

# Nutritional Assessment of Children under the Age of Sixty Months in District Sialkot, Pakistan

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## ABSTRACT

**BACKGROUND:** The primary objective of the study was to assess the prevalence and degree of malnutrition in District Sialkot, Pakistan. The secondary objective was to assess the frequency of the risk factors associated with malnutrition.

**METHODS:** A community-based cross-sectional questionnaire-based study was conducted in different areas of District Sialkot, from January 2003 to June 2003. Children of ages 0 to 60 months were included in the study. Frequencies and percentages were calculated.

**RESULTS:** We found that 771 (53.8%) children were suffering from malnutrition while 662 (46.2%) were normally nourished. Among the malnourished children, 243 (31.5%) were in the first degree, 265 (34.4%) were in the second degree, and 264 (34.1%) were in the third degree malnutrition. Mothers of 416 (29%) children and fathers of 281 (19.6%) children had no formal education. Fathers of 1222 (85.2%) children earned less than Rs.8000/month. Mothers of only 207 (14.5%) children exclusively breast fed their children for six months; and only 450

(31.4%) of the children belonged to a small family size ( $n \leq 4$ ).

**CONCLUSION:** Every second child under the age of five years was malnourished in Sialkot, Pakistan. Illiteracy, large family size, lack of breast feeding, and poverty were the main factors responsible for malnutrition in children of District Sialkot.

**Key Words:** Prevalence, Malnutrition, Malnourished, Family size, Diarrhea

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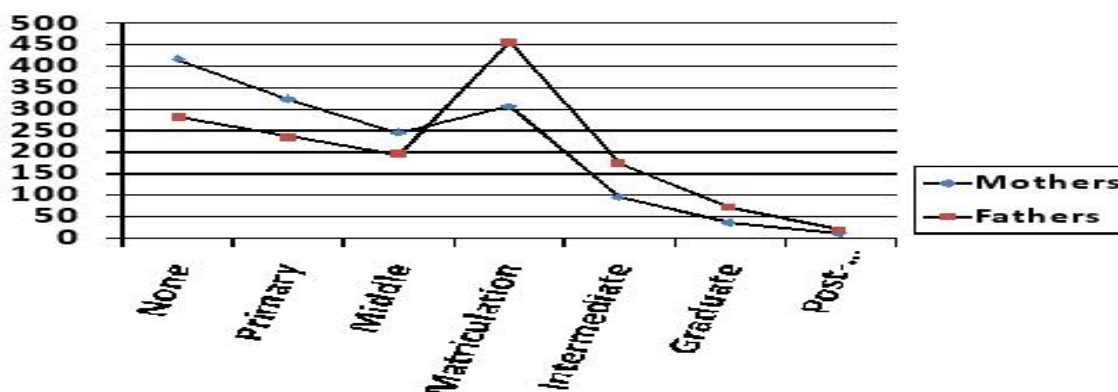
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## INTRODUCTION

Malnutrition is defined as a pathological condition of varying degrees of severity and diverse clinical manifestations, resulting from deficient assimilation of the components of the nutrient complex [1]. It is a factor in an estimated 54% of all childhood deaths globally [3]. In Pakistan, malnutrition is stated to be present in 50-60% of the children and is associated with mortality in young children [9]. As recently as 2000, 10.5 million children died each year in India due to malnutrition,

and about 2.5 million of these were under 5 years of age [2]. In developing countries, malnutrition is a major cause of death in children less than five years of age. Malnutrition may manifest as a delayed or stunted growth. The most powerful tool in growth assessment is the growth chart, used in combination with accurate measurements of height, weight, and head circumference. Accurate measurement is a key component of assessing growth.



