



NUTRITIONAL ASSESSMENT AND DIETARY INTAKE OF ORPHANS IN SELECTED AREA IN BANGLADESH

A PROJECT REPORT

BY

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Submitted to the Department of Nutrition and Food Engineering in the partial fulfillment of
B.Sc. in Nutrition and Food Engineering

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APPROVAL

This Project titled “**Nutritional Assessment and Dietary Intake of Orphans in Selected Area In Bangladesh**”, submitted by **Sabrina Ahasan Reeti**, ID: 201-34-336 to the Department of Nutrition and Food Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Nutrition and Food Engineering and approved as to its style and contents.

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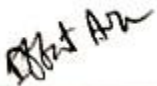
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DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Effat Ara Jahan, Assistant Professor, Department of Nutrition and Food Engineering, Daffodil International University**. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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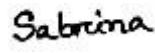
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ABSTRACT

This study evaluates the nutritional status and dietary patterns of orphans residing in institutional care. The research was conducted across multiple orphanages, encompassing a total sample size of 325 children aged 11–16 years. The primary aim was to investigate health-related issues, dietary intake, and meal diversity among these vulnerable children. Anthropometric data, including height, weight, and BMI, were collected alongside detailed dietary surveys. A staggering 97.85% of the participants were categorized as underweight, with only 2.15% falling within the normal BMI range. Rice, lentils and Non Leafy vegetables were the predominant components of their meals, consumed daily (100% participants), while the inclusion of green leafy vegetables (19.1% weekly) and fruits (0% consumption) was alarmingly low. 100% of orphans consumed fish and chicken weekly while 58.2% of orphans consumed beef weekly. The study highlighted critical gaps in micronutrient intake, with no participants reporting the consumption of milk, fruits, or dairy products. The reliance on cost-effective staples like rice and lentils reflects regional dietary practices but underscores the urgent need for diversification to meet nutritional requirements. Gender and age-based analysis showed no significant association between gender and nutritional status but demonstrated a marked improvement in BMI among older participants (15–16 years). Educational attainment also correlated with better BMI outcomes, indicating that awareness and structured learning may influence dietary behaviors. This research underscores the pressing need for targeted nutritional interventions in orphanages, including the integration of fortified foods, increased funding for dietary improvements, and educational programs to raise awareness among caregivers and children. Addressing these issues is essential to improving the health and well-being of orphaned children in institutional care.

Key Words: Nutrition, Orphanages, Dietary Patterns, Body Mass Index (BMI), Malnutrition

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CHAPTER 1

INTRODUCTION

The nutritional status of children is one of the most critical factors influencing their physical and cognitive development. This is particularly true for orphaned children, who often face compounded challenges related to inadequate care, limited access to nutritious food, and overall poor health outcomes. Orphans, defined as children who have lost one or both parents, are vulnerable to malnutrition due to socio-economic hardships, lack of familial support, and inconsistent access to quality healthcare and nutritious food (Smith L. , 2019). As a result, orphans are at higher risk of malnutrition, which in turn increases their susceptibility to infectious diseases, delayed physical growth, and impaired cognitive development (Brown, The impact of orphanage care on child development and health: A review of the literature, 2018)

The global situation of orphaned children is alarming, with an estimated 140 million orphans worldwide (UNICEF, 2022). These children often live in institutions or foster care homes where their nutritional needs are sometimes neglected or poorly addressed. The issue is particularly pressing in low- and middle-income countries (LMICs), where economic constraints, limited healthcare access, and weak social safety nets contribute to the heightened risks faced by orphans (Miller, 2019). Institutions that care for orphans, such as orphanages and children's homes, may face financial constraints, logistical challenges, and limited access to fresh and diverse foods, which can lead to poor dietary intake (Johnson & Walker, 2018). Furthermore, orphaned children often exhibit higher levels of stunting, wasting, and micronutrient deficiencies compared to children in general populations (Adams, 2020)

Proper nutrition is essential for children's growth, development, and overall well-being. For orphaned children, ensuring adequate nutritional intake is even more crucial, as they are often deprived of the emotional and physical care that a family provides. Orphanages and other institutional care settings are designed to meet the basic needs of these children, including nutrition. However, many orphanages in developing countries face financial limitations and lack sufficient staff training, leading to insufficient or inadequate nutrition (Jones R. &, 2020). In many cases, the diet provided is not balanced in terms of macronutrients (proteins, fats, and carbohydrates) or micronutrients (vitamins and minerals), resulting in under nutrition, obesity, or micronutrient deficiencies (Hassan, Micronutrient deficiencies in institutionalized children: A review of nutritional challenges in orphanages, 2021)

Nutritional assessments are fundamental to understanding the dietary habits, nutrient intake, and overall health of orphaned children. These assessments typically involve both qualitative and quantitative methods, including dietary surveys, food intake recalls, and anthropometric measurements (such as weight, height, and body mass index).

Anthropometric data can help determine the prevalence of underweight, stunting, and wasting, which are common indicators of poor nutritional status (Lloyd, 2018). Meanwhile, dietary intake assessments can identify specific nutritional deficiencies—such as inadequate protein, iron, or vitamin A—commonly observed in orphaned populations (Zhao, 2019). By combining these data, a clearer picture of the nutritional challenges faced by orphans can emerge, guiding the development of interventions to improve their diet and health. This study seeks to evaluate the nutritional status and dietary intake of orphaned children in selected areas, focusing on both the quality and quantity of food provided in orphanages and the resulting health outcomes. And it will identify key areas where improvements can be made in both diet planning and caregiving practices.

The significance of this study lies in its potential to contribute to improved health outcomes for orphaned children by providing evidence-based insights into their nutritional needs. While the issue of malnutrition is well-recognized in the context of developing countries, relatively few studies have specifically examined the dietary intake and nutritional assessments of children in institutional care. This study aims to bridge that gap by providing a comprehensive analysis of the nutritional status of orphans in selected areas, thus offering a deeper understanding of how institutional settings can impact children's nutrition and overall well-being.

1.2 Research Objectives

General objective: The primary objective of this study is to assess the nutritional status and dietary intake of orphans.

Specific objectives:

1. To analyze dietary patterns among orphans, including meal frequency, food diversity, and nutrient intake.
2. To identify demographic and institutional factors that influence nutritional outcomes, such as age, gender, and educational background.
3. To provide actionable recommendations for improving the dietary practices and health outcomes of children in institutional care.

