



## EFFECT OF MATERNAL LITERACY FOOD INSECURITY ON THE NUTRITIONAL STATUS OF CHILDREN AGE 1-5 YEARS IN RURAL AREAS OF RUDRAPRAYAG

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### ABSTRACT

Child malnutrition is the major problem in developing countries like India. This research worked on the factors “maternal literacy” and “food insecurity”. Mother’s education which plays major role in giving the child primary care during early years of life and food insecurity effect the child’s health by not fulfilling dietary requirements of a child. Child nutritional status was calculated using tools to measure anthropometric measurements and maternal education level was observed with the help of a questionnaire and household food insecurity was measured using standard questionnaire of NHANES 2013. From the analysis, we noticed that 33% of children were stunted, 5% were underweight, 1% wasted, 18% both underweight and stunted, 6% both underweight and wasted and 31% were healthy, it was also concluded that there is “strong positive relation between child nutritional status and maternal education”. The frequency of feeding child was also very low in mothers which lead to child malnutrition because mothers were engaged in agricultural activities. Food insecurity was very low in rural areas of uttarakhand because they were dependent on the cultivated crops and available wild vegetables and fruits.

**KEYWORDS:** Malnutrition, maternal literacy, food insecurity, NHANES, feeding practices.

### INTRODUCTION

There are number of researches which showed that “children nutritional status” is dependent on the food insecurity and maternal education.<sup>[1,2]</sup> Developing country like India, there are many factors which are responsible for the nutritional status of children like, education level, social group and standard of living. Therefore in India malnutrition is more prevalent in low economic group and over nutrition is prevalent in high economic group.<sup>[3]</sup> “According to UNICEF” there are several factors such as poor childcare, household food insecurity and lack of healthy environment which can lead to child malnutrition in developing countries<sup>[1]</sup> According to “World health organisation (WHO)”, malnutrition means “the insufficient or excess in person’s intake of energy and nutrients”.<sup>[10]</sup> WHO classified malnutrition into three categories that is underweight, stunting and wasting. Weight for height is the best indicator for recent nutritional status and height for age indicates long term nutrition.<sup>[9]</sup> Z-score cut of points are used to identify moderate and severe malnutrition which is Z-score <-2 SD categorised under underweight, stunted and wasted as moderate and <-3

SD as severe malnutrition.<sup>[4]</sup> There are various factors which are responsible for causing “child malnutrition”. But maternal knowledge is of the most important factors which is directly related to causing malnutrition is mother’s nutritional knowledge because mother is the primary care provider to fulfil her child needs during “early stages of life”. Mother’s education level effects the child care practices to a great extent.<sup>[9]</sup>

### Causes of malnutrition

There are various factors which are responsible for causing “child malnutrition”. But maternal knowledge is of the most important factors which is directly related to causing malnutrition is mother’s nutritional knowledge because mother is the primary care provider to fulfil her child needs during “early stages of life”. Mother’s education level effects the child care practices to a great extent.<sup>[9]</sup>

In India majority of mothers don’t have knowledge about the child care practices. Reduce period of breastfeeding especially during the first 6 months increase the chances of malnutrition in infants and children.<sup>[4]</sup> Women education plays a major role in reduction of child

malnutrition showed by analysis of NFHS-3 data. There are studies which shows that girls who were malnourished and their early marriage and early conception leads to birth of low weight babies or malnourished babies.<sup>[4]</sup>

**Poor sanitation and hygiene practices** is another contributing factor to malnutrition. WHO states that “50% of malnutrition” is caused because of disease like “diarrhea” and other “intestinal infection”, the reason behind this are “bad or low sanitation practices” and “drinking unsafe water”. Open defecation may be one of the factor in India which is responsible for spreading infection.<sup>[4]</sup>