**Figure 1:** Education of the father (n=1433) and mother (n=1433)

Despite the need for additional approaches, a number of anthropometric indices have been used successfully for many years to estimate the prevalence of under-nutrition among pre-school children. These include height-for-age, weight-for-age, and weight-for-height. Height-for-age is an index of cumulative effect of under-nutrition during the life of the child. Weight-for-age is the combined effects of both, the recent and the long-term levels of nutrition, whereas weight-for-height reflects the recent nutritional experiences of the child. These indices are reasonably sensitive indicators of the immediate and underlying general causes of nutrition[19]. Among these three indices, the assessment of the nutritional status of children by weight-for-age is a very sensitive and recognised method which is most effective and used all over the world[10,11]. In 2000, 26.7% of pre-school children in the developing world were estimated to be underweight, as reflected by low weight-for-age, and 32.5% were estimated to be stunted, based on low height-for-age. Compared with those in 1980, these estimates have dropped by approximately 11% and 15%, respectively, suggesting considerable improvements, at least in some regions, over these two decades. However, the population of the developing world increased during this time; thus, the total number of underweight children and children with stunted growth has not changed dramatically since 1989[19]. The prevalence of low height-for-age (<5<sup>th</sup> percentile) was 4-5% among children from 2 month to 11 years in U.S.A. The prevalence of under-nutrition among hospitalised children in U.S.A. is as high as that in developing countries. Moderately underweight (60-69% of reference weight-for-age) have a three to four fold greater risk. More than 50% of the child deaths maybe caused directly or indirectly by undernutrition[19]. The risk of mortality was inversely related to children's height-for-age and weight-for-height[4,5]. There is an increased mortality in children hospitalized for a treatable condition simultaneously suffering from malnutrition.[6,19]

According to Any et al, even children with mild to moderate malnutrition, rather than only those with more severe form, had an increased risk of death<sup>7</sup>. Bhutta ZA et al, from Pakistan, has described that acute diarrhea is more severe and becomes persistent more often in children with malnutrition as compared to their counterparts enjoying normal nutritional status. In Pakistan, an average child of age less than 5 years suffers from 4-5 episodes of acute diarrhea annually. It is more prevalent in socio-economically deprived communities[8].

The malnutrition is also associated with mothers' education, weaning of the child, income of the family and family size[20]. Breast feeding till the age of two years and exclusive till the age of six months of age is of prime importance. Breast feeding might protect children against asthma and related conditions[6].

The objective of our study was to assess the prevalence and degree of malnutrition in District Sialkot, Pakistan. The secondary objective was to assess the frequency of the risk factors associated with malnutrition in the same area.

## MATERIALS AND METHODS

A community-based cross-sectional study was conducted in different areas of District Sialkot, Pakistan, from January 2003 to June 2003. Children of ages 0 to 60 months were included in the study. 500 children from the city, 100 from the slums and 900 from the rural area were included in this study according to the rural-urban distribution of population.

In Pakistan, at every 200 houses (1000 population), one Lady Health Worker (LHW) is deployed who is responsible for all the health care activities for the mothers and the children of that area, including polio day's immunization and other primary health services. They also maintain the record of the growth and health of children in their area.

The Lady Health Supervisors (LHS) are more qualified (i.e. graduate) whereas LHW usually have middle or matriculate qualification. Of the 30 LHS in the district Sialkot, we selected 9 from the rural areas, five from the city, and one from the rural-urban slums. A LHS covers a population of 20,000 – 25,000 individuals and supervises the healthcare of children and women of that area. Each lady health supervisor was given 100 copies of combination-type semi-structured questionnaire containing demographics, nutritional assessment of the children (anthropometric measurements, height, weight, head circumference) along with developmental milestones of the children, their feeding pattern (breast-feeding, bottle-feeding, weaning), EPI vaccination record, status of parents (alive or not, occupation, income, education, consanguinity), family size, and water and disposal system the family uses. The frequency of acute respiratory infections and acute diarrhea that the child experienced during the last year was also asked in the questionnaire.