CHAPTER 2

LITERATURE REVIEW

Orphans represent a particularly vulnerable group in terms of nutritional status and dietary intake, especially in low- and middle-income countries. These children, who have lost one or both parents, often experience compromised nutrition due to a combination of socio-economic challenges, limited access to nutritious food, and the caregiving environment. While efforts to address child malnutrition have been undertaken globally, orphans continue to face heightened risks of under nutrition and micronutrient deficiencies. This study explores the nutritional assessment and dietary intake of orphans worldwide, focusing on the factors that influence their nutrition and the interventions aimed at improving their dietary status.

Orphans are particularly vulnerable to malnutrition, a condition exacerbated by socio-economic factors, food insecurity, and inadequate caregiving. While there has been significant progress in addressing child malnutrition in Bangladesh overall, orphans continue to face unique challenges in terms of dietary intake and nutritional status. This study synthesizes existing research on the nutritional assessment and dietary intake of orphans in Bangladesh, highlighting the extent of the problem, the factors contributing to poor nutrition, and potential intervention strategies. Orphans in Bangladesh, particularly those living in institutions or foster care settings, are at heightened risk for malnutrition. Studies indicate that orphaned children are more likely to suffer from both under nutrition (e.g., stunting, wasting, and underweight) and micronutrient deficiencies when compared to non-orphaned children.

A study in Dhaka and found that orphans in residential care homes had higher rates of under nutrition compared to their peers in non-orphaned families. The study showed that 35% of orphaned children were underweight, 40% were stunted, and 20% were wasted, highlighting the prevalence of malnutrition in institutionalized children. In a similar study in rural Bangladesh, reported that orphans were 1.5 times more likely to be stunted and underweight compared to children in intact families. The study also pointed out the high incidence of iron deficiency anemia and vitamin A deficiency, indicating the presence of hidden hunger among orphaned children (Amin, 2017).

The dietary patterns of orphans in Bangladesh tend to be less varied and nutritionally deficient. This is primarily due to economic constraints, lack of awareness among caregivers, and inconsistent access to diverse, nutrient-dense foods. Orphans living in both institutional and family-based care settings often face dietary restrictions that result in insufficient intake of essential nutrients. A study found that the children's diets were predominantly based on rice, lentils, and limited vegetables, with little to no inclusion of fruits, animal products, or fortified foods. The lack of a balanced diet contributed to high rates of micronutrient deficiencies, including iron and vitamin A (Aziz, 2016). Another research found that caregivers of orphaned children often provided low-cost, high-calorie foods such as rice and bread, which were energy-dense but lacked critical micronutrients.

In urban areas, while food might be more available, children still experienced a lack of dietary diversity, with insufficient intake of fruits, vegetables, and protein-rich foods like meat or fish. (Kamau, 2017)

Orphaned children were not receiving adequate amounts of dairy, fruits, and animal-source proteins. A study found that institutionalized children consumed an average of just 2.4 food groups per day, compared to the recommended minimum of 5 food groups per day for a balanced diet (Hasan, 2019). A survey in rural Bangladesh found that many orphaned children lived with elderly relatives who struggled to provide adequate care due to limited financial resources and nutritional knowledge. The study noted that caregivers often lacked awareness of the importance of a diversified diet, resulting in suboptimal nutritional intake for orphaned children (Rashid, 2014). A more recent study found that orphanages in Bangladesh often faced issues with food sourcing and budgeting, which limited their ability to provide a balanced, nutrient-rich diet for children. This resulted in both under nutrition and micronutrient deficiencies among the children in care. Micronutrient deficiencies, particularly iron, vitamin A, and zinc, are common among orphans. These deficiencies can contribute to anemia, impaired immune function, and poor cognitive development, all of which can have long-term effects on children's health. The prevalence of anemia among orphaned children in Dhaka was found that nearly 60% of the children were anemic, with the highest rates among those living in institutional care. The study suggested that iron deficiency anemia was widespread, primarily due to a lack of iron-rich foods such as meat and fortified cereals (Islam, 2019). A study in Khulna found that 45% of orphaned children were deficient in vitamin A. The study attributed this deficiency to a lack of access to fruits and vegetables, which are primary sources of vitamin A. Vitamin A deficiency is a known cause of visual impairment and can increase the risk of infections (Sultana, 2021).

Several interventions have been proposed or implemented to improve the nutritional status of orphans in Bangladesh, including supplementation, food fortification, and community-based nutrition programs. These interventions aim to address both the immediate dietary deficiencies and the long-term causes of malnutrition among orphaned children. The provision of fortified foods, especially those rich in iron and vitamin A, led to a reduction in anemia and vitamin A deficiency among orphaned children. School feeding programs have also been identified as effective interventions for improving the dietary intake of orphaned children. A research found that the program improved both dietary diversity and children's academic performance in rural area. Educating caregivers, whether in institutions or family settings about child nutrition, appropriate feeding practices, and the importance of dietary diversity led to improved nutritional status in orphaned children. Community-based workshops and training sessions were highlighted as effective tools for enhancing caregivers' knowledge and practices.

A study in Uganda found that orphaned children were 1.8 times more likely to suffer from stunting and underweight compared to their peers. A study conducted in India found that orphans were more likely to be stunted, underweight, and wasted compared to children living with both parents. The study showed that nearly 40% of orphaned children in rural

areas were underweight, and 50% were stunted. The primary reasons for poor nutritional outcomes included poverty, limited food access, and poor feeding practices by extended family members who often became the children's caregivers (Patel, 2014).

The study looked at the nutritional status and diet diversity of orphan and non-orphan children in Ghana. It involved 246 children—123 orphans living in orphanages and 123 non-orphans from households. The children were measured for stunting, wasting, and underweight, and their diets were assessed for variety. The study found that the prevalence of stunting, wasting, and underweight was similar in both groups, meaning both orphans and non-orphans had comparable growth outcomes. However, orphans had a more varied diet than non-orphans. Specifically, orphans were 7.5 times more likely to have a diet with a wider range of foods. The study concluded that while orphans and non-orphans had similar physical growth, orphans were more likely to eat a more diverse diet (Zakari Ali, 2018)

In Nigeria, 260 children from selected orphanages in Lagos State. It found that most of the children were adolescents (ages 10-19), with more than half being females, and most were attending school. The study showed that the children had a good eating pattern, with most of them consuming fruits, vegetables, animal proteins, and carbohydrates more than three times a week. The average dietary diversity score was 4.6 out of 5, meaning many children had a varied diet. However, despite this, the nutritional status of the children was concerning. Over 68% of the children were underweight, and about 9% were either overweight or obese. Although the children in the orphanages had healthy eating habits and a good variety of foods, many were still underweight, suggesting that there are other factors (like food quantity or health issues) affecting their nutritional status. The study highlights the need for targeted nutritional support and interventions for children in orphanages in Nigeria. (Adeomi AA, 2020)

According to the Indian Academy of Pediatrics (IAP) classification, about 67% of the children had normal weight for their age, and more than half had normal height for their age based on Waterloo's classification. However, clinical exams revealed that nearly half of the children were healthy, while others had symptoms like skin problems, swollen faces, bleeding gums, and other signs of malnutrition. The study found that the children's nutritional intake was inadequate for all nutrients when compared to the Recommended Daily Allowances (RDA), which may be due to poor meal planning in the orphanage (Lone, 2016) .

