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HEALTH AND NUTRITIONAL ASSESSMENT OF ORPHANS IN A RESIDENTIAL EDUCATIONAL FACILITY OF PESHAWAR-KHYBER PUKHTUN KHWA. PAKISTAN.

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Maheen B; Principal investigor, conceptualized and designed the study, prepared the draft of the manuscript and reviewed the manuscript, collected the data, data analysis and interpretation.
Najib UH; Led the data collection, adviced on the data analysis and interpretation and reviewed the manuscript.
Farhat RM; Led the data collection, reviewed the manuscript, data analysis and interpretation,critical review of the entiremanuscript.
Sehar A; Conducted the study, data analysis and interpretation, assisted in drafting of the manuscript, reviewed the manuscript.

ABSTRACT:
Introduction: Underprivileged children in orphanages are at a high risk of undernutrition owing to living conditions and resource unavailability. This study aimed to assess the nutritional status along with nutritional deficiencies among the children residing in the MERCY-PAK EDUCATIONAL ORPHANAGE COMPLEX.
Methods: This was a cross-sectional analytical study involving primary and secondary school children aged 5 to 17 years with data collected from 409 children. The socio-demographic background was obtained from parents. Height and weight for age were measured for malnutrition with associated deficiencies like paleness of skin and angular stomatitis. Descriptive statistics were carried in SPSS Version 16.
Results: A total of 409 children participated in the study. Analysis showed 62 % of students residing under the normal range, followed by 25.4 % and 10.5 % as underweight and overweight respectively. Evaluation of associated abnormalities demonstrated that 24.4 % showed skin paleness

followed by angular stomatitis (5.4 %) and pale (1%) which makes a total of 22 and only 1 student respectively.

Conclusion: Most of the students had normal weight and height; however, acute malnutrition (wasting) was more prominent than chronic malnutrition (stunting). The signs of paleness and angular stomatitis were observed among the students, which may have been due to worm infestation or iron and vitamin deficiency. Anaemia was more common in junior classes as compared to senior classes. All these findings could be attributed to the consumed salads, milk, and milk products occasionally, which resulted in anaemia and stunting.

Keywords: Iron deficiency anaemia; Malnutrition; Orphanage; Underweight.

INTRODUCTION

Under nutrition in children is a major public health risk with morbidities as well as mortalities among Asian and African countries. Global statistics attribute 5 million children's deaths to malnutrition. Undernutrition in children specifically stunted has been associated with poverty in underdeveloped countries. These in turn impair school performances of the enrolled students with delayed cognitive development. Loss of parents is a huge dilemma, with 153 million global estimated orphan figures that alarm all, posing a threat to their vulnerabilities as undernourished. In a study by Ali, Abu & Ankamah (2018)[1] under nutrition, stunting and wasting were highlighted in orphans although not very remarkable as compared to non- orphan children[1].

A study by Sanghvi, Thankappan & Sharma (2001)[12] showed that 42- 57 per cent of children dies in developing countries because of malnutrition on infective disease, of which main part can be attributed to mild-to-moderate malnutrition. Low dietary intake, mal-absorption, increased nutrient losses or altered metabolic demands elevates under nutrition in children. That is why children have high morbidity and mortality rates due to under nutrition as per studies by Rodriguez, Cervantes & Ortiz (2011)[10], and Pelletier, Frongillo & Habicht (1993)[9]. Furthermore, a study by Scrimshaw & San Giovanni (1997)[13] claimed that severe under nutrition leads to immune response dysfunction. Malnutrition in children is assessed by measuring the height and weight and screening for clinical indicators and biochemical markers of nutritional deficiencies or over nutrition *(*UNICEF, 2013)[18] and through a training module this can be learned and transferred as a valid tool (World Health Organization, 2008)[19]. Anthropometric measurements like weight, height, and age are compared to international standards and are used to assess the nutritional status of a population. Stunting i.e., low height for age, are caused by long-term insufficient nutrient intake and frequent infections. Wasting i.e., low weight for height is a strong predictor of mortality among children under five. It is usually the result of acute significant food shortage and/or disease. Since the prevalence of stunting and wasting among children has declined worldwide since 1990, the global improvement is still insufficient, and millions of children are still at risk as per Onis, Blossner & Borghi (2012)[8] study. One hundred and thirty-two million children in the world are orphans, and 60 million resides in Asia (SOS, 2020)[16].

