

Original Research Article

Evaluation of knowledge regarding malnutrition and its prevention among mothers in rural areas of Uttarakhand: a cross-sectional study

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ABSTRACT

Background: Childhood under-nutrition is a major cause of child mortality in India. By providing appropriate nursing care and prompt interventions, mothers can prevent malnutrition among children. This study aimed to assess the knowledge of mothers regarding childhood malnutrition and its prevention.

Methods: A cross-sectional study was conducted among mothers in Dehradun, Uttarakhand, to evaluate their knowledge related to malnutrition and its prevention. One hundred mothers were selected using purposive sampling technique through door-to-door visit. Data were collected using structured knowledge questionnaire.

Results: Most mothers (92%) had basic understanding of malnutrition. About 70% of mothers were aware of importance of balanced diet in prevention of malnutrition. 61% of mothers were unaware of duration of exclusive breastfeeding and 77% were unaware of exact age of weaning among infants. 90% of the mothers recognized weight loss as the major symptom of malnutrition among children and were unaware of other symptoms of malnutrition such as stunting and edema.

Conclusions: The study revealed that majority of the mothers possessed a basic understanding of malnutrition and recognized weight loss as its primary symptom. However, significant knowledge gaps remain regarding exclusive breastfeeding duration, appropriate weaning age, and other signs of malnutrition such as stunting and edema. Strengthening maternal education on infant feeding practices and comprehensive malnutrition indicators is essential for improving child health outcomes.

Keywords: Knowledge, Malnutrition, Mothers, Under five children

INTRODUCTION

The 2030's Agenda of Sustainable Development Goals (SDGs) depend heavily on nutrition, and at least 12 of the 17 SDGs have nutrition-related indicators. Malnutrition in one or more forms affects every nation on the planet.¹ One of the biggest issues facing global health is the fight against malnutrition in all its manifestations. It is a major health issue still impacting children under five years of age, especially in low- and middle-income nations. Nearly 45% of deaths among children under five are attributed to malnutrition, with the majority of these deaths taking place in underdeveloped nations.²

Malnutrition is a complicated and multidimensional problem that encompasses not only undernutrition (wasting, stunting, and underweight), but also micronutrient deficiencies and overnutrition.³

In India, childhood undernutrition is a leading cause of child mortality and a contributing factor to childhood illnesses. The NFHS-5 report states that 21% of children under five in Uttarakhand are underweight, 13.2% are wasting, and 27% are stunted. Malnutrition rates have somewhat decreased when compared to NFHS-4, however the problem is still serious.⁴ Mothers are

essential in preventing malnutrition by providing appropriate care and acting quickly.⁵

Mothers are essential to the health and nutrition of their children because they are their primary caregivers. Their knowledge, attitudes, and practices about breastfeeding, supplemental feeding, hygiene, and recognizing the symptoms of malnutrition are critical to preventing malnutrition and preserving health.⁶

Preventing early childhood malnutrition is commonly recommended to involve exclusive breastfeeding for the first six months, followed by suitable supplemental food. On the other hand, inadequate maternal education frequently leads to inadequate eating habits and delayed identification of malnutrition signs, thereby postponing prompt interventions.⁷

Designing successful community-based nutrition initiatives requires an understanding of maternal knowledge of malnutrition and related prevention techniques. The purpose of this study was to determine the degree of awareness and education that mothers of children under five have about malnutrition and how to prevent it.

METHODS

A cross-sectional research methodology was employed to investigate the knowledge of mothers residing in Lacchiwala, Doiwala, Dehradun, India, which was selected randomly. The approval for conducting this study was obtained from the ethics committee of Swami Rama Himalayan University, and administrative authorization was secured from the head of the village before the commencement of data collection. Data collection was done from August to September 2022. Purposive sampling technique was used to recruit 100 mothers for the study. Mothers who were willing to participate in the study and knows Hindi language were enrolled in the study. Mothers who were health care workers and not available at the time of data collection were excluded from the study. Written informed consent was obtained from all the participants involved in the study. Prior assurance was also provided to maintain their confidentiality and anonymity. Data collection from the participants was conducted using validated and pre-tested tools encompassing various dimensions of knowledge related to malnutrition and its prevention. The knowledge of the mothers regarding malnutrition was assessed in various domains such as causes, risk factors, signs and symptoms, prevention and management of malnutrition. Accordingly, the mothers were sorted into 3 categories, poor (<60%), average (60-80%), and good (>80%) based on their scores.