“Food Insecurity” is another factor which deals with the “sufficiency and quality of food”.<sup>[1]</sup> In 1996 “world food summit plan of action” describe food security as “food security exists when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life”<sup>[5]</sup> Therefore there are four elements of food security given by FAO: that is availability, accessibility, utilization and stability. In Himalayan region, food security depends on the agricultural productivity which is forest based and the purchasing power. There are many limitations to attain food insecurity in hilly regions like soil erosion, lack of infrastructure facilities, traditional methods of cultivation and fragmented land.<sup>[6]</sup> In hills crop production is low as compared to that with plains due to low level of irrigation facilities and difficulty in using advance technology because of non-availability. Therefore the major constraints in attaining food security are absence of proper market, finance, poor post-harvest management, high losses of soil due to erosion<sup>[7]</sup> Non-availability of adequate food especially high protein diet is one of the major reasons of causing child malnutrition, which can lead to growth retardation. In developing countries linear growth retardation is prevalent which cause between 6-18 months of age.<sup>[8]</sup>

## METHODOLOGY

The study was done by collecting data from the community and cross sectional method was used for conducting survey in Rudraprayag district of Uttarakhand, to study the effect of food insecurity and maternal literacy on children nutritional status age 1-5 years using semi structured questionnaire and measuring “MUAC(mid upper arm circumference)”, “weight” and “height”. 100 samples were collected from 4 villages of Rudraprayag district. In household with more than one child between the ages of 1-5 years. Height was measured using centimeter tape and Vernier tape was made to measure the “mid- upper arm circumference (MUAC)” of children and Weighing machine was used to calculate the “weight” of children. Anthropometric measurements data was collected, “self-designed questionnaire” and “standard questionnaire”. The data

was collected from children and their mothers. Anthropometric measurements height, weight and MUAC were taken following the standard methods to check the nutritional status of children and food insecurity standard questionnaire and maternal literacy and knowledge questionnaire were used to collect information from mothers. The maternal literacy questionnaire mainly include questions regarding the education level of mother, infant feeding practices, deworming, sanitation and hygiene practices to check the basic knowledge of mother regarding the nutrition and child care. The food security household standard questionnaire by NHANES 2013 was used to check the food insecurity in household. It consist of 18 household food security questions. 10 questions were directly related to adult while 8 questions were specific to children. The questionnaire concerned on last 12 months conditions and respondent mainly response in often/sometimes/never true. The positive response of any of these questions indicates food insecurity in the household. Anthropometric measurements were taken for 1-5 years of children. The collected data was arranged and entered in a “Microsoft excel version 2010” and then into “statistical software SPSS (statistical package for social sciences)”. Children nutritional status was analyzed by comparing it with “WHO growth standard graphs” and, demographic characters and response of participants were represented on tables using descriptive study. Anthropometric measurements height, weight were used to calculate underweight, stunted and wasted children by using WHO growth charts to measure their z scores and MUAC was also measured using WHO growth standard. Correlation test was applied to check the correlation between the nutritional status of children and other two variables. Subjects were asked about their occupation, education level and income of family to measure their socio economic status and analyze them using kuppaswamy scale 2019. Food security was measured by positive response of respondents. Three options were available often/sometimes/never true one positive response indicated food insecurity in the household. And mother’s literacy was measured by her education level.

## RESULT

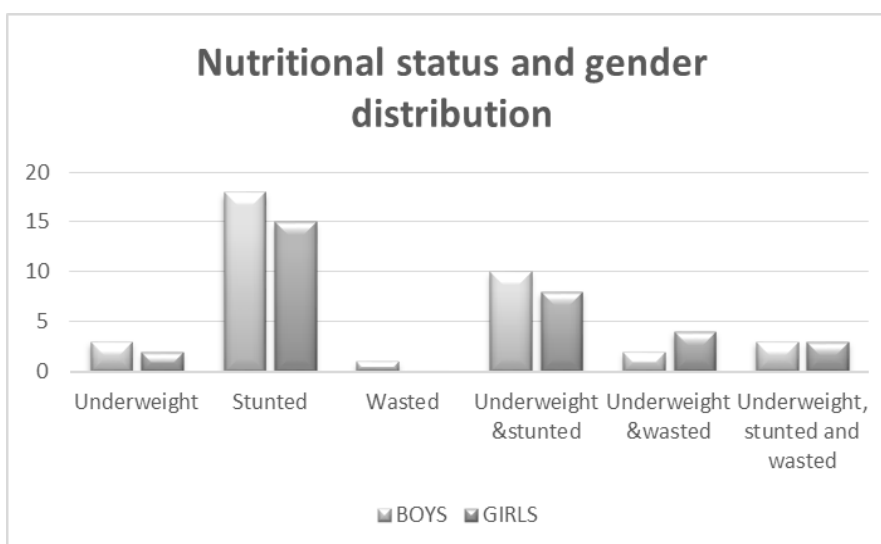
There were 100 children, 50 male and 50 female from four villages of Rudraprayag district of Uttarakhand were included in this study. Mothers of these children were also interviewed for the collection of data regarding their knowledge and household food insecurity.