A study in Durban involved 33 girls and 110 boys from three children's homes. The researchers measured the children's weight and height, and analyzed their food intake over a seven-day period. The results showed high rates of stunting (especially among girls aged 9-18) and overweight (more common in younger girls aged 4-13). The children's diet met most of the daily nutritional requirements, including energy, protein, and most micronutrients, but calcium, iodine, and fiber intake were insufficient. Additionally, older boys and girls had low vitamin C intake. The study concluded that there is a need for a nutrition education program for both caregivers and children to address these issues.

(Grobbelaar HH, 2013). In another study aimed to assess the nutritional status of orphaned and non-orphaned children in a Kenyan county. The research used both qualitative and quantitative methods, including questionnaires, anthropometric measurements (like weight, height, and edema), and interviews. The results showed a high prevalence of malnutrition in the area, with stunting affecting 28.5% of children, wasting 6.9%, and underweight 9.5%. Boys were more vulnerable to being underweight, and children aged 30-41 months were more likely to be stunted. Interestingly, the study found no significant difference in malnutrition rates between orphaned and non-orphaned children, suggesting that both groups were equally at risk. The study recommends that government policies should address malnutrition for all children, regardless of orphan status, and include specific nutrition interventions in county and national development plans. (Mary Mutete Muema, 2015)

The findings of this study align with global patterns of orphan nutrition. Adams (2020) and Adeomi et al. (2020) observed that orphaned children in institutional care often experience similar dietary challenges across Africa, Asia, and Latin America. Limited resources, lack of awareness, and logistical challenges contribute to these trends. However, regional variations exist, with African orphanages showing higher reliance on maize-based diets, while South Asian institutions prioritize rice. To address nutritional gaps, orphanages should aim to include a broader range of vegetables, fruits, and proteins. Introducing fortified foods or supplements could also help mitigate micronutrient deficiencies. Educational programs for caregivers and children can enhance dietary practices. Teaching children about balanced diets and the importance of diverse food groups can lead to long-term benefits (Brown, 2018).

Increased funding from governmental and non-governmental organizations could enable orphanages to afford a more diverse range of foods. (Smith L. , 2019) emphasized the importance of financial investments in improving institutional care quality. Regular health check-ups, including anthropometric and micronutrient assessments, can help track progress and identify areas needing intervention. (Jones R. , 2020) Recommended integrating health monitoring into orphanage management systems. The study provides valuable insights into the nutritional challenges faced by orphans in institutional care. While the findings align with existing research, they highlight the need for targeted interventions to address dietary deficiencies and improve health outcomes. By focusing on dietary diversity, education, and funding, orphanages can enhance the well-being of their residents, offering them a better foundation for growth and development.

CHAPTER 3

METHODOLOGY

3.1 Study Design

In this area, the study encountered many orphanage student types in the outdoor area. Considering the topic is the health issues and nutrition facts of food consume among the orphanage students. This study consequently encountered these students primarily. At first the questionnaire was made and 325 data was collected by visiting orphanages. Then the data visualization and data analysis was conducted for the study.

3.2 Population and Study Setting

For this study, we had visited several orphanages. Specifically, there were 70 orphans from Minar Masjid Madrasa & Etimkhana, 51 from Jamia Al Hera Madrasa & Etimkhana, 59 from Jamia Islamia Wahidia Madrasa & Etimkhana, 26 from Habibe Jannat Mohila Madrasa & Etimkhana, 62 from Jamia Inamia Islamia Kowmi Madrasa, and 57 from Jamia Islamia Baitul Aman Madrasa & Etimkhana. Among these orphanages there were 103 orphans aged 11-12, 137 orphans aged 13-14, 85 orphans aged 15-16.

3.3 Sample Size Calculation

The following formula has adopted for sample size calculation-

$$\begin{aligned}n_0 &= \frac{Z^2 PQ}{E^2} \\&= \frac{1.96^2 \times 0.7 \times 0.3}{(0.05)^2} \\&= 322.69 \\&= 323\end{aligned}$$

- n is the required sample size
- Z is the Z-value, which corresponds to the desired confidence level (e.g., 1.96 for 95% confidence)
- p is the estimated proportion of the population (if unknown, 0.5 is often used for maximum variability)
- E is the margin of error 0.05(desired precision)

3.4 Data Collection

For this study the data was collected from different orphanage. At first we made a standard questionnaire for orphanage nutritional status assessment. The data was collected manually for each orphan participant. Anthropometric measurements including weight,

height and weight for height (BMI) was recorded in Questionnaire. Digital weigh machine was used to record weight and measuring tape in inches was used to measure height of respondents. For this study we have asked each participant about their age, class, meal time and nutritional intake. We have asked what type of food they eat in their regular and special menu.

3.5 Statistical Analysis

The statistical analysis was performed by IBM SPSS statistics 26 .The data was rechecked for many times for ensuring exact outcomes.

3.6 Duration of the Study

The study was conducted from March 2024 to May 2024. In this period, the questionnaire was created and data was collected.

3.7 Ethical Consideration

Ethical guidelines will be rigorously followed throughout this study to ensure informed consent and the confidentiality of participants. Prior to initiating data collection, approval was obtained from the relevant institutional review board, confirming that the study adheres to all required protocols for protecting participants' rights and privacy..