Statistical analysis

The data were analyzed using the Statistical Package for Social Sciences (SPSS) software version 21, using a

descriptive statistical approach to express the results in frequency and percentage distributions.

RESULTS

Baseline characteristics of mothers

The socio-demographic status of the mothers is illustrated in Table 1. The majority of mothers (94%) were within the age range of 20 to 30 years. More than half of the participants (54%) reported a monthly household income between Rs. 25,000 to Rs. 30,000, indicative of a lower socioeconomic status. In terms of educational attainment, 59% had completed primary education, 1% had no formal schooling, and only 5% were graduates, underscoring the limited prevalence of higher education within the study population. A substantial proportion (92%) of the mothers were homemakers. Furthermore, 31% were identified as having anemia during pregnancy. In the study population, approximately 61% of mothers belonged to joint families. The majority of families (72%) followed a non-vegetarian diet. With respect to the age distribution of the children, 59% were in the 3-5-year age group, while 41% were in the 0-3-year age group. Additionally, 51% of the respondents had male children. The baseline characteristics offer important insights into the demographic and health profiles of the participants, allowing for a more comprehensive interpretation of the study findings.

Table 1: Frequency and percentage distribution of socio-demographic variables of the mothers (n=100).

Subject profiles	Frequency
Age (in years)	
20-25	31
26-30	63
31-35	6
Monthly family income	
Rs. 25,000 - Rs. 30,000	54
More than Rs. 25,000	46
Education	
No formal education	1
Primary education	59
Higher secondary education	35
Graduate	5
Occupation	
Home maker	92
Self -Employed	8
History of anemia during pregnancy	
Yes	31
Type of family	
Joint	61
Nuclear	39
Type of diet	
Vegetarian	28
Non vegetarian	72

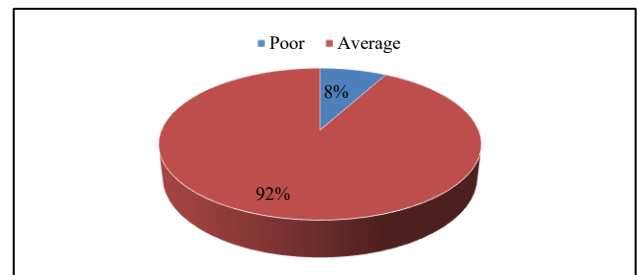
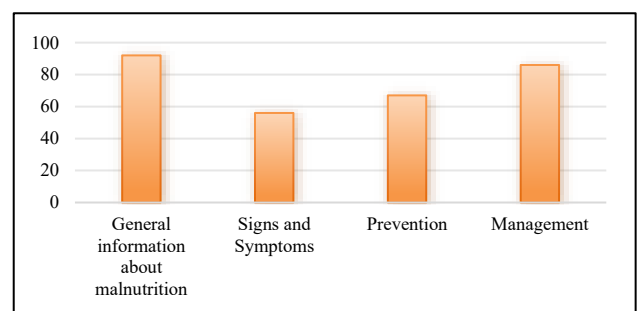
Table 2: Frequency and percentage distribution of socio-demographic variables of the children (n=100).

Subjects profiles	Frequency
Age	
1-3 years	41
3-5 years	59
Gender	
Male	58
Female	42
Birth order	
1-2	73
3-4	27
Birth weight	
<2.5 kg	39
>2.5 kg	61
Received exclusive breastfeeding	
Yes	41
No	59
Age of weaning	
at 6 months	44
>6 months - 9 months	24

Baseline characteristics of the children

Baseline characteristics of the children of the participating mothers are detailed in Table 2. About 59% of the children were aged between 3-5 years, and the demographic distribution shows a predominance of females (58%). Most (61%) were weighed between 2.5 to 3.5 kg at birth. Most of the children (59%) were on mixed

feeding, indicating they received a combination of breast milk, cow's milk and formula feed. Furthermore, 24% of the children experienced delayed initiation of weaning, starting between 6 months to 9 months.