Orphan homes provide care and support to the vulnerable children in the absence of their parents. These children are given education within or outside the orphanage homes. Numerous physical and behavioural problems were recognized among children raised in orphanages, particularly when they faced adverse situations during their primary years of life as stated in the book (Nelson, 2020)[6]. Children living in social welfare and orphanages are more susceptible to malnutrition compared to children staying at home with their parents. This could lead to more disease conditions among these children as stated by Scrimshaw *et al.* (1997). According to an estimation, orphan children are 140 million. Globally, 69 million orphan children are victims of malnutrition, of which 75% live in underdeveloped countries. Moreover, children and adolescents, residing in orphanages, are potentially exposed to the effects of deprived nutrition leading to poor health as discussed in the study by Subedi, Baral & Dahal (2020)[17].

It is essential to conduct studies for nutritional status assessments, dietary, and lifestyle habits. According to National Nutritional Survey (2011)[2] in Pakistan, the community data revealed that stunting was 44%, wasting 15% and underweight was 32% in under 5 years' age children. Children in the orphanages are at higher risk and there was scarcity/ no baseline data available for this particular area. Therefore, the present study is first of its kind aimed at to investigate the nutritional status of children with credible and reliable baseline data along with intention of identifying the signs associated with nutritional deficiencies among children living in Mercy Education Orphanage Complex Peshawar- Khyber Pakhtunkhwa (KPK. Pakistan). The second objective of this study is equally important to highlight the deficiencies to be rectified well in time to maintain the health status of the children, which are our future prospect.

MATERIALS AND METHODS

This descriptive study was ethically approved by the Institutional Review Board Committee of Prime Foundation- Pakistan. Informed consent of participants along with the director of the Orphanage Complex was sought before conducting the study.

This study assessed nutritional status of children residing in the Mercy Orphanage Education Complex- Peshawar, Khyber Pukhtun Khwa, to determine and identify their body weights, height with signs of nutritional deficiencies. The study sample size was 409 children of co prising of ages between 5-17 years. All the children of the orphanage complex were residing in the hostels as per their rules so everyone was recruited through convenient sampling technique into this study to have their baseline data.

The variables included were height for age, weight for age, general physical examination of each child along with screening for hepatitis, anaemia and blood grouping. All this was used by clinical data preformat to diagnose the signs of malnutrition. Nutritional Status Assessment was made through measurement of height for age and weight for age. The variables of interest were as follows.

Weight: Subjects weighed in light clothing using a bathroom scale which has a precision of +/- 100 grams. Children were asked to step on the scale and stand motionless in the middle of the scale platform with the feet slightly apart and the body weight distributed equally on both feet.

Height: Heights were recorded with children barefoot, the back of feet, buttocks, shoulders, and head touching the wall, looking straight ahead with chin tucked in such a way that Frankfurt's plane is achieved, and height is measured using a vertically mobile scale, stadiometer with a precision of +/- 0.1 cm10.

General Physical Examination: of each child was done using clinical data preformat.

Hepatitis B & C Screening: students of orphanage were screened for Hepatitis B and C by blood test

Blood Group and Anaemia Screening: of the residing students were also done as per standard procedures.

All the collected data was entered in SPSS version 19.00 (IBM Corp., Chicago, United States) and descriptive statistics were performed through computation of frequency and percentages.