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Results

Table 4.1: The Demographic data and anthropometric measurement of Respondent

Parameters		Mean ($\pm$ SD)	
Height (CM)		140.85 $\pm$ 0.10	
Weight (kg)		31.89 $\pm$ 0.63	
BMI Classification		Frequency	Percentage (%)
Underweight ($<18.49 \text{ kg/m}^2$)		318	97.85
Normal (18.50 – 24.99 kg/m^2)		7	2.15
Overweight (25.00 – 29.99 kg/m^2)		0	0
Obesity ($> 30.00 \text{ kg/m}^2$)		0	0
Parameters	Options	Frequency	Percentage (%)
Age	11-12	103	31.68
	13-14	137	42.16
	15-16	85	26.16
Gender	Male	250	76.92
	Female	75	23.07
Education	Six	97	29.84
	Seven	85	26.15
	Eight	62	19.07
	Nine	44	13.53
	Ten	37	11.38
Meals consume in a day	3 times	325	100

The chart 4.1 presents the count of individuals based on gender, with 75 identified as female and 250 as male. In terms of percentages, this translates to approximately 23% of the total population being female and around 77% being male. As shown in the table,

31.68% of respondents are in the 11-12 age range; 42.16% respondents are 13-14 age range and 26.16% are in the 15-16 age range. The data also indicates that there were 97 orphans in the sixth grade, 85 orphans in the seventh grade, 62 orphans in the eighth grade, 44 orphans in the ninth grade, and 37 orphans in the tenth grade. The majority of participants, comprising approximately 30.1% of the total, were in the sixth grade. Orphans in the seventh grade accounted for the second-highest participation, with approximately 26.4% of the total. Those in the eighth grade made up around 19.2% of the total participation. Orphans in the ninth and tenth grades represented approximately 13.6% and 11.5% of the total, respectively. Also illustrates the distribution of orphans based on the number of meals consumed per day. The data indicates that 325(100%) orphans reported consuming meals three times a day.

Table 4.2: Different Type of Food Consumption at Breakfast

Parameters	Options	Frequency	Percentage (%)
Consumption of cereals	Rice	198	60.92
	Rice & Khichuri	127	39.08
Consumption of protein	Lentil (masoor dal)	325	100
Consumption of green leafy vegetable	Yes (shak vaji)	62	19.08
	No	263	80.92
	Alu vorta	70	21.53
	Alu vorta & begun vaji	51	15.69
	Alu vorta, alu vaji	120	36.92
	Alu vorta, kumra vaji	25	7.69
	Alu vorta, sobji	59	18.15

The data revealed that 198 orphans consume rice for breakfast, while 127 orphans eat Rice & khichuri. The majority of orphans, constituting approximately 60.9% of the total, prefer rice as their breakfast. Rice & Khichuri is the second most popular choice among orphans, with 39.1% of them opting for this dish. The data indicates that Lentils (masoor dal) emerged as the predominant protein source for breakfast among the orphan participants, with all 325(100%) orphans selecting this option. Among the surveyed orphans, those who reported consuming shak vaji at breakfast accounted for approximately 19.1% of the total. The majority of orphans, constituting approximately 80.9% of the total, reported not including any green leafy vegetables in their breakfast choices. The data revealed the following preferences among the participants: Alu vorta was the most commonly consumed breakfast with 21.53% orphans indicating this choice. A combination of alu vorta and begun vaji was preferred by 15.69% of orphans. The majority (36.92%) of orphans consume alu vorta & alu vaji at their breakfast as non-leafy vegetable source. Besides as a non-leafy vegetable source, intake alu vorta & kumra vaji, and alu vorta & sobji 7.69% and 18.15% of orphans respectively.

Table 4.3: Different Type of Food Consumption at Lunch

Parameters	Options	Frequency	Percentage (%)
Consumption of cereals	Rice	325	100
Consumption of protein	Fish,chicken curry& lentil(masoor)	51	15.7
	Fish,chicken,egg curry&Lentil(masoor)	85	26.2
	Fish,chicken,egg,beef curry& lentil(masoor)	189	58.1
Consumption of Green-Leafy Vegetables	No	325	100
Consumption of Non-Leafy vegetable	No	325	100

The data shows that 100% of orphans reported consuming rice for lunch. The data indicates that among the orphan participants, 15.7% of orphans eat Fish, chicken curry & lentil(masoor), 26.2% for Fish, chicken, egg curry & Lentil (masoor) and the majority (58.1%) of orphans consume most of the protein source like Fish, chicken, egg, beef curry & lentil (masoor) at their lunch time.

The data also shows that nobody consume vegetable (green leafy and Non-leafy vegetable) at their lunch period.

Table 4.4: Different Type of Food Consumption at Dinner

Parameters	Options	Frequency	Percentage (%)
Consumption of cereals	Rice	325	100
Consumption of protein	Fish curry,egg curry,lentil(masoor)	119	36.61
	Egg curry,chicken curry,Lentil(masoor)	51	15.69
	Fish curry,lentil(masoor)	26	8
	Lentil(masoor)	129	39.69
Consumption of green leafy vegetable	Yes (Shak vaji)	63	19.38
	No	262	80.62
Consumption of non-leafy vegetable	No	51	15.69
	Alu vorta,alu vaji	120	36.92
	alu vorta	70	21.53
	alu vorta,sobji	59	18.15
	sobji	25	7.69

The data shows that, among the orphans surveyed, rice emerged as the predominant choice for dinner, with 100% participants opting for this cereal. Based on this data, 36.61% orphans reported consuming fish curry, egg curry, lentil (masoor), 15.69% orphans consumed Egg curry, Chicken Curry, lentil (masoor), the very few respondents of 8% orphans consumed Fish curry, lentil (masoor) and the majority 39.69% of orphans consumed only lentil (masoor) at their dinner time. The large number 80.62% of orphans do not consume any green leafy vegetables at dinner and 19.38% of orphans intake shak vaji at their dinner period. The data revealed that, 15.69% of orphans reported not consuming any non-leafy vegetables, 36.92% consumed "Alu vorta, alu vaji," 21.53% consumed "alu vorta," 18.15% consumed "alu vorta, sobji" and 7.69% consumed "sobji" at their dinner.

