

CHAPTER 5

DISCUSSION

The present research study was done in villages of Haldwani block, Uttarakhand and was carried out in two phases. For the first phase about 703 children were screened to assess nutritional status and risk factors relating to it was also explored through semi-structured interview and focused group discussions. Effectiveness of Family-Based Intervention Program on nutritional status of children, nutritional knowledge and nutrition related practices of mothers was evaluated in phase II. For nutritional status post-test was done at third month, sixth month and ninth month. And for nutritional knowledge and nutrition related practices it was done at first month and third month.

Findings of the present study have been discussed in terms of objectives, hypothesis, and supportive findings under following titles mentioned below.

1. Prevalence of malnutrition
2. Risk factors of related to malnutrition
3. Effectiveness of FBIP on knowledge of mothers regarding nutrition
4. Effectiveness of FBIP on nutrition related practices of mothers
5. Effectiveness of FBIP on nutritional status of children

Prevalence of Malnutrition

In the present study, out of 703 children screened, about 152 (21.6%) children were found to be malnourished. It was found that 74 (11%) children were underweight in mild to moderate category and 2 (0.28%) were severely underweight. For wasting, it was found that 28 (4%) were in mild category and 11 (1.5%) children

were found to be moderately wasted. About 87 (12%) children were stunted in mild to moderate category.

A cross sectional study was conducted among 400 children aged 0-23 months of Pune, Maharashtra. It was reported that 62 (15.5%) children were moderately underweight, 41 (10.3%) stunted and 90 (22.5%) were wasted.¹⁶⁹

Another cross-sectional study done in 368 children below three years of Ludhiana found that, 82 (21.2%) were underweight. Of which 65 (16.8%) were moderately and 17 (4.4%) severely underweight.¹⁷⁰

Similar findings were also reported by a study conducted in Trans-Yamuna district of Prayagraj among 100 of children aged 1-6 years. The results showed that about 39% had mild malnourishment, 31% had moderate and 9% were severely malnourished.¹⁷¹ Another cross-sectional study done among 483 children aged (0-36) months reported contradictory results. It was reported that 35.2% children were underweight, 43.1% had stunting and 31.5% children had wasting.¹⁷²

The above studies highlighted that status of malnutrition in our country varies from 20 – 40% in children below five years. There needs to be regular screening of children at different time intervals so that adequate steps are undertaken by the mothers of children and health workers to recover the child from the state of undernutrition. Further, in the present study thought the overall prevalence of malnutrition was found to be 21% but there needs to be extensive survey at different areas of Uttarakhand so that the status of malnutrition in children below three years be estimated.

Risk factors of related to malnutrition

The factors of the malnutrition identified in the children were – *anemia during pregnancy* (11.2%), *complications during pregnancy* (10.5%), *duration of pregnancy less than nine months* (7.1%), *birth weight of child below 2.5kg* (11.7%), *non-initiation of breast-feeding within one hour* (12.8%), *weaning before six months* (11.2%), *Bottle feeding* (57.7%), *recurrent illness during childhood* (17.3%), *Skipping of meals by children* (61.1%), *open drainage* (94.7%), *not having toilet* (3.9%) and *not sowing own vegetables* (15.9%).

The identified significant risk factors for malnutrition in children were: *anemia during pregnancy* [Underweight - 95% CI (0.271, 0.965), $p = 0.039$ and Stunting - 95% CI (2.39,0.765), $p = 0.059$], *birth weight of child below 2.5kg* [Underweight - 95% CI (1.106, 3.817), $p = 0.023$], *non-initiation of breast feeding within one hour of birth* [Underweight - 95% CI (0.979, 3.344), $p = 0.045$; Wasting - 95% CI (0.989, 4.711), $p = 0.048$ and Stunting 95% CI (1.090, 3.440), $p = 0.022$], *weaning before six months* [Underweight - 95% CI (1.162, 4.026), $p = 0.013$], *Bottle feeding* [Underweight - 95% CI (0.359,0.995), $p = 0.046$]; [Wasting - 95% CI (0.183,0.837), $p = 0.013$ and Stunting - 95% CI (0.372,0.966), $p = 0.034$], *recurrent illness during childhood* 103 (17.3%) [Underweight - 95% CI (1.466,4.361), $p = 0.001$] and [Stunting - 95% CI (1.187,3.447), $p = 0.009$], *Skipping of Meals* [Underweight - 95% CI (1.163, 3.447), $p = 0.011$], *not enjoying meals while eating* [Underweight - 95% CI (1.209,3.333), $p = 0.006$ and Stunting - 95% CI (1.495, 3.837), $p = 0.001$], *open drainage* [Underweight - 95% CI (1.301,6.346), $p = 0.007$] *not having pucca house* [Stunting - 95% CI (0.339,0.887), $p = 0.014$], *not having toilet* [Stunting - 95% CI (1.054,6.269), $p = 0.038$] and *not sowing own vegetables*