RESULTS

A total of 409 students enrolled in this study. Table 1 shows the age to weights of all the orphan students with their cumulative percentages. Majority of the students were observed to be in normal range (62.3 %), followed by the underweight (25.4 %) and overweight (10.5 %) children respectively. This table also explains that the percentage of obese children is the lowest among weight for age parameters bearing a value of 1.7 percent.

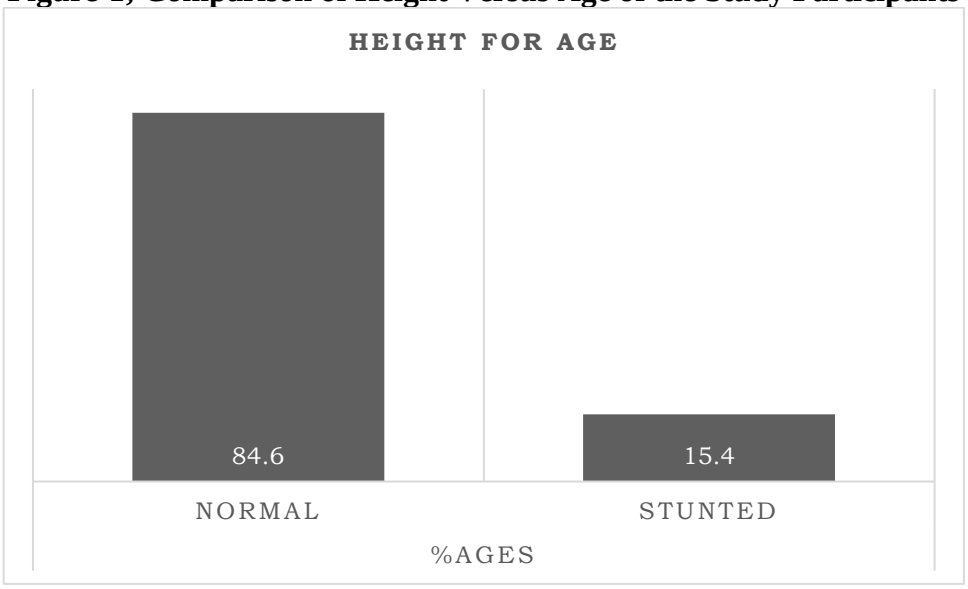
Table-1; Orphan Students age to weight Percentages.

Parameters	Frequency	%	Valid %	Cumulative %
Normal	255	62.3	62.3	62.3
Obese	7	1.7	1.7	1.7
Overweight	43	10.5	10.5	10.5
Underweight	104	25.4	25.4	25.4

Total	409	100.0	100.0	99.9

The comparison of normal and stunted children under height for age parameters is shown in Figure-1. The number of normal children were significantly higher in comparison with that of the stunted children with the values of 84.6 % and 15.4 % respectively.

Figure-1; Comparison of Height Versus Age of the Study Participants



Furthermore, it was observed that among all of the included students of the study, 31 students had anaemia with low haemoglobin levels, out of which 27 were in grade 5th and below whereas, remaining (4) were from grade 6th and above. shows that distribution of anaemia among the students. Table 2 further demonstrated the distribution of anaemic students per class/ grade. It was observed that the percentage of anaemic students were higher in lower grades as compared to above the 6th grade. The absolute values of anaemia were also calculated for the anaemic students with the variables of MCV (66.84), MCH (22.64), MCHC (33.62) and RBC Counts (5.01) respectively.