**Figure 1: Categorization of mothers based on knowledge regarding malnutrition.****Figure 2: Percentage scores of mothers in different domains of knowledge regarding malnutrition among children.****Table 3: Knowledge of the mothers regarding malnutrition (n=100).**

Categories	Frequency
General knowledge of malnutrition	
Malnutrition refers to both under nutrition and over nutrition	97
Protein energy malnutrition is deficiency of both protein and energy	54
Balanced diet refers to variety of foods in right proportion having essential nutrients	70
Children 0-5 years of age are most susceptible to malnutrition	68
Exclusive breastfeeding is the ideal food for newborns	87
Signs and symptoms of malnutrition	
Child with malnutrition experience weight loss or no gain in weight.	90
Child with malnutrition experiences low height	60
Child with malnutrition may have swollen limbs (edema)	20
Child with malnutrition experiences frequent infections	60
Malnutrition may lead to permanent growth retardation among children	43
Prevention of malnutrition	
Balanced diet is necessary for prevention of malnutrition	79
Exclusive breastfeeding should be done from birth till 6 months of age	61
Weaning should be started at 6 months of age	53
Hygiene is important for preventing malnutrition among children	77
Management of malnutrition	
Caregivers must seek medical help if child demonstrate signs of malnutrition	91
Hospitalization is required in case of severe malnutrition	82
Mild malnutrition can be managed at home with balanced diet	94

Maternal knowledge regarding malnutrition and its prevention

Knowledge of the mothers was evaluated using standardized questionnaires (Table 3). and accordingly, categorized into three groups based on their scores (a) poor (<60%), (b) average (60-80%), and (c) good (>80%). The majority of mothers (92%) had an average level of knowledge regarding malnutrition, while 8% exhibited poor knowledge (Figure 1). The assessment of maternal knowledge on malnutrition covered four specific domains: general knowledge about malnutrition, signs and symptoms, prevention and management of malnutrition. This highlights that the mothers generally possess moderate knowledge across these key areas of malnutrition among children. The percentage distribution of the mothers based on their level of understanding in different domains of malnutrition has been illustrated (Figure 2).

DISCUSSION

The present study assessed the socio-demographic characteristics of mothers, baseline attributes of their children, and maternal knowledge regarding malnutrition and its prevention. The findings bring to light critical insights into maternal and child health determinants within the study population.

Baseline characteristics of mothers

The study participants' socio-demographic details offer crucial background information for comprehending the results. The majority of mothers (94%) were between 20 and 30 years of age, which is consistent with the typical reproductive age group reported in several studies across India. Both Kumari et al and Bhatia et al discovered that the majority of pregnant women in their samples were between the ages of 21 and 30, which corresponds to the time frame with the maximum fertility and potential for childbearing.^{8,9} More than half of the participants (54%) reported a monthly household income between ₹25,000 and ₹30,000, indicating a lower socioeconomic status. Singh et al observed that mothers from lower-income families often have limited access to quality healthcare, nutritional resources, and health education, which can contribute to adverse pregnancy outcomes such as anaemia and low birth weight.¹⁰ Regarding education, only 5% of mothers had a degree, while a significant percentage (59%) had only finished primary school. Similar patterns have also been noted in earlier research, such as Sharma and Patel and Das et al, which highlighted the connection between poorer maternal education and suboptimal food habits, low health awareness, and low use of prenatal care.^{11,12} The majority of mothers (92%) were homemakers, which aligns with findings by Kaur et al, who noted that most women in rural and semi-urban communities are not employed outside the home.¹³

A moderate public health concern is indicated by the fact that 31% of the women experienced anemia during pregnancy. In a study carried out in Uttarakhand, Reddy et al found a similar frequency of anemia in pregnant women was found to be closely linked with low educational and socioeconomic status.¹⁴ This reinforces the need for targeted nutritional education and iron supplementation programs.

Baseline characteristics of children

The children's baseline features offer crucial information about their health and nutritional condition, which is strongly related to the knowledge and behaviors of the mothers. 41% of the children in the current study were in the 1-3 age range, while the majority (59%) were in the 3-5 age range. The early childhood years, which are crucial for growth and development, are represented by this age distribution. Similar findings were reported by Kumari et al, who observed that most children in their community-based sample were preschool-aged, reflecting a population highly vulnerable to nutritional deficiencies and infections.⁹

There was little gender difference in involvement, as seen by the demographic profile's modest predominance of male children (58%), which is in line with the gender ratio found in research by Bhatia et al. In terms of birth order, 27% of the children were third or fourth born, whereas 73% were first or second born. Higher birth order is frequently linked to increased nutritional risk because parental attention and resources may be divided among several children, according to studies like Patel et al. 39% of the children were born weighing less than 2.5 kg, whilst 61% of the children were born weighing more than 2.5 kg.¹¹ This study's low birth weight prevalence is consistent with research by Das et al and Reddy et al.^{12,14}

Only 41% of the children in this population were exclusively breastfed for the necessary six months, indicating suboptimal exclusive breastfeeding practices. This is less below the NFHS-5's (National Family Health Survey, 2021) estimated national average of between 55 and 60 percent. According to studies by Kaur et al and Sharma et al, mixed feeding and the early introduction of cow's milk are typical practices that are frequently brought about by misunderstandings, maternal workload, or inadequate lactation counseling.^{11,13} The current study's 59% mixed feeding prevalence points to the need for improved postnatal care and breastfeeding teaching.

