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Evaluation of Nutritional Knowledge and Lifestyle Habits of Orphan Children Residing in Different Institutes of Peshawar City

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ABSTRACT

The nutritional status of orphaned children residing in Peshawar orphanages is scantily documented. **Objectives:** To assess the eating habits, awareness of nutrition, and dietary status of children living in orphanages in the Peshawar area of Pakistan. **Methods:** The study involved 120 children, ages 5 to 15, and was conducted at three separate orphanages in Peshawar city. Food frequency questionnaires were used to collect data on the orphan children's socioeconomic situation, anthropometric measures (weight and height), eating patterns, physical activity, and food preferences. Additionally, data on biochemical tests used to measure hemoglobin levels (Hb) were gathered. To determine the orphans' knowledge, attitudes, and behaviours about dietary guidelines, another Knowledge, Attitude, and Practice (KAP) questionnaire was used. SPSS-26 was used to analyze the data that were collected. **Results:** According to the findings, 4%, 9%, and 3% of the children in the study were underweight, overweight, and obese, respectively. Additionally, 12% of the orphans were anemic, and 13% were stunted. Carbohydrates, fruits, vegetables, meat, legumes, dairy products, nuts, and beverages were consumed by the majority of the orphans. However, they also have a great preference for chips, pickles, and fast food. **Conclusions:** It was concluded that the current findings indicated poor diet habits and the occurrence of malnutrition among various children's orphanages of Peshawar. The present study reveals the link between malnutrition in orphans and the absence of particular care, which indicates the importance of intervention strategies to diminish the risk of malnutrition for this vulnerable group in the district of Peshawar.

INTRODUCTION

Malnutrition is a frequent public health concern in Pakistan [1-5], and the orphaned children are most affected [6]. Children aged less than 18 years who lost one or both parents are 'orphans'. The number of orphans has risen and is now over 140 million in the world, of which most are residing in Asia and Africa. Orphans are on the rise due to armed conflict, epidemics like HIV/AIDS, and low socioeconomic status. Orphans, particularly in the developing world, suffer from widespread health and nutritional issues, with malnutrition being common [7]. A lot of this vulnerable section of the population has a certain perception regarding healthy diets, and hence, they adopt inappropriate dietary practices and incur nutritional deficiencies [6, 8]. In Pakistan, there are approximately 4 million orphans, mainly due to security issues, natural

disasters, and the loss of parents. Orphans in institutions often experience poverty, poor living conditions, poor learning achievements, and increased exposure to abuse and mental illness. Their diet is typically not as good as children raised in families, especially micronutrient deficiency [8]. Similar to the rest of Pakistan, in KP province, although orphans are generally cared for by extended families [9], some of them still lack nutritional information and support systems. Rising costs and shifting values in society are challenging traditional patterns of care. Institutional care in Pakistan does not always meet the emotional and nutritional needs of orphans, potentially increasing the risk of long-term psychological and physical morbidity. The present research specifically focuses on the measurement of major anthropometric parameters



like height, weight, and body mass index (BMI), as well as on precise body composition measurements like fat mass and lean mass. By relating such measures of physical health with food intake among the children, nutrition awareness, and prevailing feeding patterns in orphanages, the research tries to disentangle determinants influencing their nutritional status. This study aims to examine the impact of caregiving in institutions, the structure of menus, and caregivers' awareness on child development and overall health of these vulnerable children. Through this multi-dimensional approach, the study hopes to offer practical recommendations for policy and practice improvement in child care and nutrition in institutions.

Although malnutrition among orphaned children is recognized as a public health concern in Pakistan, limited empirical data exist regarding the combined assessment of nutritional status, dietary intake, and nutrition knowledge among institutionalized orphans in Peshawar. Most previous studies have primarily focused on anthropometric outcomes, with insufficient attention to the role of caregivers, institutional feeding patterns, and children's knowledge, attitudes, and practices (KAP) in shaping nutritional outcomes. Furthermore, micronutrient deficiencies such as anemia in this vulnerable group remain under-documented at the district level. Therefore, comprehensive, context-specific research is needed to better understand the multidimensional determinants of malnutrition among orphan children in Peshawar. This study aims to comprehensively evaluate the nutritional status, knowledge, attitudes, and feeding practices of 5- to 15-year-old and 15-year-old institutionalized orphan children residing in various orphanages in Peshawar, Khyber Pakhtunkhwa (KP).