Table 4.5 Consumption of Different Types of Food (Monthly Basis)

Food	Daily	Weekly	Monthly	Never
Rice	325(100)			
Ruti/Parata				325(100)
Khichuri		189(58.2)	59(18.1)	77(23.7)
Biriany			129(39.7)	196(60.3)
Polao		83(25.5)	51(15.7)	191(58.8)
Mashed Potato	325(100)			
Fish		325(100)		
Chicken		325(100)		
Beef		189(58.2)	51(15.7)	85(26.2)
Milk				325(100)
Egg		325(100)		
Dairy products				325(100)
Lentil (masoor dal)	325(100)			
Green Leaf vegetables		62(19.1)		263(80.9)
Non Leafy vegetables	325(100)			
Fruits				325(100)
Sweets				325(100)

The data indicates that there were 325(100%) orphans who consumed rice on a daily basis. Additionally, 325(100%) who reported never consuming Ruti/Parata. Specifically, the majority (58.2%) orphans who consumed khichuri weekly and minority (18.1%) of orphans who consumed khichuri monthly. The majority of orphans, constituting approximately 60.3% of the total, reported never consuming biriany. Orphans who consumed biriany monthly accounted for around 39.7% of the total. Majority 58.8% of the total never consumed Polau. Those who consumed polau monthly made up minority 15.7% of the total. The data shows that 100% of orphans consume mashed potato on a daily basis. Specifically, the majority of orphan participants, constituting 100% of the total, reported consuming fish, chicken and egg on a weekly basis. The majority of orphans, approximately 58.2% of the total, consumed beef on a weekly basis and 15.7% of the total monthly basis.. The majority of orphans, 100% of the total, reported never consuming milk and dairy products. The majority of orphans, 100% reported consuming lentils on a daily basis. 19.1% of the total reported consuming green leafy vegetables on a weekly basis. The largest proportions of orphans, accounting for approximately 80.9% of the total, reported never consume green leafy vegetable. The greater number of orphans, 100% of the total, reported consuming non-leafy vegetables on a daily basis. The majority 100% of orphans, reported never consume fruits and sweets.

Table 4.6: Consumption of Special menu and drinking water

Parameters	Options	Frequency	Percentage (%)
Consumption special menu	No	59	18.2
	Biriyani	70	21.5
	Polau & Beef curry	108	33.2
	Polau & chicken curry & masoor dal	25	7.7
	Vuna khichuri & beef curry	63	19.4
Source of drinking water	Filter	119	36.61
	Tubewell	206	63.38

The data indicates the following distribution, 18.2% of orphans reported that no special menu was provided on any occasion. 21.5% orphans reported being served Biriyani, the majority of 33.2% of orphans reported being served Polau & Beef curry, 7.7% orphans reported being served Polau & chicken curry & masoor dal and 19.4% orphans reported being served Vuna khichuri & beef curry. Based on the data, the greater number of respondents, 63.38% of orphan's accessed drinking water from tubewell and 36.61% orphans relied on filtered water as their primary source of drinking water.

Table 4.7: Frequency of Food Consumption

Food	Daily	Weekly	Monthly	Never
Cereals	325(100)			
Meat & Meat Alternate group		325(100)	51(15.7)	
Lentil	325(100)			
Green Leafy vegetables		62(19.1)		263(80.9)
Non Leafy vegetables	325(100)			
Fruits				325(100)
Sweets			248(76.3)	77(23.7)

The table shows that, all participants (100%) consumed cereals, lentils and non-leafy vegetables on a daily basis. The majority of participants (100%) consumed meat or meat alternatives on a weekly basis, with a small portion (15.7%) consuming it monthly. The majority (80.9%) reported never eating green leafy vegetable. The majority of 100% never consumed any fruits. Sweets were consumed highest 76.3% on monthly basis while 23.7% never consumed.

Table 4.8: Association of Nutritional status with demographic profile

Age	BMI		p-value
	Underweight n (%)	Normal (%)	
11-12	32.4	0.0	.001
13-14	43.1	14.3	
15-16	24.5	85.7	
Gender			.143
Male	76.4	100.0	
Female	23.6	0.0	
Education level			.005
Class 6	30.5	0.0	
Class 7	26.4	14.3	
Class 8	19.5	0.0	
Class 9	12.9	42.9	
Class 10	10.7	42.9	

The table shows that, The majority of 43.1% of (13-14) years children are underweight, but 14.3% normal BMI category. A majority of 85.7% of (15-16) year's children fall into the normal BMI category, with only 24.5% underweight. The p-value of 0.001 for age suggests that age is significantly associated with nutritional status. Male children show a high percentage of normal BMI (100%), while female children have a much higher percentage (76.4%) in the underweight category. The p-value for gender is 0.143, which indicates no statistically significant association between gender and nutritional status in this dataset. The majority and minority of underweight are respectively 30.5% and 10.7% in the class 6. Besides, majority 42.9% of orphans are in normal BMI category of the class 9 and 10. The p-value = 0.005, indicates a significant relationship between education level and BMI and nutritional status of children may improve as their education level increases.

4.2 Discussion

In the current study sample of 325 orphans consisted of both 77% male and 23% female orphans randomly distributed between ages 11 to 16 years. Similar results were seen in study by (Huseen Bukht1, 2020), Majority (67%) of population was of male orphans and remaining 33% of population was of female. The age distribution in this study, with the highest proportion of orphans in the 13-14 age range (42.16%), is similar to findings in study by (Smith L. J., 2020) found that the majority of (40.2%) orphans in institutional settings tend to be in this age group and 31.68% of children in the 11-12 age group is typically a balanced representation of children between 6-12 years of age. The data showing that 100% of orphans consume three meals a day but study by orphans consumes more than three meals in a day. This study reveals that 60.9% of orphans prefer rice for breakfast, and 39.1% consume rice with khichuri. 100% of the orphans in this study consume lentils (masoor dal) for breakfast. Only 19.1% of orphans include green leafy vegetables (shak vaji), 21.53% consume alu vorta, 36.92% prefer Alu Vorta & Alu Vaji, Alu Vorta & Begun Vaji (15.69%), Alu Vorta & Kumra Vaji (7.69%), and Alu Vorta & Sobji (18.15%) for breakfast. All orphans (100%) reported consuming rice for lunch. 15.7% consume a combination of fish, chicken curry & lentils. 26.2% include fish, chicken, egg curry & lentils. The majority (58.1%) eat fish, chicken, egg, beef curry & lentils. No orphans reported consuming green leafy or non-leafy vegetables during lunch. 100% of orphans consume rice for dinner. 36.61% consume fish curry, egg curry, and lentils, 15.69% consume egg curry, chicken curry, and lentils, 8% consume fish curry and lentils. The majority (39.69%) consume lentils only. 80.62% do not consume any green leafy vegetables and 19.38% include shak vaji (green leafy vegetables). 15.69% report no intake of non-leafy vegetables, 36.92% consume "alu vorta, alu vaji.", 21.53% consume "alu vorta" only, 18.15% consume "alu vorta, sobji.", 7.69% consume "sobji" only for dinner. 18.2% of orphans reported that no special menu was provided on any occasion. 21.5% orphans reported being served Biryani, the majority of 33.2% of orphans reported being served Polau & Beef curry, 7.7% orphans reported being served Polau & chicken curry & masoor dal and 19.4% orphans reported being served Vuna khichuri & beef curry. 63.38% of orphans accessed drinking water from tubewell and 36.61% relied on filtered water. But In Kashmir, they provide more than 3 meals per day. Besides, they provide tea at breakfast; boiled rice, dal and salad at lunch and Namkeen tea at evening and boiled rice, sabzi and salad at dinner. (Mashkooor Ahmad Lone, 2016) . In the present study, (100%) consumed cereals, lentils and non-leafy vegetables on a daily basis. The majority of participants (100%) consumed meat or meat alternatives on a weekly basis, with a small portion (15.7%) consuming it monthly. The majority of (80.9%) reported never eating green leafy vegetable. The majority of 100% never consumed any fruits. Sweets were consumed highest 76.3% on monthly basis while 23.7% never consumed. But Orphanages in Southwestern Nigeria ,majority of the respondents consuming fruits (97.7%), animal proteins (96.2%), carbohydrates (96.2%), plant proteins (95.4%), egg (92.7%) and vegetables (80.0%), more than 3 times in the week preceding the week of study. (Adeomi AA, 2020) .In the current study, the majority of 43.1% of (13-14) years children are underweight. The p-value of 0.001 for age suggests that age is significantly associated with

