# A Study of the Nutritional Status of ECD Children in Pokhara

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## Abstract

*The goal of this study was to examine the relationship between socio-economic factors and the nutritional wellbeing of children in the early childhood development (ECD) centers operated in Pokhara. Both quantitative and qualitative data were collected from 100 ECD children staying in 10 different centers. Random sampling techniques were employed during field surveys; and data were analyzed using descriptive statistics, cross-tabulation, and the Chi-Square Test using SPSS software. The Body Mass Index (BMI) of each child was calculated, and the results were compared with the reference values to evaluate their nutritional status. The study revealed that approximately thirty-three percent of the children were experiencing moderate acute malnutrition (MAM) and sixty-seven percent were with normal nutritional status. It showed that mother's occupation had no significant impact on children's nutritional status. Additionally, no correlation was found between family type, and mother's education, and junk food consumption. However, child's family type, father's education, occupation, and income source had a significant impact on their nutritional status. The overall nutritional status of ECD children in Pokhara was found inadequate. It is suggested to improve the situation through collaborative efforts of parents, school teachers, local government and Nepal government by implementing appropriate policies for ECD children.*

*Keywords:* Malnutrition, wasted, anthropometric measurement, moderate acute malnutrition

## Introduction

Early childhood care and development encompasses a wide range of policies and programs for children from birth to eight years of age and includes various factors such as early learning and stimulation, health, education, nutrition, hygiene, and sanitation. The early years of a child's life are crucial for their future health and development. Nutrition plays a vital role in a child's growth and is crucial for maintaining good nutritional standard. Deficiencies in the macronutrients (protein, fat, carbohydrates, vitamin A, iodine, iron, and zinc)

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contribute to increase the likelihood of illness and may lead to delayed mental and motor development (WHO, 2016). Undernutrition during the ECD period can negatively impact physical, mental, social, cognitive, and behavioral development; and in the long-term it can slow economic growth and contribute to poverty through direct losses in productivity due to poor physical health. Ensuring preschool children's normal nutritional status is, therefore, the foundational step towards the development of healthy citizens and has become one of the major concerns in Nepal (Bhandari and Chhetri, 2013).

The nutritional status of children plays a critical role in their rapid brain development until the age of 8 years. High-quality early childhood environment and education are linked to better health, fewer illnesses, better academic skills, and less absence from school. In Nepal, the most common forms of malnutrition include protein-energy malnutrition, iodine deficiency disorders, iron deficiency anemia, and vitamin A deficiency. One major indicator of malnutrition in Nepal is stunting, which is a sign of chronic undernutrition. More than one-third (36 percent) of children under five years are stunted or too short for their age in Nepal (MOHP, 2017). It has been found that stunting is more prevalent among rural children (40 percent) than urban children (32 percent). Additionally, 10 percent of children are wasted, a sign of acute malnutrition. Furthermore, 27 percent of the children are underweight, or too thin for their age. According to the NDHS report (2016), 36 percent of children under five years in Nepal were stunted and had a lower age-to-weight ratio.

## Objectives of the study

The study was conducted to see the nutritional status of ECD children. The main objective was to analyze the nutritional status of ECD centres in Pokhara and assess the impact of socio-economic factors on nutritional status of the children.

## Research gap

Assessment of nutrition among school children and adolescents in the western Nepal (Maskey and others, 2020) has revealed that a high proportion of children were found suffering with stunting and undernutrition. A high proportion of school children with overweight and obesity were also recorded. The role of parental education and occupation was found significantly associated with the nutrition of children. Pokhara is the third largest city in Nepal with a population of over 2.6 millions and has both government and private schools, with most children attending affordable but inadequately

equipped government-run pre-schools. The literacy rate in Pokhara is 83 percent, but awareness of the importance of nutrition for young children is low.

The high prevalence of stunting and undernutrition along with the high proportion of overweight and obesity among school children in western Nepal suggests the need for a deeper understanding of the nutritional status of ECD children in the city areas. In this connection, there is a need for a study to assess the effectiveness of nutritional facilities provided by parents, educational institutions and the government in addressing malnutrition in Pokhara. This is particularly important as malnutrition can have long-term negative effects on children's physical and mental development. Since children in this age range spend a significant time span in school, the quality of nutrition they receive there can have a significant impact on their overall health; and studying the status of their nutrition deserves particular attention in this connection.