All the LHS were provided with weighing scales for younger children and infants separately, measuring boards for length, measuring tapes for head circumference, and height charts to measure height. During training, each LHS was required to complete 5 copies of the questionnaire under the supervision of the author. Each LHS selected 2 lady health workers in their catchment area. Systematic random sampling was done for selection of houses. The houses were surveyed until 100 children were interviewed and examined by each LHS. The frequency and percentages of the variables were calculated.

The World Health Organization classification of weight-for-age index was used to assess the nutritional status of the children. According to this classification, first-degree malnutrition is when the weight-for-age of the child is 71-80% of expected weight for that age; second degree malnutrition is 61-70% of expected weight-for-age, and third-degree malnutrition is a weight-for-age of less than 60% of expected.

## RESULTS

Of the 1500 questionnaires, 1433 (95.5%) were completely filled and included in the study; 77 (4.5%) were excluded due to incomplete information. Of the 1433 children, 743 (52%) were male and 847 (59%) were from rural areas. It was found that 416 (29%) of the mothers and 281 (19.6%) of the fathers did not receive any formal education (Figure 1). Most of the mothers had education till grade 10 or less (n=847, 60.1%) and only 47 (3.2%) had graduate or post-graduate level education. Similarly, 887 (61.8%) fathers were educated till grade 10 or less and only 91 (6.3%) had graduate or post-graduate level education.

A quarter of the children lived in families with incomes less than Rs.3000 (n=381 or 26.6%), 528 (36.8%) children were from families with income between Rs.3001 and 5000 and 313 (21.8%) children were from families with income greater than Rs.8000. Furthermore, 450 (31.4%) children belonged to a small family (1-2 children/family), 560 (39.1%) belonged to a medium-sized family (3-4 children/family), and 423 (29.5%) of the children belonged to a large family ( $\geq 5$  children per family). Majority of the families (n=983, 68.6%) had more than 2 children.

It was seen that 207 (14.5%) children were exclusively breastfed for the first six months of their life, while 354 (24.7%) children were both breast-fed and bottle-fed simultaneously. Figure 2 shows the age-wise distribution of children who were breast-fed or bottle-fed. The total number of children who were breast-fed was 1142 (79.7%), whereas 825 (57.5%) were bottle-fed at some time during their life. Those who weaned or bottle-fed also received other drinks like tea, cola drinks, kahwa (green tea), lassi (a local drink), rice water etc. The number of children who were not breast-fed was 291 (20.3%). Some degree of malnutrition was present in 771 (53.3%) children (Figure 3). In children below 4 years of age, the number of malnourished children was greater than normally nourished children through all age-groups. The highest number of malnourished children was in the 13-36 months age-group, while the lowest were in 7 -12 months. Among malnourished children, 243 (31.5%) had first-degree, 265 (34.4%) had second-degree, and 263 (34.1%) had third-degree malnutrition. The age-wise distribution is shown in Figure 4. First degree malnutrition increases with age with a peak at 13 to 24 months and then declines, whereas second degree malnutrition peaks at 25 to 36 months age-group. At least one episode of acute diarrhea and at least one of acute respiratory infection were reported in all the children (Figure 5).

## DISCUSSION

Malnutrition results from various factors and is present in all developing countries. We made an effort to assess the prevalence of malnutrition in children younger than 5 years of age and the associated demographic and social factors in this study. In our study, 662 (46.2%) of children were normally nourished while 771 (53.8%) were malnourished. These findings are similar with overall estimates of national prevalence of malnutrition in Pakistan and India[15,16].

In our study, 243 (31.5%), 265 (34.4%), and 263 (34.1%) children were suffering from first, second, and third degree malnutrition respectively. Similar estimates of the severity of malnutrition were reported previously in literature[6,17].