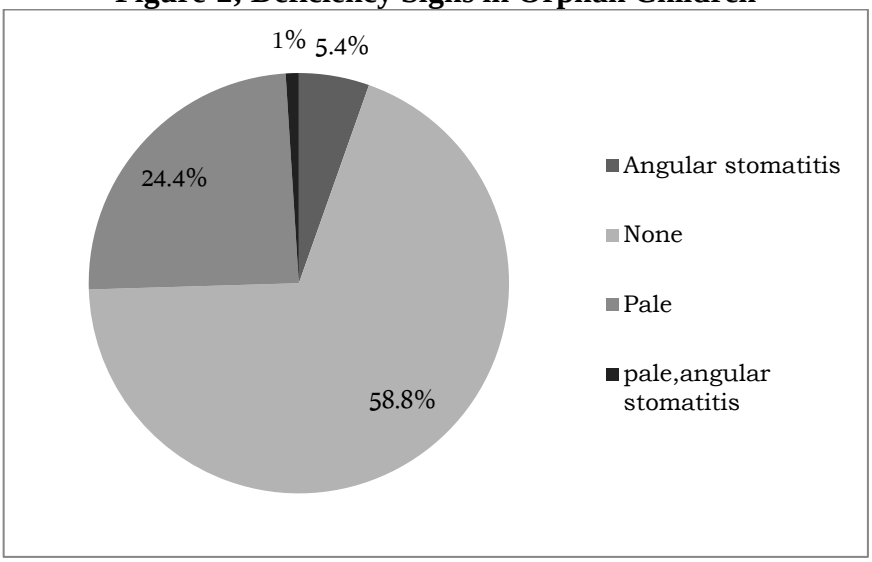
Table-2; Orphan Anaemic Students

Classes	***No. of students***
Prep	**4**
1st	**4**
2nd	**2**
3rd	**7**
4th	**5**
5th	**5**
6th	**1**
7th	**1**
8th	**1**
9th	**1**
Total	**31**

Some students from the orphanage were evaluated further to determine the impact of nutritional deficiencies and overall health status as depicted in Figure 2. Furthermore, it was observed that (68.90 %) of children did not show any signs and symptoms of nutritional deficiency. However, paleness of skin was observed in 24.40 % (96 students) followed by angular stomatitis and pale, angular stomatitis with the values of 5.40 % and 1 % respectively. The 96 pale students were further

evaluated by child specialist. Hepatitis screening for Hepatitis B and C shows a total of 3 students with positive HBsAg. Whereas all other students were negative for HBsAg as well as HCV Ab. Table 3 shows details of the blood group screening done on these orphan children.

Figure-2; Deficiency Signs in Orphan Children



All the children of the study were also tested for their blood groups. Details of which are shown in the Table-3.

Table-3; Blood Grouping of the Orphan Children

Group	Total (N)	Positive	Negative
A	121	112	9
AB	38	34	4
B	145	131	14
O	121	110	11
Total	425	387	38

DISCUSSION

In this study nutritional assessment was done on parameters like weight for age and height of the students with z-score measures for determination of wasting and stunting respectively in relation to weight for age, height for age, as well as hepatitis screening, haemoglobin determination and blood grouping of all the children.

A Nepali study of an Orphanage home showed body mass index of the children as 14.4% being underweight, 10.8% overweight and 2.7% obese. As per malnutrition levels 44.1% had first degree malnutrition, 23.5% with second degree malnutrition and severe malnutrition as 2.2%. An interesting fact regarding dietary diversity of the orphan children revealed 53.2% consumed milk and milk products, which is quite unusual in an orphanage. The findings of the study supported the results of the present study except diversity of food items was not taken into account as in *Subedi et al. (2020)* [17].

An Ethiopian institutional based study by *Huq et al. (2013)* [7]. assessed the prevalence of undernutrition and its associated factors. Findings revealed 15.8% stunting, 10.9% wasting and 8.7% underweight respectively. This cross-sectional study compared two models of residential orphanage institutions for nutritional status, behavioural problems of the children with anxiety and depression assessment through validated tools among the foster mothers and children. The findings depicted

nutritional status of S.O.S Orphanage as 18% stunted and 22 % malnourished whereas, conventional Orphanage had better figures of 6% stunted and 8% as malnourished with acute malnutrition prominent. A prevalence of 33% behavioural problems among the children found through foster mothers and 39% as per teacher ratings. All the findings of the present study were comparable however, behavioural problems were never assessed and only one institution was included in the present study.

