-for-age scores showed a dismal picture of the health condition of children in almost all states in India. Lily Yaa Appoh and Sturla Krekling (2001) examine the relationship between mother's nutritional knowledge, maternal education, and child nutritional status in the Volta Region of Ghana. Maternal formal education and marital status were also found to be associated with child nutritional status in bivariate analysis.

Girma Woldemariam and Timotiows Genebo (2002) examines the determinants of nutritional Status of Women and Children in Ethiopia, it reveals that household economic status, education of parents, number of prenatal care visits of the mother, child’s age, birth order and preceding birth interval are important determinants of child stunting. Elangovan and Shanmugan (2002) analyses the immunization and nutritional status among children aged under five in a major district in India, it reveals that Children in rural areas in India die due to infectious and communicable diseases.

Rajaram et al (2003) analyses the childhood malnutrition in Kerala and Goa revealed that the confounding factors that influence the nutritional status of children in these states. The results showed that the relative prevalence of underweight and wasting was high in Kerala, but the prevalence of stunting was medium. The study recommends more area-specific policies for the development of nutritional intervention programmes. Uma Sanghvi et al (2004) assessing potential risk factors for child malnutrition in rural Kerala, it indicate that 42-57 percent of all child deaths in developing countries are due to the potentiating effects of malnutrition on infectious diseases, of which over three-quarters can be attributed to mild-to-moderate malnutrition.

Jayanta Bhattacharya et al (2004) examine the relationship between nutritional status, poverty and food insecurity for household members of various ages. While poverty is predictive of poor nutrition among preschool children, food insecurity does not provide any additional predictive power for this age group. Michele Gragnolati et al (2005) examined the study explores the dimensions of child undernutrition in India
and the effectiveness of the Integrated Child Development Services (ICDS) program in addressing it. Jyothi Lakshmi et al (2005) investigated the morbidity profile of preschool children in relation to the child and maternal factors. Prevalence, duration and incidence of infections were marginally lower among female children. Age among the child factors and literacy status and living conditions among the environmental factors were found to be critical factors that influenced the health status of preschool children. K.R.G Nair (2007) analysed the inter-state differentials in malnourishment among children in India, it finds the ICDS as the best package to tackle the issues and suggest to extend it and make it more oriented towards reducing child malnourishment. Harsha Aturupane et al (2008) examine the determinants of child weight and height in Sri Lanka: A quantile regression approach, it reveals that reducing child malnutrition is a key goal of most developing countries. To combat child malnutrition with the right set of interventions, policymakers need to have a better understanding of its economic, social and policy determinants.

The above review of various research studies on child nutritional status has given an important insight into the factors influencing child nutritional status of preschool children. None of the studies done earlier has made an attempt to correlate household deprivation status and nutritional status of the preschool children. The present study aims to fulfill the gap that exists in the literature on nutritional status of preschool children.

**Methodology**

There are mainly two approaches to measure the incidence of malnutrition among vulnerable groups of the society. (i) Calorie/nutrition intake approach (Sukhatme, 1977, 1982; Gopalan, 1992; Seckler, 1982, 1984), and (ii) Anthropometric approach (Strauss and Thomas, 1995; Kakawani, 1997; Svedberg, 2001; Pal, 1999; Osmani, 1992). Dietary approach is taken into consider one nutritional element only, viz the energy (calorie) content in the food. The present study focus on anthropometric approach, it is considered as more reliable measurement over calorie intake approach. It was used almost exclusively to estimate undernutrition among children under the age of six.

Causes of malnutrition in children are complex, ranging from biological and social to environmental factors. Based on the previous research about the causes of malnutrition, here constructed a conceptual hierarchical framework of the determinants of nutritional status. According to the conceptual model, variables in this model can be
divided into three groups: socio-economic variables, intermediate factors include environment variables and maternal variables and proximal factors. These variables, in turn, may affect the nutritional status of preschool children.

In this context, the present study constructed a household deprivation score (HDS) based on the socio-economic status of household. The index of deprivation is based on simple measurement of deprivation of the households in three dimensions of deprivation: 1) basic economic assets; 2) basic amenities and 3) basic communications with the outside world. This deprivation index is not a direct measure of the economic condition of the household as the per capita income or expenditure or the standard of living index but a measure of the extent to which the household is deprived in the above three dimensions. In HDS-I, those which have no above six possessions or have one or two possessions, it indicates ‘moderate deprivation’ (MD) and it indicates the deprived sections of the population. Three or four as in HDS-II indicate ‘just above deprivation’ (JAD) and five or six items in HDS-III indicate ‘well above deprivation’ (WAD). Against this background, this study is designed in an attempt to examine household deprivation index (HDS) and that of households affect child nutritional status regardless of their individual characteristics, and how they interact in this process.