Education level of mothers has significant effect on the nutritional status of their children. In Pakistan, 52.4% of the mothers without a formal education have malnourished children, while mothers with formal education have a better understanding of the benefits of a small family, breast feeding and the weaning process, and hence have less malnourished children (23 to 24%) [20]. In our study, 29% of mothers and 19% of fathers were without formal education while 61% of the mothers and 62% of the fathers had less than grade 10 education and only 10% of mothers and 18.4% of fathers had graduate or higher level education.

Gender disparities in health and education provision are higher in South Asia. In one study, a girl in India was 30-50% more likely to die under five year of age than her counterpart boy. There was no gender difference in seeking medical advice but girls were about 2.5 times more malnourished than boys[13,14].

In our study, under the age of six months, only 14.5% of children were exclusively breast-fed, while 20.3% of the children were not breast-fed at all. Moreover, 825 (57.6%) children were bottle-fed along with other foods. Children who received no breast feeding have a high frequency of malnutrition, which according to one study is estimated to be almost 39%<sup>20</sup>. Similarly, delayed weaning, after one year of age, was associated with malnutrition in 53.4% of children in another study[20]. According to various studies, families with one child have 29.8% risk of child malnutrition, while families having four or more children had 52.9% risk of malnourished children. Majority of the families (68.6%, n=983) in our study had more than two children, which has a negative impact on the nutrition of the children. The family size is a reflection of child spacing and family planning. With increasing family size, the nutritional status of the children as well as the mother goes down, which has been shown in previous studies[22].

In our study, 53.4% families had income less than Rs.5000 per month. In earlier studies, families with low socio-economic status, where monthly income was Rs.2000 or less, had 52.2% malnourished children, while the families with an income of Rs.5000 and more, had 24.7% malnourished children<sup>20</sup>. Economic development also brings down malnutrition and vice versa[21].

In our study, almost all of the children had suffered from at least one episode of acute diarrhea and acute respiratory tract infection during their life. Malnutrition leads to increased incidence of infections.

Based on our study, our recommendations will be to promote exclusive breast feeding up to the age of 6 months and proper weaning starting at the same age; to promote routine immunization through EPI (Expanded Program on Immunization) to prevent recurrent infections; and to include Rota virus vaccine and pneumococcal vaccine in the routine EPI immunization.

## CONCLUSION

The frequency of malnutrition (51.8%) in children under the age of five years is quite high in district Sialkot, which means that every second child in the area is malnourished. Lack of formal education, large family size, late weaning, lack of breast feeding, and poverty were the factors that were associated with malnutrition in children. Our results highlight the high frequency of these risk factors in District Sialkot. Combination of these factors and malnutrition, in turn, predisposes the children to various infections, hence the high frequency of acute diarrhea and acute respiratory infections in the sampled population.