**Table no. 1: Nutritional Status of Children.**

| VARIABLES                       | ALL CHILDREN<br>n=100 |    | BOYS<br>n=50 |    | GIRLS<br>n=50 |    |
|---------------------------------|-----------------------|----|--------------|----|---------------|----|
|                                 | NO.                   | %  | NO.          | %  | NO.           | %  |
| Underweight<br>(<-2z score)     | 5                     | 5  | 3            | 6  | 2             | 4  |
| Stunted<br>(-2z score)          | 33                    | 33 | 18           | 32 | 15            | 30 |
| Wasted<br>(-2z score)           | 1                     | 1  | 1            | 2  | 0             | 0  |
| Underweight &stunted            | 18                    | 18 | 10           | 20 | 8             | 16 |
| Underweight &wasted             | 6                     | 6  | 2            | 4  | 4             | 8  |
| Underweight, stunted and wasted | 6                     | 6  | 3            | 6  | 3             | 6  |
| Healthy                         | 31                    | 31 | 14           | 28 | 17            | 34 |

Table no.1 shows that the above table shows that the prevalence of stunting was 33% which is higher in children. Among boys it was higher i.e. 32% than the girls 30%. There were 5% of underweight children out of

which 3% were boys and 2% were girls. The prevalent of both underweight and stunted children were 18% which was higher among boys than the girls. Whereas the only 1% of children were wasted.

**Fig no. 1.****Table No. 2: Mid Upper Arm Circumference of Children.**

| MID UPPER ARM<br>CIRCUM FERENCE | ALL CHILDREN<br>n=100 |    | BOYS<br>n=50 |    | GIRLS<br>n=50 |    |
|---------------------------------|-----------------------|----|--------------|----|---------------|----|
|                                 | NO.                   | %  | NO.          | %  | NO.           | %  |
| Below -2z score                 | 26                    | 26 | 11           | 22 | 15            | 30 |
| Below -3z score                 | 6                     | 6  | 3            | 6  | 3             | 6  |

From table no.2 it showed that From above table 26% of children had MUAC below -2z score in which 30% were girls and 22% were boys and only 6% children had MUAC below -3z score.

**Table no. 3: Education Level of Mother and Child Nutritional Status.**

| Nutritional status    | Junior school |    | High school |    | Interschool |    | Graduate |    | R value | P value |
|-----------------------|---------------|----|-------------|----|-------------|----|----------|----|---------|---------|
|                       | No.           | %  | No.         | %  | No.         | %  | No.      | %  |         |         |
| Malnourished children | 30            | 30 | 35          | 35 | 3           | 3  | 1        | 1  | 0.74    | 1.27    |
| Healthy children      | 0             | 0  | 1           | 1  | 10          | 10 | 20       | 20 |         |         |

Table no.3 shows that, majority of children (35%) whose mothers studied only up to high school (10<sup>th</sup> class) were malnourished then the children whose mothers who studied up to inter (12<sup>th</sup>) and graduation. There is a

strong positive correlation between the mother literacy level and child nutritional status ( $0.25 < r < 0.75$ ). And there is no linear relationship between mother's literacy and child nutritional status ( $p > 0.05$ ).