Cross-sectional descriptive survey using a well-structured questionnaire and measurements of weight and height to determine the nutritional status of children aged below 6 years (preschool age group) and to examine the impact of socio-economic, environmental, demographic and household deprivation on nutritional status of preschool children in rural areas of Kasaragod district in Kerala. In this context, the present study is confined on rural areas of Kasaragod district in Kerala. It comprises of two taluks of Kasaragod and Hosdurg. Almost all child development indicators were poor in hosdurg taluk and majority of the rural people lived in this taluk. In Hosdurg taluk, five PHC and two CHC were randomly selected from the list of PHC/CHC centres of Kasaragod district. Socio-economic, environmental and demographic particulars were collected from the households of the 400 preschool children covered in each selected PHC/CHC.

Data were gathered by a combination of a structured questionnaire and the collection of anthropometric data through measurements of height and weight was measured. The anthropometric measurement by National Center for Health Statistics (NCHS) and WHO standards (WHO, 1995) were used for the determination of
nutritional status of preschool children. Standard deviation of scores (Z-scores) for weight-for-age (WAZ), height-for-age (HAZ) and weight-for-height (WHZ) were calculated.

Both bivariate and multivariate analyses are employed to identify the determinants of underweight, stunting and wasting in preschool children in rural areas of Kasaragod district in Kerala. These analysis focus on two outcomes of nutritional status for children: whether they are undernourished or not. In the bivariate analysis, the Chi-square test was employed to see the association between each of the independent variables under study and the nutritional status of preschool children as measured by underweight, stunting and wasting, and p-values less than 0.05 are considered as significant. The Chi-square bivariate analysis does not consider confounding effects; therefore, the net effects of each independent variable are estimated controlling other factors using the Logistic regression multivariate analysis.

Results and Discussion

Household deprivation status has strongly influenced the child nutritional status among preschool children. HDS-I group has 9 percent of kutcha/semi-pucca houses and HDS-II group has 40 percent of kutcha/semi-pucca houses. While 89.8 percent of the households have some land, the remaining 10.2 percent of households have no land. Rural areas of the district has about 64.5 percent of households getting own arrangement of drinking water facilities within the residence. In the case of adult literacy, about 97 percent of the adult males in the households surveyed were literate. Among the literates, about 9 percent came from HDS-I, 44.5 percent in HDS-II and 43.5 percent in HDS-III group. The survey found that while 11.2 percent of households do not have radio/TV/newspapers, 88.5 percent of families have at least one of these. Household deprivation index is not a direct measure of the economic condition of the household as the per capita income or expenditure or the standard of living index but a measure of the extent to which the household is deprived.

HDI-I, HDI-II and HDI-III includes 11 percent, 45.2 percent and 43.8 percent of preschool children respectively. On the basis of weight-for-age classification, 52.27 percent, 46.93 percent and 21.14 percent of preschool children were moderately underweight in HDS-I, HDS-II and HDS-III groups and severe underweight was more seen in HDS-I group. Height-for-age (HAZ) classification, 65.90 percent, 54.14 percent and 38.29 percent of preschool children were moderately stunted in HDS-I, HDS-II and HDS-III groups. But severe stunted was more seen in HDS-II group.
According to weight-for-height (WHZ) classification, 45.45 percent, 33.15 percent and 13.71 percent of preschool children were moderately wasted in HDS-I, HDS-II and HDS-III groups. These results confirm that malnutrition is both a cause and consequence of economic status which is the key determinant of the nutritional status of preschool children. This study also found that household deprivation score is a stronger correlation of nutritional status of preschool children in rural areas of Kasaragod district. Hindu and Muslim children are equally likely to be undernourished, but Christian children are considerably better nourished. Children belonging to scheduled castes/scheduled tribes or other backward classes have relatively high levels of undernutrition according to all three measures of nutritional status.

Extent of malnutrition varies with the age of the child and the prevalence of underweight children varied by age. The age-wise classification was higher in 37-48 months age category (10.5%) and 49-60 months age category (10.2%). The higher incidence of malnutrition among children of 3 to 4 years of age is mainly due to poor infant feeding practices. The survey findings indicate that only marginal differences in proportion in undernutrition are observed by sex of child in the case of underweight, stunting and wasting. A greater proportion of first born children exhibited a better weight-for-height ratio than the ones born later. The association between stunting, wasting and birth order was found to be significant at 0.05 level. These findings reveals that a birth order of three or more show a birth interval of less than 24 months which is unhealthy for the mother.

Mother’s education could bring about a noteworthy reduction in the incidence of underweight in preschool children in the study area. Mother’s education has a milder influence on wasting than on stunting in preschool children. 14 percent of children of mothers with at most primary education are moderately wasted. This signifies the importance and necessity of female education in improving the child nutritional status of the children and hence the future generation. The present study reveals that 66.2 percent of mothers were spending on work at home including meal preparation and child care and 26.8 percent of mothers were engaged in agricultural and allied activities and only 7 percent of mothers are included in employment class.

The nutritional status of the preschool children has a significant association with that of their mothers. The prevalence of moderate underweight was high (21%) in medium nutritional awareness score category and prevalence of stunting was highest in
medium NAS. But in the case of the prevalence of wasting was highest in low nutritional awareness score category.