Weaning ages varied, with 19.2% postponing weaning until nine months and 35.2% starting at six months. Delayed weaning has been associated with inadequate nutrient intake and slower growth, as highlighted by Bose et al. The current finding mirrors similar trends in other community studies where delayed complementary feeding was linked to lack of knowledge and cultural feeding practices.¹⁵

Maternal knowledge regarding malnutrition

The findings of the present study provide a comprehensive overview of mothers' knowledge regarding malnutrition among children under five years of age. The results reveal moderate to good awareness in certain domains, such as general understanding and management of malnutrition, while gaps persist in identifying signs and preventive practices.

A large majority (97%) of mothers correctly identified that malnutrition includes both undernutrition and overnutrition, indicating satisfactory conceptual understanding. Similarly, 70% recognized that a balanced diet includes a variety of foods in the right proportion with essential nutrients, reflecting awareness of dietary diversity. However, only 54% knew that protein-energy malnutrition (PEM) results from a deficiency of both protein and energy, and 68% were aware that children aged 0-5 years are most susceptible to malnutrition. These findings are in line with Kaur et al and Das et al, who also reported that while most mothers were aware of basic nutrition concepts, detailed understanding of specific deficiencies remained inadequate.^{12,13} The relatively high awareness (87%) about exclusive breastfeeding being the ideal food for newborns aligns with findings from NFHS-5 and Bose et al, suggesting improved maternal awareness due to government and community-level health education programs.¹⁰

Knowledge regarding signs and symptoms

Awareness about the signs and symptoms of malnutrition varied. Most mothers (90%) knew that weight loss or lack of weight gain was an indicator, but only 20% identified swollen limbs (edema) as a sign of malnutrition. Around 60% recognized frequent infections and stunted growth as consequences, while less than half (43%) were aware that malnutrition can cause permanent growth retardation. Similar gaps were reported by Patel et al and Reddy et al, who noted that caregivers often recognize visible weight loss but fail to identify subtler clinical signs such as edema or developmental delays.^{11,14} These findings highlight the need for focused health education emphasizing clinical manifestations beyond just body weight.

Knowledge regarding prevention

In the prevention domain, 79% of mothers correctly identified that a balanced diet is necessary to prevent malnutrition, and 77% emphasized hygiene as an important preventive measure. However, only 61% and 53% of mothers knew the correct duration for exclusive breastfeeding (till 6 months) and appropriate weaning age (at 6 months), respectively. These results are comparable to those of Sharma and Singh, who found that misconceptions about the duration of exclusive breastfeeding and delayed weaning remain widespread in many communities. Proper feeding and hygiene practices

are fundamental to preventing malnutrition, and these knowledge gaps may contribute to the persistence of undernutrition in young children.

Knowledge regarding management

The mothers demonstrated relatively good knowledge regarding management of malnutrition. Most participants (94%) were aware that mild malnutrition can be managed at home with a balanced diet, while 91% agreed that medical help should be sought when a child shows signs of malnutrition, and 82% understood that hospitalization is necessary in severe cases. These findings are consistent with Kumari et al and Gupta et al, who reported that mothers generally seek medical advice when the condition becomes severe but need more awareness about early identification and timely intervention at the household level.^{8,11}

CONCLUSION

The results of this study demonstrate how maternal socio-demographic characteristics in particular household income and education, have a major impact on child feeding behaviors and knowledge of malnutrition. Although the majority of women have a moderate level of awareness, there are still gaps in understanding the best time to nurse, how to wean and particular indicators of malnutrition. Accessible and focused health information is still required, as evidenced by sub-optimal rates of exclusive breastfeeding and delayed weaning practices. The finding highlights the ongoing need for community based educational interventions and support services to empower mothers, particularly in situations with limited resources and education. Improving maternal education through culturally appropriate initiatives and including dietary advice into standard medical treatment could close important gaps and promote children's healthy development.

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