METHODS

This study used a cross-sectional design, where data were collected at one-time point [10]. The present research study was conducted in Pakistan's District Peshawar. For the current study, the 5-15-year-old orphans residing in the Peshawar district's lower-level orphan institutions were surveyed. The formula $n = N/1 + Ne^2$ developed by Solvin was used to calculate the sample size. The sample size to be drawn from the population was calculated using this formula. The margin of error and confidence level would be considered using this calculation. Having a total number of orphan children in the three orphanages ($n=200$), with a Margin of error $e=0.05$, the estimated sample required was 133. A master list of potential participants (or schools/institutions) was created first, and all were given a unique identification number. From a computer-generated random number list (Excel), the number of participants required was chosen. To achieve representativeness by institution, stratified random sampling was used, splitting

the population into institutions, and randomly selecting samples proportionally from each of these strata from a random number generator. The process listed below was used to choose a random sample: A list of every orphanage in Peshawar was acquired. Using these lists and a random number selection technique, a representative sample was chosen from each orphanage. A total of 120 orphans between the ages of 5 and 15 were chosen. Sociodemographic information, anthropometric measures, 24-hour dietary recall (24 hr-DR) data, and blood hemoglobin levels were among the indicators that were gathered. Anthropometric measures and blood hemoglobin levels were the dependent factors, whereas sociodemographic and food consumption, as assessed by 24-hour DR, were the independent variables. In this study, participants between the ages of 5 and 15 were enrolled as study subjects. Participants with a history of sickness or those who had just recovered from a medical ailment were excluded. The research excluded participants who had recently recovered from any medical issues or who had previously had any sickness. Following BKUC regulations and ethics standards, participant identities were kept anonymous. To examine the data, SPSS version 26 was used. The means and standard deviations of the data were presented. Anthropometric indicators such as weight for age (WAZ), height for age (HAZ), and BMI for age (BAZ) were computed with WHO Anthro Plus software from the WHO Growth Reference for 5-19-year-old children and adolescents (2007) [11]. The Z-scores were obtained according to WHO recommendations for measuring nutritional status and pattern of growth. Before using parametric tests, normality was tested using the Shapiro-Wilk test (for $n < 50$) or the Kolmogorov-Smirnov test (for $n \geq 50$), and visual inspection of Q-Q plots and histograms. Dietary intake values were contrasted with the Recommended Dietary Allowances (RDA) to determine the energy deficit from the RDA and the protein intake deficit from the RDA. RDAs were established according to the age- and sex-related values presented in the Pakistan Dietary Guidelines (2018). For 11-13-year-old participants, the RDA for energy was about 2200 kcal/day for boys, 2000 kcal/day for girls, and for protein was 45-50 g/day, based on sex. These reference values were employed to calculate individual differences between recommended and reported intake. Independent samples t-tests were used only if normality was established. For non-normal continuous data, the Mann-Whitney U test was utilized instead. For categorical variables, Chi-square tests were employed to evaluate associations, and Chi-square assumptions, such as expected cell frequencies ≥ 5 in at least 80% of cells, were checked. In case of violation of assumptions, Fisher's Exact Test was utilized. A p-value of 0.050 was used as the level of significance.

RESULTS

The general traits of the orphan are displayed in Table 1. The orphans were 12.2 (1.88) years old on average. A significant portion of individuals (14.2%) had both parents deceased. The family size was greater (5-7 individuals) in most situations (75.8%). The average family's monthly income was between 8,000 and 10,000 rupees. The majority of parents were illiterate, according to the parents' educational status (83% of mothers and 83% of fathers) (Table 1).

Table 1: Overall Student Qualities

Non-Categorical Variables	Mean ± SD	Range
Age	12.23 ± 1.88	5.5 - 15
Weight	38.92 ± 1177	22.0 to 66
BMI	18.38 ± 7.25	13.0 to 22
Hb	12.01 ± 1.09	9.8 to 13.5
Categorical Variables		n (%)
Parent status	Only Father Dead	113 (94.2%)
	Only Mother Dead	17 (14.2%)
	Both Dead	17 (14.2%)
Family Member	2 to 4	31 (25.8%)
	5 to 7	91 (75.8%)
Monthly Income	8000 to 10000	76 (63.3%)
	1100 to 15000	44 (36.7%)
Father Education	Illiterate	104 (86.7%)
	Middle	11 (9.2%)
	Matric	5
Mother Education	Illiterate	100 (83.3%)
	Middle	10 (8.3%)
	Matric	10 (8.3%)
Physical Activity	Mild	8 (6.7%)
	Moderate	105 (87.5%)
	High	7 (5.8%)
	TV Viewing	80 (66.7%)

The findings show the distribution of the students' characteristics according to their level of nutrition knowledge. According to the findings, pupils who knew a lot about nutrition were taller, heavier, and older. The mean weight (SD) of students with high nutrition knowledge was 38.9 ± 11.31 kg, while that of students with inadequate nutrition knowledge was 38.8 ± 13.55 kg. Both the poor knowledge group (38.8 kg) and the good knowledge group (38.94 kg) had a very similar mean weight. The t-test statistic was $t = -0.056$ and the p-value = 0.956, i.e., there was no significant difference between the two groups in terms of weight. The mean age poor knowledge group was 11.88 years of age, whereas the good knowledge group was 12.3 years of age. No significant difference was found concerning age ($t = -1.492$; p-value=0.138). The poor knowledge group had a mean height of 144.1 cm, whereas the good knowledge group's mean height is 146 cm, with no significant difference in height between the two groups