[Underweight - 95% CI (1.839-5.312), $p = 0.000$; Wasting - 95% CI (1.451-5.883), $p = 0.002$ and Stunting - 95% CI (1.369,3.885), $p = 0.002$].

The present study findings were similar to study done in West Bengal among 485 under five children which reported that *exclusive breast feeding till six months* [95% CI (0.30-0.82), $p < 0.05$], *birth order* [95% CI (0.78-3.68), $p < 0.01$], *diarrhea* [95% CI (0.08-1.07), $p < 0.05$] and *maternal education* [95% CI (0.21-0.89), $p < 0.05$] were significant factors for malnutrition in children (0-5) years.¹⁷³

A case-control study from Jabalpur was conducted among 350 children aged 0-5 months. The study reported following risk factors to malnutrition in children: *birth weight less than 2.5 kg* (95% CI: 3.8-32.4, $p < 0.0001$); *immunization* (95% CI: 3.0, 27.2, $p < 0.008$); *less intake of iron and folic acid supplementation during pregnancy* (95% CI 1.5, 6.8, $p < 0.002$); *kutchra house children were 7.5 times more at risk* (95% CI 2.5, 22.1, $p < 0.0001$); *poor hygiene* (95% CI 2.7-19.7, $p < 0.05$) and *acute respiratory illness* (95% CI:1.05-1.22, $p < 0.0001$).¹⁷⁴

Another case control study from Karnataka among 570 under five children reported *birth weight below 2 kg* [95% CI (0.95, 4.07), $p < 0.01$], *recurrent cold and cough* [95% CI (5.38, 18.57), $p < 0.01$], *children using latrine* [95% CI (1.37, 4.14), $p < 0.002$], *open drainage system* [95% CI (1.329, 3.29), $p < 0.001$] and *exclusively breastfed up to six month* [95% CI (1.32, 2.69), $p < 0.001$] as significant risk factors of malnutrition which were similar to findings of present study.¹⁰⁸

Similarly, a cross-sectional study done among 400 children aged below 23 months in Maharashtra also reported that *birth weight less than 2,500 g* [95% CI, Stunting (1.316,2.735), Wasting (1.175,2.660), Underweight (1.782,3.620); $p < 0.05$], *not feeding colostrum* [95% CI (1.124,5.426), $p < 0.05$] and *early intro-*

duction of complementary feeds [95% CI (1.019,3.909), $p < 0.05$] were significant factors of malnutrition.¹⁷⁵

The findings of the present study have highlighted: *anemia during pregnancy, birth weight of child below 2.5 kg, non-initiation of breast feeding within one hour of birth, weaning before six months, recurrent illness during childhood, open drainage and not having pucca house as significant risk factors* related to malnutrition. These risk factors were also supported by above mentioned literatures. Thus, there is an urgent need to address these risk factors specifically during the antenatal period so undernutrition and anemia can be prevented during pregnancy. This can be done by regularly screening the mothers in the community by health workers. There needs to be more emphasis on feeding, weaning at six months, deworming of children at regular intervals and preventing recurrent illnesses in them by educating mothers at regular intervals.