## Review of relevant literature

Nutrition plays a vital role in a child's development and therefore is very essential to maintain. A deficiency of macronutrients such as protein, fat, carbohydrates, Vitamin A, Iodine, Iron, and Zinc is known to cause more likeliness to illness and may lead to delayed mental and motor development. (WHO, 2016). Eventually, it slows economic growth and causes poverty through direct losses in productivity from poor physical status, and indirect losses from poor cognitive function as well as increased health costs.

According to the Global Nutritional Report (2020), stunting has affected 140.9 million children under the age of 5 and wasting has affected 49.5 million children under 5. Every year millions of ECD children die in the world due to malnutrition and the number is larger in developing countries (Black and others, 2013). Studies in South Asia showed that 27.8 million children of 36-59 months failed to attain ECD benchmarks (Mc Co and others, 2016). More than half (81.7 million) of the stunted children reside in South Asia (WHO, 2020). The nutritional country profile (FAO, 2012) shows that the rate of malnutrition in Bangladesh is highest in the world. More than 54 percent of preschool-age children are stunted, 56 percent are underweight, and more than 17 percent are wasted. The nutritional status of children depends on external factors such as food safety, culture, society, and economy and internal factors such as age, sex, nutrition, behavior, physical activity, and diseases of the person.

Malnutrition and its various manifestations are urgent and enduring public health issues in Nepal. Although the overall nutritional status of children has gradually been improving since 1996, malnutrition is known to place an enormous burden on children and women in Nepal. ECD programs have been

conducted by Nepal Government itself and non-Governmental organizations such as Save the Children, WHO, and UNICEF. However, there is no significant improvement in the nutritional status of ECD children as expected.

Stunting is found more common among the rural children (40%) compared to the urban children (32%). Overall, 10% children are wasted (too thin for height), a sign of acute malnutrition. In addition, 27% children are underweight, or too thin for their age. 36% of them under five years were stunted and had lower age-to-weight ratio in Nepal (NDHS, 2016).

Rijal and others (2011) conducted a study on the nutritional assessment of children in Nepal Medical College Teaching Hospital, and found 28.9 percent of the children undernourished, 14.2 percent of them wasted, and 12.5 percent stunted. Among the children under 5 years of age in Padampur VDC (Chitwan Nepal), Ruwali (2018) found that malnutrition was the major cause of child morbidity and mortality.

## Methodology

To achieve the objective of this study, a mixed-methods research design was employed, combining both quantitative and qualitative techniques of data collection. In order to study the impact of socio-demographic practices of the parents of ECD children aged 3-5 years, 5 parents and 2 school principals were sampled for in-depth qualitative interview.

For collecting the quantitative data, anthropometric measurements of the ECD children were done. Specifically, these measurements were taken among the 100 ECD children sampled for study from 10 ECD centers. The Body Mass Index (BMI) of each child was calculated and compared to the reference values (Fanta Project, 2016) in order to classify their nutritional status.

The purpose of using both qualitative method was to gather a bit detailed understanding of the research problem, which allowed for in-depth understanding of the experiences and perspectives of ECD principals. Quantitative assessment of socio-economic status and anthropometric measurements have yielded numerical data which were statistically analyzed. The use of both qualitative and quantitative methods allowed for the triangulation of findings, resulting in a more robust understanding of the research problem. Data were analyzed using descriptive statistics, cross-tabulation, and the Chi-Square Test, applying the SPSS software. In addition, observations were also made to triangulate the information and gain a more well-rounded understanding of the research problem.

## Analysis

Based on the close observation of the data collected from field, the analysis is presented under the sub-headings that follow.

### *Socio-economic and demographic characteristics of children*

Based on the information available from the facilitators in the respective ECD centres, children's socio-economic and demographic characteristics were recorded, which are presented in Table 1 given below.