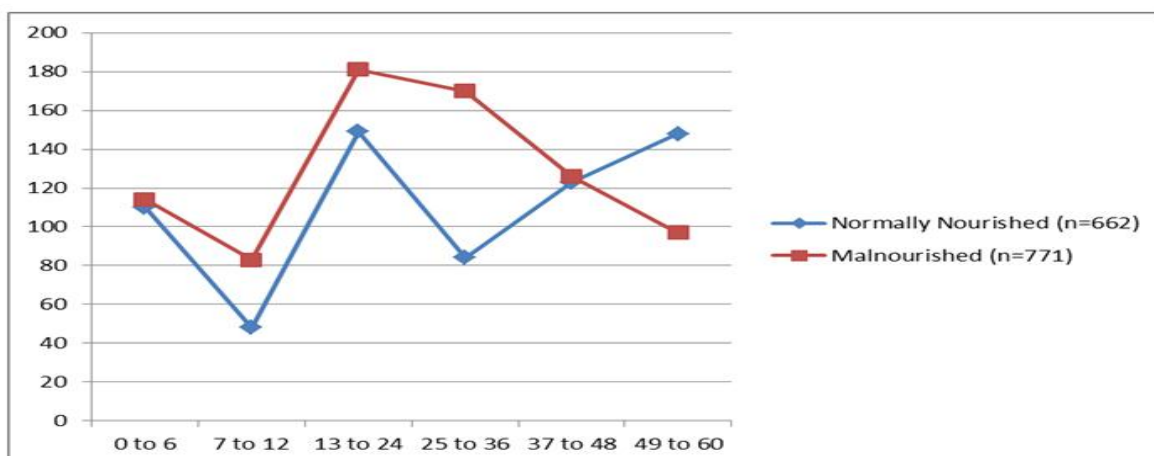
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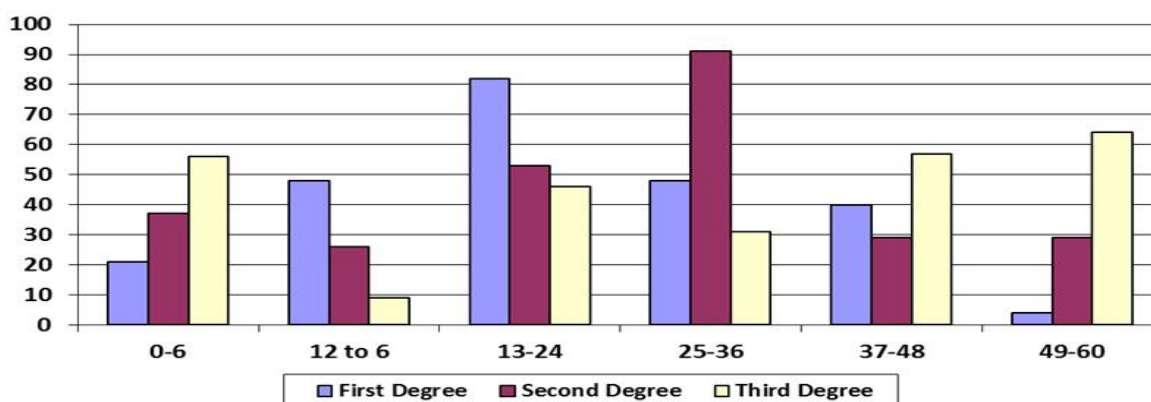
Duration	Breast-Fed Children (%)	Bottle-fed Children (%)
Up to 6 Months	561 (39.2)	354 (24.7)
Up to 12 Months	300 (20.9)	262 (18.3)
Up to 24 Moths	281 (19.6)	127 (8.9)

**Table 1:** Duration of Breast-Feeding (n=1433) or Bottle-Feeding (n=1433)

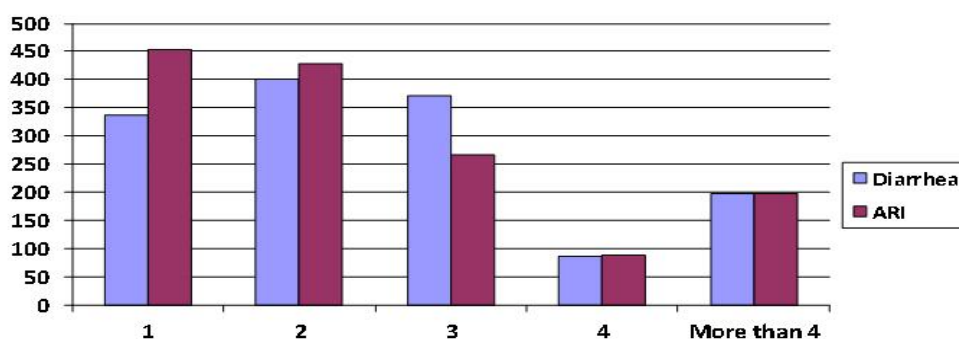




**Figure 2:** Age wise Nutritional Status of Children (n=1433)



**Figure 3:** Age in months and the Degree of malnutrition (n=1433)



**Figure 4:** Episodes of Acute Diarrhea(n=1433) and Acute Respiratory Infection (ARI) (n=1433) in children

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