A study in Bangladesh by *Salam, Das & Bhutta (2015)* [11] assessed anthropometric and dietary behaviours with unsatisfactory nutritional status of the orphan children. The proportions of the underweight, stunted and wasted were high as 12%, 14.3% and 6.3% respectively. This drew an attention towards the alarming facts that orphanages had deficient menu with limited food choices and occasional fruits addition in the meal. The results of this study were consistent with the present study however the present study had only one Orphanage Institute included. Both discussed studies showed a consistent pattern of stunting among the orphan children however, the proportion of underweight children were almost double in comparison with that of the Bangladeshi Orphanage.

An article discussed burden and trends of global under five mortalities, associated factors infections, nutritional conditions and aetiology related with strategies to reduce these infections for improved child health. Wasting and malnourishment in children could be attributed to the behavioural problems, memory deficit, poor attention span and fewer peer relationships. Moreover, wasting negatively affected brain growth and resulted in violent behaviour and cognitive behaviour problems. The most common clinical signs and symptoms of malnutrition ad observed in the present study i. e paleness of skin, angular stomatitis, and anaemia, were also observed in the study by *KS et al. (2017)* [3], that were attributed to low frequency of milk and fruits consumption in diet. Another quoted signs of anaemia, paleness of skin and angular stomatitis almost double of the present study. This were because the residents had good diet that led to reduction in the signs of anaemia over the time. Comparison of the present study with this mentioned one showed promising results for the paleness of skin and angular stomatitis. It was observed that the number of students with paleness and angular stomatitis at MEC was approximately 36 % and 25 % respectively however, less in comparison with the results of an Indian study. This indicated that MEC provided the necessary essential diet on timely basis that helped in the improvement of nutritional status of the children.

An epidemiological study with a valid instrument in local language was conducted among five registered Orphanage facilities of Karachi for behavioural problems of the children residing in these institutions in comparison with foster mother and teacher ratings. Interestingly, findings revealed high burden of behavioural problems among those children that affected their nutritional health status as well. Association of wasting with behavioural problems and malnourishment revealed poor attention and poor mental health of the students in this study of Lassi *et al.* (2011) [4]. These results were comparable with the present study however behavioural problems were never assessed in it. An Orphanage based study by Singh *et al.* (2021) [5] assessed the health status of 69 children. Results showed moderately & severely undernourished children with infections, skin diseases and dental carries owing to poor dental hygiene as well as anaemia prevalence. Another study done on 200 orphan children living in a Social Welfare Hostel of Bangalore, assessed them for health and nutrition with a conclusion of children being underweight, stunted, wasted, with anaemia, fluorosis, skin problems cheilosis as well as dental problems in study by Sharadda *et al*. (2014) [14]. An Ethiopian study used a structured questionnaire in an Orphan Center upon 6- 12 years of 265 children using anthropometric measures to determine the magnitude of malnutrition with its associated factors involved. All children were found to be underweight, stunted, wasted and undernourished in the study conducted by Mohammad *et al.* (2021) [5]. All these results were comparable with the present study.

CONCLUSION

The study results concluded majority students with normal weight and height; however, acute malnutrition (wasting) was prominent than chronic malnutrition (stunting). The signs of paleness

and angular stomatitis were observed among the students, which might have been due to worm infestation or iron and vitamin deficiency. Anaemia was more common in junior classes as compared to senior classes. All these findings could be attributed to the consumed salads, milk and milk products occasionally, that resulted in anaemia and stunting.

The recommendations in this regard would be as follows;

Good nutrition is the key to good health, therefore modifications with;

- Addition of nutritious yet economical items would be mandatory to add in the hostel meal menu like green leafy vegetables, milk and milk products and lentils.
- Vaccination for Hepatitis- B should be planned for students in near future to keep them safe and healthy.
- Measures must be made for the rectification of iron deficiency anaemia of all the students on the target.

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