*Table 1: Children's socio-economic and demographic characteristics*

| Types of Family | | Joint Family | | 49% | - |
|---|---|---|---|---|---|
| | | Nuclear Family | | 51% | - |
| Sex of Children | | Boys | | 45% | - |
| | | Girls | | 55% | - |
| Age structure of the children | | *2 years* | *3 years* | *4 years* | *5 years* |
| | | 3% | 24% | 39% | 34% |
| Parental Education | | *0-10 class* | *11-12 class* | *Above school level* | - |
| | Father | 27% | 56% | 17% | - |
| | Mother | 77% | 23% | - | - |
| Parental occupation | | Service | Business | Farming | Housewife |
| | Father | 51% | 38% | 11% | - |
| | Mother | 50% | - | - | 50% |

The above table shows that there is not much difference in the number of children joining the ECD centres who come from nuclear families and joint families. Girls' number is 10% more than boys. Regarding the difference in participation between girls and boys, a parentsaid: *We send our boys to Montessori or private English medium schools as far as possible and we send our daughters to community school ECD centres.* The ECD principal said: *There is the presence of patriarchal dogma which motivates the discriminating attitude of their parents.* Altogether 97% of the children fall under 3-5 years of ECD age-group, which is the appropriate age for participation in ECD centres – with only 3% of them remaining under-age (less than 3 years of age). Regarding the cause of early age admission (less than three years) of children, one of the parents opined that it was their *compulsion to admit children in school because they don't have another*

*person to take care of their smallest kid at home.* Moreover, principals also replied that *the cause of early year admission to school is the tiffin facility; and kids also want to go to school with their eldest sister and brother.*

The table also informs about parental education – where the percentage of fathers and mothers completing the various levels of education are found in three categories: 0-10 class, 10-12 class, and above the school level. Fathers of more than 73% of the children have the education of higher secondary level or above, while only 23% of mothers have the education of that level. As one of the fathers remarked: *We need to go for earning from early ages to run the day to day life of our family. Because of this, we couldn't pursue higher studies.* A mother also stated: *We had to start working from early ages and indulge in household chores and stop our study. And there is a practice of early marriage which has led to teenage pregnancy, thus hampering our education.*

Considering the fathers occupation, the largest percentage is found in service category which is more than half of the total sample population. For mothers, there is equal distribution in 'housewife' and 'service' category. While verifying this fact from field reality, the researcher visited selected parents' homes and found that the majority of them were slum dwellers and their economic status was further deteriorated by COVID-19 impact. Obviously, most of the families belong to the category of low socio-economy.

### Food practices, hygiene and sanitation

Pre-school children need healthy food to meet their growth and development. Parents know the importance of nutrition for children for physical and mental growth. Food eating habits and culture directly affect the health, growth, and development of a child. Moreover, proper maintenance of personal hygiene can prevent children from the possible attack of various diseases. The table below shows the situation of children by thir food practices, hygiene and sanitation.

*Table 2: Distribution of children by food practices, hygiene and sanitation*

| Home Nutritional Status | |
|---|---|
| Balanced Diet (%) | 30 |
| Unbalanced Diet (%) | 70 |
| **Qualities of Drinking Water** | |
| Safe Drinking Water (%) | 30 |
| Unsafe Drinking Water (%) | 70 |
| **Status of Toilet** | |
| Unhygienic Toilet (%) | 60 |
| Hygienic Toilet (%) | 40 |
| **Quality of Mid-day meal** | |
| Good quality (%) | 30 |
| Low Quality (%) | 70 |
| **Junk Food Practices** | |
| Do not consume (%) | 52 |
| Consume (%) | 48 |

The majority of children were found using unbalanced food (70%) and unsafe drinking water (70%). Only few schools have the facility of safe drinking water. As one of the school principals said, the school was "*unable to supply filtered water to all because of the insufficient budget. However, some schools get financial and technical support from social clubs and NGOs to purchase filters and RO/UV water filtration systems to supply safe drinking water".* It was found that most of the children used unhygienic toilet (60%). In observation, toilets were found with a poor supply of water and were lacking privacy; therefore, there is a high possibility of infection in children.