**Table No. 4: Other factors related to nutritional status of children.**

| Variables                                  | All children<br>n=100 | Mean | SD   | P value | r value |
|--|-----------------------|------|------|---------|---------|
| During diarrhea ORS given                  | 49                    | 1.49 | 0.49 | 0.41    | 0.63    |
| Give deworming tablets                     | 37                    | 1.37 | 0.48 | 0.005   | 0.61    |
| hygiene practices during feeding her child | 43                    | 1.43 | 0.49 | 0.0003  | 0.81    |

From table no.4 it showed that there was a "positive intermediate correlation" between the nutritional status of children and ORS given during diarrhea ( $0.25 < r < 0.75$ ), and "it is not statistically significant" ( $p > 0.05$ ). While there is "positive intermediate correlation" between the deworming tablets given to

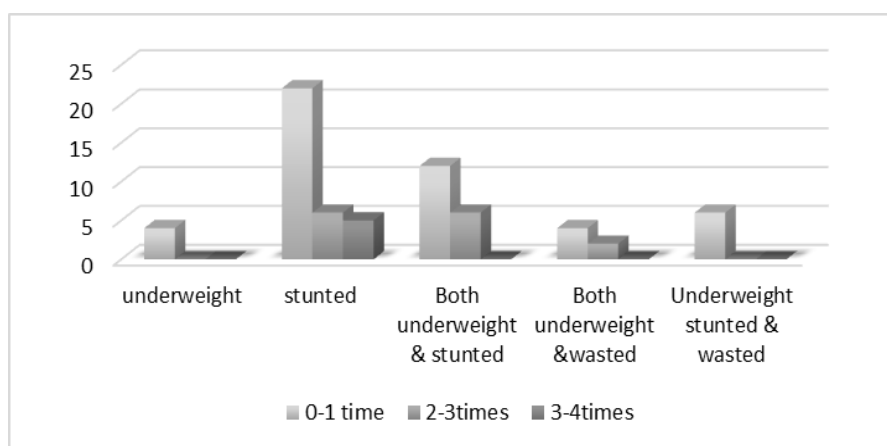
children and nutritional status of children ( $0.25 < r < 0.75$ ), "it is statistically significant" ( $p < 0.05$ ). The above table shows that, there was a "strong positive correlation" between the nutritional status of children and sanitation and hygiene practices ( $r > 0.75$ ), and "it is statistically significant" ( $p < 0.005$ ).

**Table no. 5: Frequency Of Feeding Complementary Food And Nutritional Status Of Children.**

| NUTRITIONAL STATUS           | Frequency of feeding with complementary foods |     |          |    |          |    |
|------------------------------|---|-----|----------|----|----------|----|
|                              | 0-1time                                       |     | 2-3times |    | 3-4times |    |
| Underweight                  | 4   | 4%  | -        | -  | -        | -  |
| Stunted                      | 22  | 22% | 6        | 6% | 5        | 5% |
| Both underweight & stunted   | 12  | 12% | 6        | 6% | -        | -  |
| Both underweight & wasted    | 4   | 4%  | 2        | 2% | -        | -  |
| Underweight stunted & wasted | 6   | 6%  | -        | -  | -        | -  |

From table no.5 showed that children who feed only 0-1 times along with breastfeeding were more stunted (22%) and malnourished than the children who feed 2-3 times

and 3-4 times. Children who were both stunted and underweight had feeding frequency 0-1 time (12%) and 2-3 times (6%).



**Fig no.2: Complementary feeding and nutritional status of children.**

**Table no. 6: Socio Economic Status.**

| Socio Economic Status | All children |     |
|-----------------------|--------------|-----|
|                       | NO.          | %   |
| Upper middle          | 28           | 28% |
| lower middle          | 51           | 51% |
| Upper Lower           | 13           | 13% |
| lower                 | 8            | 8%  |

From table no.6 it showed that 51% of children belongs to lower middle class, 28% from upper middle class, 13% from upper lower and 8% from lower class.

