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Spring 5-1-2020

**Prevalance, Risk factors for Malnutrition and effectiveness of  
need-based intervention on nutritional status and cognitive  
development of preschool children in Anganwadi centers of Udupi  
Dist.**

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**Title of the study:** Prevalence, risk factors for malnutrition and effectiveness of need based intervention on nutritional status and cognitive development of preschool children in Anganawadi centers of Udupi District.

### **Abstract**

Malnutrition is one of the most important global health problems, and it affects a large number of children in developing countries. Proper nutrition of children, which promotes adequate growth and good health is an essential basis for human development.

The effects of undernutrition on young children include retarded physical growth and motor development. Chronic malnutrition is associated with serious health impairment later in life, which adversely affects the quality of life. It can obstruct behavioural and cognitive development and reduce educational achievement. It can also cause deficient social skills, decreased attention and deficient learning. Malnutrition in early childhood has serious, long-term consequences; it increases morbidity bringing in greater risk of diseases and early death. As a step towards reducing the prevalence of malnutrition, there is a need to identify the important determinants of malnutrition in the specific population so that preventive and control measures can be adopted.

This study 'Prevalence, risk factors for malnutrition and to assess the effectiveness of the need based intervention on nutritional status and cognitive development of preschool children in Anganawadi centers of Udupi District' was carried out to identify the risk factors and to evaluate the need based intervention for malnutrition among preschool children.

The objectives were to identify the prevalence and risk factors of malnutrition among preschool children. To evaluate the effectiveness of need based intervention on mothers' knowledge on malnutrition and its management, changes in nutritional status (weight and height) of malnourished preschool children, and the changes in the cognitive development of malnourished preschool children.

The conceptual framework adopted for the study relied on the extended care model developed by Engle, Menon & Haddad in 1990 according to which the care to be provided from the household and the community are expected to meet the physical, mental and social needs of the growing children.

The methodology of the study was applied in two phases. The sample for phase I included a group of preschool children between three and six years of age registered in Anganawadi centres and their mothers. In phase I-part I a cross sectional survey design was adopted to find the prevalence of malnutrition among preschool children. The weight and height measurements of the children those who met the inclusion criteria in Anganawadi center were taken. The survey was conducted in 93 Anganawadi centers of 15 villages. A total number of 1485 preschool children were surveyed for the prevalence of malnutrition.

In phase I part II, a case-control design was used to find the risk factors for malnutrition. Children with weight for age ratio of less than -2 SD (-2Z scores) were selected as cases and controls were healthy children in the same age group with weight for age ratio above -2 SD (-2Z scores). Visits made to the houses of selected children and data on risk factors for malnutrition were collected from 190 mothers of underweight children and 360 mothers of normal weight children.

In phase II of the study, a cluster randomized controlled trial was carried out to evaluate the effectiveness of the need-based intervention. Twelve villages in Udupi taluk were randomized into experimental and control group (six each). 127 malnourished preschool children and 126 normal weight children between three and six years registered in Anganwadi centres and their mothers were included in phase II.

The data collection instruments used in the study were: Background information tool, Scale of socio-economic status of the family, Questionnaire on Risk factors for malnutrition, Knowledge questionnaire on malnutrition and its management, and Cognitive development scale. The validity and reliability of the tools were established. The health teaching programme module was developed after identifying risk factor and discussion with the guides. The validity of the programme module was established.

The phase I part I analysis related to sample characteristics revealed that 52.4% of the children were in the age group of 3.0 – 4.0 years and the mean age was  $4.09 \pm 0.834$ . Out of the 1485 children surveyed, 24.37% were underweight, 21.7% wasted, and 14.5% stunted. Most of underweight children (47.24%) were found among children aged between 3 and 4 years.

After adjusting for the confounders, the risk factors identified for underweight were socio-economic status of the parents, birth weight <2000 grams, recurrent diarrhoea, recurrent cold and cough, worm infestation and prelacteal feed supplement.

The phase II analysis of the sample characteristics revealed that children and mothers in the intervention and control group were having similar characteristics. Repeated measures ANOVA showed mean weight and height of the malnourished children and mean knowledge score of the mothers in the intervention group was higher than in the control group. The mean knowledge score of the mothers in the intervention group changed from  $10.63 \pm 2.89$  to  $19.93 \pm 2.23$  whereas in control group from  $11.07 \pm 2.86$  to  $12.29 \pm 2.81$ . The repeated measures ANOVA on knowledge scores between the groups revealed a higher statistical significance  $F_{(1, 251)} = 227.88, p < .001$ , partial  $\eta_p^2 = .479$  and within the intervention group analysis shown a statistical significance  $F_{(1.54, 126)} = 1.159, p < .001$ , partial  $\eta_p^2 = .904$ .

There was significant weight and height increase among the children in the intervention group. Analysis of repeated measures ANOVA on weight measurements between the groups proved a statistical significance  $F_{(1, 251)} = 15.42, p < .001$ , partial eta  $\eta_p^2 = .058$  and within the intervention group analysis revealed a higher statistical significance  $F_{(12, 125)} = 974.96, p < .001$ , effect size (partial eta)  $\eta_p^2 = .795$ . Analysis of repeated measures ANOVA on height within the intervention group showed a statistical significance  $F_{(2, 1258)} = 1.540, p < .001, \eta_p^2 = .860$ . The difference between the intervention group and control group was not found to be statistically significant  $F_{(1,251)}, 1.04, p = .308, \eta_p^2 = .004$ . The difference of change between the intervention and control group was minimal.

It was also observed that the cognitive development of the preschool malnourished children has improved significantly in the intervention group than the control group. There was significant difference in pre and posttest 2 ( $Mc\chi^2_{(df)} = 78.89_{(1)}, p < .001$ ) & pretest and posttest 3 ( $Mc\chi^2_{(df)} = 53.94_{(1)}, p < .001$ ) cognitive development scores in the intervention group. It is inferred that there was significant improvement in the cognitive development scores in the intervention group over the period of 12 months.

To conclude the need-based intervention was effective in improving the nutritional status and cognitive development of the preschool children, and also in increasing mother's knowledge on malnutrition management and dietary practices of the children.