Regarding the mid-day meal, more than 2/3 of the children consume low-quality of the meal; and the junk food users are less than those not using such food items. In this connection, a Principal said: *Those children who get sufficient food at home and quality mid-day meals at school don't like to consume junk food.*

Thus, the percentage of children those who do not consume junk food is slightly higher than those who consume it. Based on the data, it can be concluded that most of the parents know nutrition is required but are not able to supply the essential nutrients.

### *Anthropometric measurements*

Anthropometric measurements are a series of quantitative measurements of the muscle, bone, and adipose tissue used to assess the composition of the body. The

core elements of anthropometry are height, weight, body mass index (BMI), body circumferences (waist, hip, and limbs), and skinfold thickness. The statistical analysis of anthropometric measurements of the children was carried out based on their height and weight, as demonstrated in the table below.

*Table 3: Descriptive statistics of anthropometric measurements*

|  | Height in CM | Weight in KG | BMI=Weight in KG/Height in meter square |
|---|---|---|---|
| Mean | 98.16 | 15.17 | 15.79 |
| Median | 100. | 16.00 | 16.00 |
| Mode | 100 | 16 | 16.00 |
| Std. Deviation | 6.29 | 2.06 | 1.07 |
| Range | 32 | 8 | 6.62 |
| Minimum | 80 | 12 | 12.75 |
| Maximum | 112 | 20 | 19.37 |

As this study found, the mean height of children was 98.16 cm; and the mean weight is 15.17 kg. The mean BMI is 15.79. The minimum height is 80 cm, and the maximum height is 112 cm. Most of the children's weight is 16 KG and their height is 100 cm as it is clear by the median value. The BMI ranges from 12.75 to 19.37cm respectively.

## BMI analysis

By using the BMI formula (BMI=Weight in KG/Height in Meter Square), the value of the BMI of each child was calculated. BMI was chosen as the best parameter for the measurement of the nutritional status of the children. The result of BMI was analyzed with the help of NACS- (Nutritional Assessment and Classification System), Chart – Module 2, Fantaproject, 2016. Based on the reference value of standard classification, children's nutrition status was categorized into 3 groups: Severe Acute Malnutrition (SAM), Moderate Acute Malnutrition (MAM), Normal group. It was found that 33 percent of children were suffering from MAM and the rest 67 percent were normal.

*Table 4: Nutritional Status of the Children by their Family Types*

|  | Family type | | Total |
|---|---|---|---|
| **Nutritional Status of children** | **Nuclear** | **Joint** | |
| Normal | 29 | 38 | 67 |
| Moderate Acute Malnutrition | 22 | 11 | 33 |
| Total | 51 | 49 | 100 |

The result revealed that 67 percent of children have normal nutritional status, and more of them are from joint families than nuclear family. Likewise, 33% of children are with MAM, and more of these children belong to nuclear familities compared to joint families. Severe malnutrition was not found among children. Parents say: *Children from joint family are taken care of by their grandparents or other immediate family members but children in nuclear family were not cared properly.* In this way, data shows that joint family has cared the children more for maintaining their nutrition than the nuclear families.

*Table 5: Nutritional status of the children by their parents' education*

| Nutritional Status | Father's education | | | | Mother's education | | |
|---|---|---|---|---|---|---|---|
| | Class 1-10 | Class 11-12 | Above 12 | Total | Class 1-10 | Class 11-12 | Total |
| Normal | 18 | 37 | 12 | 67 | 49 | 18 | 67 |
| MAM | 9 | 19 | 5 | 33 | 28 | 5 | 33 |
| Total | 27 | 56 | 17 | 100 | 77 | 23 | 100 |

The above table shows that very few of the children having the fathers with the educational qualification of above school level (more than 12th Grade) have suffered from the problem of MAM, while very large number of children with fathers having the education of school level or below are suffering from this problem.

Among the children suffering from MAM, comparatively speaking, larger number of them have their mothers with the education of Class 1-10, while few of the children have mothers with the qualification of Class 11-12. Whether we see the father's or mother's side, it seems the increase in education has contributed to better nutritional status of children in one way or the other.