**Table no. 7: Children Nutritional Status and Food Security.**

| Nutritional status    | Food security |    |     |    | r value | P value |
|-----------------------|---------------|----|-----|----|---------|---------|
|                       | Yes           |    | No  |    |         |         |
|                       | No.           | %  | No. | %  |         |         |
| Malnourished children | 51            | 51 | 18  | 18 | 0.38    | 0.07    |
| Healthy children      | 30            | 30 | 1   | 0  |         |         |

Table no.7 shows that, majority of malnourished children belongs to food secure households, whereas only 30% of healthy children belongs to food secure household. And there is positive intermediate correlation ( $r=0.38$ ) between the food security and children nutritional status, and there is no linear relationship between the food security and children nutritional status.

## DISCUSSION

This study showed that the frequency of malnutrition among the children of rural area of uttarakhand was high. The prevalence of stunted (33%) and both stunted and underweight (18%) children was high, whereas the frequency of “wasted” and “underweight” children was only 5% and 1% respectively. The Mid upper arm circumference data revealed that 26% of children had MUAC below  $-2z$  score and 6% children had MUAC below  $-3z$  score.

From the data, we observed that 30% and 37% of mothers studied up to 8<sup>th</sup> and 10<sup>th</sup> class whereas 14% and 19% mothers completed their 12<sup>th</sup> and graduation. When statistical analysis was done, it showed that there is “strong positive correlation” between the child nutritional status and education level of mother, but it did not show linear relationship between the mothers education and children nutritional status ( $p>0.05$ ). Other researches.<sup>[9,11]</sup> showed there is a strong relation between the education level of mothers and health status of child and also stated that the child nutritional intake increases with the increase in “maternal education” level. The intake of more effective foods such as fruits, vegetables, milk products, oils and nuts was high among the preschool children having literate mother than the children having illiterate mother.

Intake of deworming tablets and ORS during diarrhea showed that 37% and 49% of children take deworming tablets and ORS during diarrhea. And on statistical analysis it showed that intake of deworming tablets in every 6 months and consumption of ORS during diarrhea were positively correlated with nutritional status of children. Whereas proper maintenance of hygiene before feeding child were positively correlated and it was also statistically significant. In India, under ICDS programme on every 6 month deworming tablet given to child for better digestion and absorption of nutrients. There is a research<sup>[12]</sup> which shows that administration of deworming tablets in malnourished children helps in increasing weight and improve child growth.

In this research, there were 51% of children who belonged to lower middle class group but still food insecurity was very low and “nutritional status of children” and “food security” were positively correlated with each other. If there is enough availability, accessibility and utilization of resources then food security is present which leads to variability in food choices and therefore better nutrition. Our research shows that there was low prevalence of household food in rural areas of uttarakhand because people especially women were engaged in agricultural activities and they were not depend on the availability of food in markets. They had made food and nutritional security blend with the help of available resources around them in nature.<sup>[13]</sup> There are large number of wild vegetables and fruits which are used during the scarcity in the production of cultivated crops. During winter season, they use dehydrated vegetables and also cultivate crops in poly houses. They gained knowledge about these wild plants from their ancestors and diversity in their food helps them to live a food secure life.

## CONCLUSION

From this study we concluded that the both food security and maternal education were a positively correlated with each other. “Maternal education” is strong correlated with “child nutritional status”. Thus it is important that mother should be literate then there will be high chances that her child is not malnourished. But not only the maternal education level, nutritional knowledge also important. Therefore intervention of nutrition knowledge regarding infant feeding practices (IYCF), deworming tablets, ORS and sanitation and hygiene practices is important to prevent child malnutrition. In rural areas of uttarakhand mothers are literate and they are well aware of breastfeeding practices but some had low knowledge about complementary feeding and importance of hygiene practices. They were generally engaged in agricultural activities therefore because of ignorance also she couldn't give proper care to her child which leads to child malnutrition. Children from low socioeconomic class were belonged to food insecure household. In case of “food security” it has a positively relation with the “children nutritional status” but it shows no linear relationship, in uttarakhand food security was there because they were more dependent on cultivated crops, they were also engaged in organic farming and available wild vegetables and fruits but lack of child care leads to inadequate food intake in children and ultimately lead to child malnutrition. Both lack of education and nutrition knowledge in mothers and “food insecurity” had a harmful effect on the “child nutritional status”.

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