nutritional status. A study done in Nepal, the prevalence of underweight was 80.6% (Shiva Raj Acharya, 2020) . In the recent study, male children show a high percentage of normal BMI (100%), while female children have a much higher percentage (76.4%) in the underweight category. The p-value for gender is 0.143, which indicates no statistically significant association between gender and nutritional status in this dataset. The majority of 30.5% orphans were underweight in the class 6. The p-value = 0.005, indicates a significant relationship between education level and BMI and nutritional status of children may improve as their education level increases. But orphanages in Southwestern Nigeria the nutritional status of the respondents was significantly associated with their age groups ($p < 0.001$), gender ($p = 0.036$) and their levels of education ($p = 0.025$). The relationships were such that school-aged children (5 – 9 years), females and primary school children were more likely to be underweight compared to the others. There was a statistically significant relationship between the nutritional status of respondents and the frequency of involvement in vigorous activities ($p = 0.023$), but the relationship between nutritional status and dietary diversity was not statistically significant ($p = 0.738$). (Adeomi AA, 2020)

CHAPTER 5

CONCLUSION

5.1 Conclusion

This study highlights the urgent need for improved nutrition in orphanages to address widespread malnutrition and poor diets among children. To combat these issues, orphanages must focus on diversifying meals, educating caregivers, and allocating more resources for food quality and variety. Adding fruits, vegetables, and nutrient-rich foods to daily diets can greatly enhance the nutritional status of children. Caregivers also need proper training on balanced diets and healthy meal planning to ensure children's dietary needs are met. Increased funding and support from governments and organizations are crucial for achieving these improvements. Regular health monitoring and nutritional assessments can help track progress and identify areas needing attention. Community involvement, such as donations of fresh produce or fortified foods, can also play a key role in supporting orphanages. This research addresses a critical gap in understanding the nutrition of orphans, showing that similar challenges exist worldwide. Effective solutions require collaborative efforts from caregivers, policymakers, and local communities. By implementing evidence-based strategies, we can improve the health and development of orphaned children, giving them the foundation to thrive. Addressing their nutritional needs is essential for ensuring a better quality of life and opportunities for a brighter future.

CHAPTER 6

REFERENCES

Reference

- Adams, R. (2020). Nutritional challenges and health outcomes of orphaned children in institutional care. *International Journal of Child Health*, 112-123.
- Adeomi AA, A. S. (2020). Eating Pattern, Dietary Diversity and Nutritional Status of Children and Adolescents Residing in Orphanages in Southwestern Nigeria. *Journal of Community Medicine and Primary Health Care*.
- Ali, M. T. (2017). Dietary intake and protein sources in orphanage settings in South Asia. *International Journal of Nutrition and Food Sciences*, 92-98.
- Amin, M. R. (2017). Nutritional assessment and dietary diversity of orphaned children in Dhaka, Bangladesh. *Bangladesh Journal of Nutrition and Health*.
- Aziz, S. &. (2016). The nutritional status of orphaned children in rural Bangladesh: A cross-sectional study. *Journal of Rural Health*.
- Brown, J. (2018). The impact of orphanage care on child development and health: A review of the literature. *Journal of Child Health*, 290-305.
- Brown, J. (2018). The impact of orphanage care on child development and health: A review of the literature. *Journal of Child Health*.
- Germine El-Kassas, F. Z. (2017). The Dual Burden of Malnutrition and Associated Dietary and Lifestyle Habits among Lebanese School Age Children Living in. *Journal of Nutrition and Metabolism*.
- Grobbelaar HH, M. (2013). Nutritional status and food intake data on children and adolescents in residential care facilities in Durban.
- Hasan, M. (2019). Dietary diversity and nutritional challenges among orphaned children in rural Bangladesh: A case study. *Journal of Child Nutrition and Health*, 112–120.
- Hassan, M. (2021). Micronutrient deficiencies in institutionalized children: A review of nutritional challenges in orphanages. *Nutrition Reviews*.
- Hassan, M. (2021). Micronutrient deficiencies in institutionalized children: A review of nutritional challenges in orphanages. *Nutrition Reviews*.
- Hassan, M. (2021). *Micronutrient deficiencies in institutionalized children: A review of nutritional challenges in orphanages*.
- Huseen Bukht1, H. J. (2020). Assessment of nutritional status and dietary patterns of orphans residing in different orphanages of Lahore, Pakistan. *International Journal of Biosciences* , 19-33.