Chi-square test for bivariate analysis reveals that religion, caste, education status of mother, work status of mother, mother’s mean age at marriage, household deprivation status, age of child, nutrition awareness of mother and birth order are the statistically significant in the case of underweight among preschool children in rural areas of Kasaragod district in Kerala. Sex of child is statistically insignificant in this case. It also reveals that religion, caste, education status of mother, work status of mother, mother’s mean age at marriage, household deprivation status, nutrition awareness of mother and birth order are the statistically significant in the case of stunting and wasting among preschool children. Sex and age of child are statistically insignificant in this case.

The results of the logistic regression analysis underweight among preschool children was associated with religion, community, education status of mother, mean age at marriage, age of child and nutritional awareness score of mother and these factors are statistically significant. The overall significance of the logistic regression model has been provided by the likelihood ratio test, which is highly significant. $\chi^2_{25} = 89.5647$ (p-value = 0.0000). It reveals that religion, community, nutritional awareness score of mother are the significant predictors of the stunting among preschool children. The overall significance of the logistic regression model has been provided by the likelihood ratio test, which is highly significant. $\chi^2_{25} = 75.0015$ (p-value = 0.0000). Community, nutritional awareness score of mother are the significant predictors of wasting among preschool children in rural areas of Kasaragod district in Kerala. The overall significance of the logistic regression model has been provided by the likelihood ratio test, which is highly significant. $\chi^2_{25} = 83.5209$ (p-value = 0.0000).

As is apparent from the data presented above, At a certain uncontrollable factors as household deprivation status, religion, community, age, sex, birth order further make it favourable for the onset of malnutrition. But socio-economic factors, mother’s nutritional status, mother’s educational status and knowledge on nutrition, contribute to a child’s malnutrition status to a large extent, these factors are definitely controllable.
Of the families of preschool children, 36.75 percent is addicted to alcohol and 24 percent to cigarette or beedi habits. Continuous uses of drugs or alcohol were witnessed among 38.25 percent of families of preschool children. According to the survey, 30.75 percent families undertake cleaning of their house on a daily basis, 56 percent on weekly and 13.25 percent only on occasional basis. Drainage facilities were also found to be lacking in 91.5 percent of families. Pet animals or birds are often the carriers of various diseases. Allowing them to stay inside house will affect household hygienic condition which will have its toll on the small children in the family. While 78.25 percent families are not bothered about this, only 5 percent families allow the pets animals inside and 16.75 percent did not allow them to stay inside house. Private well was the main source of water for 67 percent of families of preschool children. At the same time, 16.5 percent of families depends on neighboured well, 12.5 percent on public tap and 2.8 percent on public well. It is revealed that 58.5 percent boiled water before drinking and 38.25 percent families protected their well with proper covering. Washing vegetables before cutting was undertaken by 72.25 percent families and 59.5 percent washed their hands before handling foods.

100 percent accessibility to primary health centres (PHC) was reported in study area, whereas availability of doctors in these centres was only 82.25 percent. Both medical camp and health awareness classes on health and nutrition were conducted in these areas, medical camp attendance was found to be very low at 27.25 percent compared to class attendance at 46.55 percent. At the time of delivery 20.8 percent of children were facing low birth weight (LBW) problems. Normal deliveries were reported at 75.3 percent. Health and nutritional awareness of mother is important for child care and child nutrition. Iodized salt is used by 55.6 percent of mothers in their food pattern. Child care at home is crucial factor for their development. While 80.5 percent of mothers undertake this responsibility themselves, 17 percent of mother-in-laws and only 2.2 percent others look after kids in the absence of mother. Nutrition awareness score (NAS) is constructed on the basis of health and nutritional awareness of mother. As per the study, 25.5 percent among them are low NAS, 71.2 percent as medium NAS and 3.2 percent as high NAS.

The findings of this study stress on the empowerment of women with education, economic independence and decision making in child rearing followed by education on nutrition and health care, thereby achieving an improvement in the nutritional status of preschool children in rural areas of Kasaragod district in Kerala.
Policy Implications

The broad strategies that will be adopted to reduce malnutrition of preschool children in rural Kerala are as follows: Adopting life-cycle and rights based approaches to nutrition. The primary focus would be to strengthen family practices related to Infant and young child feeding, sick child care with appropriate medical treatment and nutrition management, prevention of illnesses through immunization and hygiene/sanitation, appropriate cooking and dietary practices in the family, appropriate use of nutritional supplements and micronutrient supplements and diarrhoea management through ORT to be promoted within the family. In order to support the family based counselling and behaviour, change communication, local community based approach will be taken up at the neighbourhood and community level to enable a positive environment to promote the appropriate family practices as acceptable social norms. The performance of food-based interventions needs to be improved by making them more demand driven. Merely scaling up the coverage of the programmes without improving their quality may not be the best way to reduce malnutrition. It is essential to reform the public distribution system and simultaneously release some resources needed by the ICDS and mid day meal programme.

Problem of undernutrition amongst preschool children needs to be addressed through comprehensive, preventive, promotive and curative measures. The community needs to be educated about environmental sanitation and personnel hygiene and also proper child rearing, breast feeding and weaning practices, especially in the context of changing life style of the rural people in Kerala. The government needs to spend more money on quality nutritional programs in order to improve the state of malnutrition and therefore health services, education for females and poverty.
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