*Table 6: Nutritional status of children by their parent occupation*

| Nutritional status of children | Father's occupation | | | Total | Mothers Occupation | | Total |
|---|---|---|---|---|---|---|---|
| | Farming | Service | Business | | Housewife | Service work | |
| Normal | 7 | 33 | 27 | 67 | 36 | 31 | 67 |
| MAM | 4 | 18 | 11 | 33 | 14 | 19 | 33 |
| Total | 11 | 51 | 28 | 100 | 50 | 50 | 100 |

Parents' occupation has played an important role in time allocation for children which ultimately affects their nutritional status. Among 33 children suffering from MAM, 4 were the children of the fathers with the occupation of farming. On the other hand, the fathers of 18 and 11 children respectively were service holders and businessmen.

Considering mother's occupation, 14 children having the mothers as housewives have suffered from MAM, while 19 of them had the mothers having other occupations. Overall, MAM is noticed less in the case of children with the parents' occupation of farming (fathers) and housewives (mothers).

*Table7: Nutritional status by children's family income source*

| Status | Family Income Source | | | |
|--------|---------|---------|----------|-------|
|        | Farming | Service | Business | Total |
| Normal | 16      | 13      | 38       | 67    |
| MAM    | 12      | 2       | 19       | 33    |
| Total  | 28      | 15      | 57       | 100   |

The above table shows that, comparatively speaking, children with the parents from service holder families have suffered from MAM less than those with the families that have business or farming as their income source. This implies that the service holder families seem to be more alert for feeding and children compared to the other parents.

The parents from farmer community have stated: "*Our families cannot give time to care the children. We have to depend on children's grandparents, elder children and neighbors to take care of children while going and coming back from school. We can hardly see the children in daylight at home because we must go to the workplace before seven when children are sleeping and return after 7 pm when children again start sleeping*". So, most of the children with moderate acute malnutrition were from such families.

### *Socio-economic Variables and Nutritional Indicators: Cross tabulation*

The figure below shows the cross-tabulation of socio-economic variables against the nutritional indicators including home nutritional status, meal frequency at home, drinking water quality latrine hygiene, and junk food practice.

*Table 8: Summary of Cross tabulation and Chi-square test result between socio-economic variables and nutritional indicators*

| Significance Test Result (Column vs Rows) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Nutritional Indicators** | **Test Results** | **Socio-economic variables** | | | | | |
| | | *Family Type* | *Father's Education* | *Father's occupation* | *Mother's education* | *Mother's occupation* | *Family income source* |
| Home Nutritional status | *Result* | Significant | Significant | Significant | Significant | Insignificant | Significant |
| | *Value* | 35.765 | 20.638a | 26.186a | 9.360a | 3.692a | 23.910a |
| | *df* | 1 | 2 | 2 | 1 | 1 | 2 |
| | *Chi sq test* | .000 | .000 | .000 | .002 | .055 | .000 |
| Meal Frequency at Home | *Result* | Significant | Significant | Significant | Significant | Insignificant | Significant |
| | *Value* | 10.1449 | 44.984a | 41.893b | 40.733a | 4.138a | 69.495a |
| | *df* | 2 | 4 | 3 | 2 | 2 | 4 |
| | *Chi sq test* | .006 | .000 | .000 | .000 | 0.126 | .000 |
| Drinking water quality | *Result* | Significant | Significant | Significant | Significant | Insignificant | Significant |
| | *Value* | 38.325a | 18.6069 | 31.808a | 8.523a | .178a | 21.681a |
| | *Df* | 1 | 1 | 2 | 1 | 1 | 2 |
| | *Chi sq test* | .000 | .000 | .000 | .004 | 0.673 | .000 |
| Latrine Hygiene | *Result* | Significant | Significant | Significant | Significant | Insignificant | Significant |
| | *Value* | 42.484a | 24.263a | 27.626a | 9.665a | .694a | 24.482a |
| | *df* | 1 | 2 | 2 | 1 | 1 | 2 |
| | *Chi sq test* | .000 | .000 | .000 | .002 | .405 | .000 |
| Junk Food Practice | *Result* | Significant | Significant | Significant | Insignificant | Insignificant | Significant |
| | *Value* | 20.638a | 19.437a | 9.228a | 3.692a | .641a | 15.478a |
| | *df* | 2 | 2 | 2 | 1 | 1 | 2 |
| | *Chi sq test* | .000 | .000 | .010 | .055 | .423 | .000 |

As the table shows, the study aimed to determine whether there is a significant association between socio-economic variables, such as family type, parent's education, parent's occupation and family income sources and the nutritional indicators of ECD children.