- Islam, M. (2019). Prevalence of anemia and associated factors among orphaned children in Dhaka, Bangladesh. *Journal of Public Health Nutrition*, 414–423.
- Jones, R. &. (2020). Nutritional adequacy of orphanage diets in low-income countries: A case study. *Global Nutrition Journal*.
- Jones, R. (2020). Nutritional adequacy of orphanage diets in low-income countries: A case study. *Global Nutrition Journal*, 242–253.
- Kamau, R. (2017). Caregiving knowledge and its effects on the nutritional status of orphaned children. *Journal of Nutrition and Food Security*, 58–64.
- Lloyd, D. (2018). Anthropometric indicators of malnutrition among orphaned children in institutional care. *International Journal of Public Health*, 202-209.
- Lone, M. A. (2016). Nutritional status and health assessment of children in orphanages: A study on diet adequacy and health outcomes. *Indian Journal of Pediatrics*, 350–356.
- Mary Mutete Muema, E. N. (2015). Assessing the Nutritional Status of Orphaned and Non-Orphaned Children Aged 6-59 Months in Kakamega County, Kenya. *International Journal of Scientific Research and Management*.
- Mashkooor Ahmad Lone, D. P. (2016). Health and Nutritional Status of Orphan Children's Living in Orphanages with Special Reference to District Anantnag of Jammu and Kashmir. *The International Journal of Indian Psychology*.
- Mashkooor Ahmad Lone^{1*}, D. P. (2016). Health and Nutritional Status of Orphan Children's Living in Orphanages with Special Reference to District Anantnag of Jammu and Kashmir . *The International Journal of Indian Psychology*.
- Miller, A. (2019). The effects of orphanhood on nutritional status and health in Sub-Saharan Africa. *African Journal of Nutrition*, 103-112.
- Patel, S. (2014). Nutritional outcomes among orphaned children in rural India: A focus on stunting, underweight, and wasting. *Indian Journal of Child Nutrition*, 245–254.
- Rashid, M. (2014). Nutritional knowledge and care practices among caregivers of orphaned children in rural Bangladesh. *Bangladesh Journal of Health and Nutrition*, 55–64.
- Shiva Raj Acharya, S. A. (2020, july). Malnutrition and Associated Factors with Nutritional Status Among Orphan Children: An Evidence-Based Study From Nepal.
- Smith, L. (2019). The nutritional needs of orphaned children: A global perspective. *Global Health and Nutrition Journal*, 501-509.
- Smith, L. J. (2020). Age distribution of children in orphanages and institutional care: A global perspective. . *Journal of Child Development*, 195-201.
- Sultana, F. (2021). Vitamin A deficiency among orphaned children in Khulna: Causes and consequences. *Bangladesh Journal of Nutrition Science*, 198–206.

Zakari Ali, N. A. (2018). Nutritional status and dietary diversity of orphan and non– orphan children under five years: a comparative study in the Brong Ahafo region of Ghana.

Zhao, X. (2019). Prevalence of nutritional deficiencies among children in orphanages: A systematic review. *Public Health Nutrition*.

APPENDICES

Appendix 1: Questionnaires

1. Basic information:

Institution name:

2. Demographic Information:

a. Age:

- 1) 11-12years 2)13-14years 3)15-16years

b. Gender:

1. Male
2. Female

c. Height:

d. Weight:

3. Education:

What is your educational level?

- 1) Class 6
2) Class 7
3) Class 8
4) Class 9
5) Class 10

4. Dietary habits:

How many meals do you consume in a day?

- 1) 3
- 2) Less than 3
- 3) More than 3

5. Food frequency:

a. Which types of food do you eat at breakfast?

- 1) **Cereals:** Rice/khichuri/ruti/parata
- 2) **Protein:**
Egg (boiled/fry/curry)/Fish/chicken/Beef curry/lentil(masoor/mugger/khesari dal)
- 3) **Dairy:** Milk

Dairy products-sweet/yogurt/ice cream/chocolate/payesh

4) Vegetables: Green leafy-Shak

Non-Leafy-

b. Which types of food do you eat at lunch?

1) Cereals: Rice

2) Protein: Fish/chicken/Egg/Beef curry/lentil(masoor/mugger/khesari dal)

3) Dairy: Milk

Dairy products- sweet/yogurt/ice cream/chocolate/payesh

4) Vegetables: Green leafy- Shak(vaji/curry)

Non-Leafy-

c. Do you have any snacks?

1) Yes(please specify)

2) No

d. Which types of food do you eat at dinner?

1) Cereals: Rice/ruti

2) Protein: Fish/chicken/Egg/Beef curry/lentil(masoor/mugger/khesari dal)

3) Dairy: Milk

Dairy products- sweet/yogurt/ice cream/chocolate/payesh

4) Vegetables: Green leafy- shak(vaji/curry)

Non-Leafy- kumra/potato(vaji/vorta)

Types of food	Daily	Weekly	Monthly	Never
Rice				
Ruti/porota				
Khichuri				
Biriyani				
Polau				
Mashed potato				
Fish				
Chicken				
Beef				
Milk				
Egg				
Dairy products				
Lentil				
Green-leafy vegetables				
Non-leafy vegetables				
Fruits				
Sweet				

6. Meal Accessibility:

Do they provide special menu in any occasion?

- 1) Yes(please specify)
- 2) No

7. Drinking water source:

What is the source of your drinking water?

- 1) Filter
- 2) Tubewell
- 3) Direct tap water

Appendix 2: Synopsis



Daffodil International University

Department of Nutrition and Food Engineering (NFE)

Faculty of Health and Life Science (FHLS)

Daffodil International University

Daffodil Smart City, Birulia, Savar, Dhaka – 1216, Bangladesh

Synopsis of the thesis

1. **Name:** Sabrina Ahasan Reeti
2. **ID:** 201-34-336
3. **Title:** Nutritional assessment and dietary intake of orphans in selected areas of Bangladesh

Introduction:

The nutritional status of children is pivotal for their physical and cognitive development, with orphaned children being particularly vulnerable to malnutrition due to socio-economic hardships and limited access to nutritious food. Orphans often rely on institutional care, where financial constraints, inadequate dietary practices, and lack of resources exacerbate the risks of malnutrition (Germine El-Kassas, 2017). This study investigates the nutritional status and dietary intake of orphaned children in selected areas of Bangladesh, aiming to provide insights into the dietary challenges faced by this vulnerable group. Through detailed assessments, including anthropometric measurements and dietary surveys, this research uncovers significant gaps in meal diversity and micronutrient intake among orphans. By focusing on the dietary habits, institutional factors, and educational influences, this research offers actionable recommendations for enhancing the nutritional care of orphaned children. The outcomes aim to guide interventions that foster better health and well-being among this underserved population (Adeomi AA, 2020)

Objectives:

1. To analyze dietary patterns among orphans, including meal frequency, food diversity, and nutrient intake.
2. To identify demographic and institutional factors that influence nutritional outcomes, such as age, gender, and educational background.
3. To provide actionable recommendations for improving the dietary practices and health outcomes of children in institutional care.

Methodology:

Study Design: A cross-sectional study approach will be used to collect data from selected areas of Bangladesh.

Data Collection: A closed-ended questionnaire will be used to obtain data on the demographics of participants, including weight, height and BMI .Digital weigh machine was used to record weight and measuring tape in inches was used to measure height of respondents. For this study we have asked each participant about their age, class, meal time and nutritional intake.