Effectiveness of Intervention on Nutritional Knowledge of Mothers

The present study found significant increase in mean scores of nutritional knowledge of mothers in post-test of intervention group than control group at 1st month (17.36 ± 3.21 , 14.0 ± 3.31 , $t = 3.06$, $p < 0.05$) and at 3rd month (17.36 ± 4.22 , 14.10 ± 3.52 , $t = 3.26$, $p < 0.05$). r-Anova was calculated in order to estimate increase in nutritional knowledge of mothers which showed significant difference within group ($F = 53.3$, $p < 0.05$).

A randomized control trial done in Ethiopia among 200 mother-child (6-23 months) pairs reported that there was significant enhancement of knowledge of mothers from 59% in pre-test to 96% in post-test in intervention group; whereas,

there was no significant improvement of knowledge in control group.¹⁷⁶

Another cluster randomized control trial done among 284 mothers of children below five years in Nigeria reported similar findings. It was found that in post-test, higher proportion of mothers in intervention group were aware regarding importance of complementary feeds (96.5%) and feeding (88.7%) than control group (19% and 43%).¹⁷⁷

A cross-sequential study conducted in Uganda in 204 mother-child pairs by also showed similar findings that there was significant difference in knowledge scores of mothers in intervention group than control group regarding feeding and hygienic practices ($p < .001$) post intervention (3rd month).¹⁷⁸

Findings of the study were also consistent with pre-experimental study done in Udaipur district among 64 mothers of under-five children. It was reported that structured teaching program was significantly effective in intervention group ($t = 36.83, p < 0.0001$) than control group.¹⁷⁹

Another study from Visnagar, Mehsana supported the present study findings. The study was done in mothers of under-five children. It was found that post-test knowledge of mothers regarding malnutrition and its prevention was higher than the pre-test scores. There was significant enhancement of 5.06 mean score from pre-test to post-test after planned teaching programme in intervention group than control group.¹⁸⁰

The present study findings highlighted that there was enhancement in knowledge of mothers after FBIP. Literature findings also supports that education intervention done in mothers will significantly improve the awareness of mothers; thus, steps should be undertaken so that similar multi-component training program

can be conducted among different groups of mothers of under-five children. This will not only enhance their knowledge but will also develop capacity in them regarding managing mild nutrition related deficiencies in their children by prompt identification.

Effectiveness of Intervention on nutrition related practices of Mothers

The present study findings showed that there was significant increase in post-test nutrition related practices of mothers in intervention group than control group at 1st month (89.55 ± 16.03 , 82.19 ± 17.60 , $t = 2.45$, $p < 0.05$) and at 3rd month (93.45 ± 20.07 , 81.63 ± 19.86 , $t = 3.36$, $p < 0.05$). r-Anova was calculated in order to estimate increase in height of children which showed significant difference within group ($F = 47.74$, $p < 0.05$).

A randomized control trial done in Ethiopia among 200 mother-child (6-23 months) pairs reported that there was significant enhancement in practices of mothers regarding complementary feeding from 54% to 70% in intervention group than control group.¹⁷⁶

A cross-sequential study conducted in Uganda in 204 mother-child pairs also reported similar results regarding infant and young child feeding and hygienic practices which improved significantly ($p < .001$) at 3 months than pre-test in intervention group than control group.¹⁷⁸

An experimental study was done in Indonesia among 15 mothers and their children of 16 villages. The study findings showed that there was significant improvement in nutrition practices of mothers in intervention group ($\bar{x} = 54.87$, $p < 0.05$) given nutrition and health education than control group.¹⁴¹

The above-mentioned studies discussed the effect of intervention on nutrition related practices of mothers of under-five children. In the present study the FBIP showed significant improved in nutrition related practices of mothers. This was supported by literature discussed above. It also highlights that if mothers and child pairs are focused together it leads to improvement in nutrition related practices of mothers and nutrition of children. In order to inculcate good eating practices in children instead of encouraging junk eating it is imperative to teach the mothers and other family members together.