The results showed that certain variables, such as the mother's occupation, and education, had an insignificant relationship with nutritional indicators such as home nutritional status, meal frequency at home, drinking water quality, latrine hygiene, and junk food practices. However, other socio-economic variables like the family types, father's education, father's occupation, mother's education

and family income source were found to have a significant impact on the nutritional status of ECD children.

## Findings and Discussion

The results of the Body Mass Index (BMI) analysis, using the NACS Chart – Module 2, revealed that the children were found with the nutritional status of Medium Acute Malnutrition (MAM) and Normal. Accordingly, 33 percent of the children were suffering from MAM, while the remaining 67 percent were in the normal range. Notably, no children were found in the categories of Severe Acute Malnutrition (SAM), Overweight, and Obesity. The finding shows that most children from ECD centers have a normal nutritional status. About one-third of the families are unable to provide adequate care for their children. This implies that there has been the need for more awareness-raising efforts targeted at ECD parents.

In a study of body mass index (BMI) in children aged 3 to 5 years, Trpkovska and others (2015) found that being underweight is a growing health concern among young children and should be addressed along with the problem of overweight.

The results of this study indicate that the mother's occupation does not have a significant impact on the nutritional status of the children, the frequency of meals at home, the quality of drinking water, the hygiene of the toilet, and the consumption of junk food. This suggests that the mother's occupation may not generate enough income to ensure adequate nutrition and water quality at home. However, the father's occupation was found to have a significant impact on home nutritional status. This can be attributed to the patriarchal nature of Nepali society, where the mother's role is traditionally limited in many aspects of life.

The studies conducted in Nepal and Bangladesh have shown a high prevalence of malnutrition among children aged 6-59 months and under-five years, respectively. Kafle and others (2017) found that 41.4% of children in the eastern Terai of Nepal were stunted, with 18.1% being classified as severe cases, while 38.6% were underweight, with 13.6% being classified as severely underweight, and 25% were wasted, with 9.5% being in severe condition. In the findings of Shrestha and others (2022) among 36-59 months children, 35.7% of them were found with low height for their age, 25.8% were underweight, and 9.3% were severely affected by malnutrition. Similarly, Gachhadar and others

(2021) found a high prevalence of malnutrition in under-five years among Dalit children in Morang district of Nepal.

A study conducted by Alom and others (2012) in Bangladesh found that father's occupation and the family's economic status were among the main contributing factors to child malnutrition in under-five age children – which suggests that parents' occupation and economic status play a role in providing nutritious food and creating nutritional habits for their preschool children. A similar finding was observed in a cross-sectional study among 5-7 years' children in Humla district of Nepal by Ranabhat and others (2016), which claimed that economic status is a major determinant of BMI.

The present research has found the nutritional status of early childhood development (ECD) children to be inadequate. The results also indicate that the mother's role is insignificant, and that the father's education and occupation have a significant impact on the nutritional status of the children.

It is important to note that this is a single study, which may have its own limitations, and further research with larger sample number, different sample locations and diverse population is needed to determine the generalizability of these findings.

## Conclusion

The findings of the study indicate that a significant proportion of ECD children (over one third) had a moderate level of malnutrition. A large percentage of these children (nearly half) came from families with poor economic status. The study identified several factors that influenced the nutritional status of ECD children, including economic status, parental education and occupation, family type, and the age of the child. However, the most significant determinants of poor nutritional status among ECD children were found to be the father's level of education, occupation, and income.

Based on the information provided, the following conclusions can be drawn from the study: A large proportion of ECD children in the city's core areas have a moderate level of malnutrition. Economic status is a major determinant of the nutritional status of ECD children, with those from low-income families being more likely to be malnourished. Parental education and occupation also play a role in the nutritional status of ECD children, with fathers being a more significant factor than mother. Other factors, such as family type and the age of the child also appear to influence the nutritional status of ECD children.

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