Sample Size and Sampling Technique: The participants in the study will be chosen using a multi-stage random sampling process.

Data Analysis: The data analysis will be carried out using the SPSS software (version 26).

Ethical Consideration: This study will abide by ethical standards, guaranteeing participants' informed consent and protecting participant privacy.

Expected outcome of the study: This study is expected to focus on the prevalence of malnutrition, micronutrient deficiencies, and food insecurity. It will examine the impact of caregiving environments, socioeconomic factors, and dietary patterns on health outcomes. The study will propose recommendations for improving nutrition education, food access, and health interventions for orphaned children.

Time Schedule of Activities:

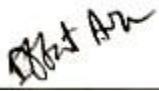
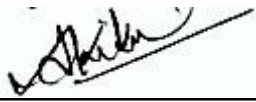
Task	Activities by Months						
	November	December	January	February	March	April	May
Literature review							
Study protocol and questionnaire development							
Sample selection							
Data collection							
Data analysis							
Project writing and submission							

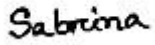
Reference

- Adams, R. (2020). Nutritional challenges and health outcomes of orphaned children in institutional care. *International Journal of Child Health*, 112-123.
- Adeomi AA, A. S. (2020). Eating Pattern, Dietary Diversity and Nutritional Status of Children and Adolescents Residing in Orphanages in Southwestern Nigeria. *Journal of Community Medicine and Primary Health Care*.
- Ali, M. T. (2017). Dietary intake and protein sources in orphanage settings in South Asia. *International Journal of Nutrition and Food Sciences*, 92-98.
- Amin, M. R. (2017). Nutritional assessment and dietary diversity of orphaned children in Dhaka, Bangladesh. *Bangladesh Journal of Nutrition and Health*.
- Aziz, S. &. (2016). The nutritional status of orphaned children in rural Bangladesh: A cross-sectional study. *Journal of Rural Health*.
- Brown, J. (2018). The impact of orphanage care on child development and health: A review of the literature. *Journal of Child Health*, 290-305.
- Brown, J. (2018). The impact of orphanage care on child development and health: A review of the literature. *Journal of Child Health*.
- Germine El-Kassas, F. Z. (2017). The Dual Burden of Malnutrition and Associated Dietary and Lifestyle Habits among Lebanese School Age Children Living in. *Journal of Nutrition and Metabolism*.
- Grobbelaar HH, M. (2013). Nutritional status and food intake data on children and adolescents in residential care facilities in Durban.
- Hasan, M. (2019). Dietary diversity and nutritional challenges among orphaned children in rural Bangladesh: A case study. *Journal of Child Nutrition and Health*, 112–120.
- Hassan, M. (2021). Micronutrient deficiencies in institutionalized children: A review of nutritional challenges in orphanages. *Nutrition Reviews*.
- Hassan, M. (2021). Micronutrient deficiencies in institutionalized children: A review of nutritional challenges in orphanages. *Nutrition Reviews*.
- Hassan, M. (2021). *Micronutrient deficiencies in institutionalized children: A review of nutritional challenges in orphanages*.
- Huseen Bukht1, H. J. (2020). Assessment of nutritional status and dietary patterns of orphans residing in different orphanages of Lahore, Pakistan. *International Journal of Biosciences* , 19-33.
- Islam, M. (2019). Prevalence of anemia and associated factors among orphaned children in Dhaka, Bangladesh. *Journal of Public Health Nutrition*, 414–423.

- Jones, R. &. (2020). Nutritional adequacy of orphanage diets in low-income countries: A case study. *Global Nutrition Journal*.
- Jones, R. (2020). Nutritional adequacy of orphanage diets in low-income countries: A case study. *Global Nutrition Journal*, 242–253.
- Kamau, R. (2017). Caregiving knowledge and its effects on the nutritional status of orphaned children. *Journal of Nutrition and Food Security*, 58–64.
- Lloyd, D. (2018). Anthropometric indicators of malnutrition among orphaned children in institutional care. *International Journal of Public Health*, 202-209.
- Lone, M. A. (2016). Nutritional status and health assessment of children in orphanages: A study on diet adequacy and health outcomes. *Indian Journal of Pediatrics*, 350–356.
- Mary Mutete Muema, E. N. (2015). Assessing the Nutritional Status of Orphaned and Non-Orphaned Children Aged 6-59 Months in Kakamega County, Kenya. *International Journal of Scientific Research and Management*.
- Mashkooor Ahmad Lone, D. P. (2016). Health and Nutritional Status of Orphan Children's Living in Orphanages with Special Reference to District Anantnag of Jammu and Kashmir. *The International Journal of Indian Psychology*.
- Mashkooor Ahmad Lone^{1*}, D. P. (2016). Health and Nutritional Status of Orphan Children's Living in Orphanages with Special Reference to District Anantnag of Jammu and Kashmir . *The International Journal of Indian Psychology*.
- Miller, A. (2019). The effects of orphanhood on nutritional status and health in Sub-Saharan Africa. *African Journal of Nutrition*, 103-112.
- Patel, S. (2014). Nutritional outcomes among orphaned children in rural India: A focus on stunting, underweight, and wasting. *Indian Journal of Child Nutrition*, 245–254.
- Rashid, M. (2014). Nutritional knowledge and care practices among caregivers of orphaned children in rural Bangladesh. *Bangladesh Journal of Health and Nutrition*, 55–64.
- Shiva Raj Acharya, S. A. (2020, july). Malnutrition and Associated Factors with Nutritional Status Among Orphan Children: An Evidence-Based Study From Nepal.
- Smith, L. (2019). The nutritional needs of orphaned children: A global perspective. *Global Health and Nutrition Journal*, 501-509.
- Smith, L. J. (2020). Age distribution of children in orphanages and institutional care: A global perspective. . *Journal of Child Development*, 195-201.
- Sultana, F. (2021). Vitamin A deficiency among orphaned children in Khulna: Causes and consequences. *Bangladesh Journal of Nutrition Science*, 198–206.
- Zakari Ali, N. A. (2018). Nutritional status and dietary diversity of orphan and non– orphan children under five years: a comparative study in the Brong Ahafo region of Ghana.

Zhao, X. (2019). Prevalence of nutritional deficiencies among children in orphanages: A systematic review. *Public Health Nutrition*.

Signature of Supervisor  _____	Signature of Co-Supervisor  _____
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Signature of Researcher  _____
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