Effectiveness of Intervention on Nutritional Status of children

In the present study, between group comparison showed significant gain in mean weight of children at 6th month (10.79 ± 0.8 , 10.32 ± 1.0 , $t = 3.08$, $p < 0.05$) and 9th month (11.32 ± 1.5 , 10.68 ± 2.2 , $t = 2.0$, $p < 0.05$) in intervention group than control group. There was also increase in height of children at 6th month (82.26 ± 5.09 , 81.57 ± 5.31) and at 9th month (83.81 ± 5.24 , 82.73 ± 5.30) in intervention group than control group but was not significant. Increase in MUAC of children in intervention group than control group at 9th month (13.18 ± 1.17 , 13.00 ± 1.16) was also observed but was not significant.

A prospective study done in Madhya Pradesh among 265 malnourished under-five children. The study findings showed that there was improvement in weight of children after nutrition education. The moderate category of underweight reduced from 39.2% to 33.9% and also in severe category there was reduction from 19.3% to 15.2% in urban children. In children from rural areas there was reduction of underweight from 44.1% to 36.6% and in severe category from 20.4% to 9.7%

respectively.¹⁸¹

A randomized control trial was done in coastal areas of South India among 60 mothers and 64 child pairs. The study reported significant enhancement of awareness in mothers of intervention group. In intervention group 52 (81%) children became normal from malnourishment whereas in control group only 41 (64%) became normal weight. There was also statistical difference in means of proteins and calorie intakes on girls and boys in intervention and control group.¹⁶⁴

A longitudinal study done in Jammu among 206 under-five children reported similar results. There was improvement in nutritional status of children in intervention group i.e., about 30% children had restored weight to normal in underweight category and 16.28% improved nutritional grade than control group. The study also reported change in nutritional behavior of mothers of identified malnourished children in intervention group than control group.¹⁵⁸

Study results were also consistent with a randomized control trial in Uttar Pradesh among 150 under-five children. In this study comparison of WHO/UNICEF recommended therapeutic food was done with home based therapeutic food for management of malnutrition. The results showed that there was significant enhancement in mean weight of children in intervention group (9.51 g/kg/day, $p < .0001$) than control group (7.20 g/kg/day). The study emphasized that both kinds of food were effective in management of malnutrition but home-based therapeutic food was more effective.¹⁸²

An experimental study with posttest control group was done among 200 malnourished children in Tamil Nadu. The study findings highlighted that home-based diet therapy led to gain in weight in children of intervention group. Also,

there was significant difference in weight gain between intervention and control group.¹⁸³

The findings discussed above showed that FBIP was effective in improving the nutritional status of children in intervention group than control group. There was 1080 grams increase in weight of children in intervention group. These findings were also supported by the literature discussed above those home-based interventions in community setting has positive impact on nutritional status of malnourished children. Thus, if interventions are planned and implemented considering the cultural and geographical setting of particular community it will help to decrease the problem of malnutrition in children of our country.

Strength of the Study

1. Exploratory survey was done to assess the nutritional status of children and associated risk factors for malnutrition on large sample of 703 children was conducted. Hence, the study findings can be generalized.
2. In order to assess the effectiveness of intervention randomized control trial was used.
3. Sample size estimated for phase II was done with 90% power.
4. Intervention (FBIP) was developed after exploration of need in the first phase, extensive review of literature, focused group discussion among mothers, guidelines of ICMR poshan Abhiyan and certificate course on child nutrition and child care.
5. The FBIP developed was a multi-component training program specific for the population which included teaching, diet counselling, demonstration on

monitoring of weight and height of children, nutrition counselling, diet analysis and distribution of nutrition calendar to mothers and poster for children.

6. Individualized diet related counselling of mothers was done after analyzing three-day dietary recall in Diet-Cal software for intervention group.
7. Post-test was done till nine months for children which is long time period to evaluate the impact of intervention program.
8. The study was conducted among under privileged population in hilly terrains of Uttarakhand having deprived accessibility to health services.

Limitations

1. The information on risk factors related to malnutrition was collected using self-reported technique, hence, there is possibility of recall bias.
2. Effectiveness of intervention was dependent on mothers' practice.
3. Nutrition related practices of mothers was based on assumption that they will give correct response.

Chapter Summary

This chapter included the discussion on findings of the study as per objectives. The findings of the study were discussed and compared with studies done in similar sample. It also highlighted the strength and limitations of the study.