($t = -1.236$; p-value=0.220). The poor knowledge group has a mean hemoglobin level of 11.85 g/dL, and the good knowledge group has a mean of 12.0 g/dL with no significant difference in hemoglobin level between the groups ($t = -0.53$; p-value=0.601). The poor knowledge group mean WAZ was -1.16, and that of the good knowledge group was -0.9 with no significant difference in WAZ between the groups (Mann-Whitney U test statistic was $U = 25.5$ and p-value=0.358). The group with poor knowledge had a mean of HAZ=-0.77, and the group with good knowledge had a mean of -0.8 with no significant difference in HAZ between the groups ($t = -0.214$; p-value=0.832). BAZ scores did not significantly vary between groups ($t = 0.684$, p=0.496). Intake of energy was the same in all groups, and there was no statistically significant difference ($t = -0.151$, p=0.880). Protein intake did not vary significantly between the two groups ($t = -0.958$, p=0.340). There was a significant difference in energy intake compared to RDA, with the "Good knowledge" group having a lesser energy deficit than the "Poor knowledge" group ($t = -2.795$, p=0.006). Likewise, protein intake deviation from RDA was significantly less (more in line with recommendations) in the "Good knowledge" group ($t = -3.025$, p=0.003)(Table 2).

Table 2: Participants' Distribution by Nutrition Knowledge Level

Variables	Knowledge Score Categories	n	Mean ± SD	SE	Test Statistic	p-Value
Weight (kg)	Poor	26	38.8 ± 13.55	2.66	$t = -0.056$	0.956
	Good	93	38.9 ± 11.31	1.17		
Age (years)	Poor	26	11.8 ± 1.84	0.36	$t = -1.492$	0.138
	Good	93	12.3 ± 1.90	0.20		
Height (cm)	Poor	26	144.1 ± 17.34	3.40	$t = -1.236$	0.220
	Good	93	146.0 ± 17.07	1.77		
Knowledge Score	Poor	26	2.5 ± 1.14	0.22	$t = -13.2$	<0.001
	Good	93	5.6 ± 0.87	0.09		
Attitude Score	Poor	26	3.4 ± 1.17	0.23	$t = -3.98$	<0.001
	Good	93	4.5 ± 0.18	0.02		
Practice Score	Poor	26	10.9 ± 2.54	0.50	$t = 0.528$	0.598
	Good	93	10.3 ± 2.31	0.24		
Hemoglobin (g/dL)	Poor	15	11.8 ± 1.46	0.38	$t = -0.531$	0.601
	Good	31	12.0 ± 0.94	0.17		
WAZ	Poor	7	-1.1 ± 0.92	0.35	$U = 25.5$	0.358
	Good	12	-0.9 ± 0.74	0.21		
HAZ	Poor	26	-0.7 ± 1.36	0.27	$t = -0.214$	0.832
	Good	93	-0.8 ± 1.85	0.19		
BAZ	Poor	26	0.06 ± 1.01	0.20	$t = 0.684$	0.496
	Good	93	-0.14 ± 1.54	0.16		
Energy Intake (kcal)	Poor	26	1776 ± 528	103.67	$t = -0.151$	0.880
	Good	93	1792 ± 448	46.47		
Protein Intake (g)	Poor	26	35.7 ± 5.53	1.09	$t = -0.958$	0.340
	Good	93	36.9 ± 5.68	0.59		

Energy Difference from RDA	Poor	26	-219.7 ± 306	60.00	t = -2.795	0.006
	Good	92	-52.7 ± 253	26.37		
Protein Difference from RDA	Poor	26	-6.1 ± 6.17	1.21	t = -3.025	0.003
	Good	93	-1.2 ± 8.71	0.90		

DISCUSSION

The current study assessed the nutritional status of 120 male orphans, approximately 15 years old, in Peshawar. Findings demonstrated that 16% were normal weight, 9% were overweight, and 3% were obese. Comparisons to research in Nepal, Ethiopia, Lebanon, and Nigeria indicated comparable or slightly different nutritional patterns among orphans and vulnerable children [12-15]. Malnutrition rates by categories, such as the Gomez method, the research revealed: 30% had normal, 46% had 1st-degree malnutrition, 25% had 2nd-degree malnutrition, and 2.6% had 3rd-degree malnutrition. The results were similar to the results of similar research on orphaned children in other areas. In this study, 21% of the subjects were anemic, similar to findings from Yemen (19%) [16]. Nonetheless, greater rates were seen in Hodeida (37.8%) (16) and Istanbul (27.6%) [18]. In the current study, nutritional knowledge was moderate but not ideal, with most participants having scores slightly above the 50th percentile. There were positive nutrition attitudes, and this is hopeful for future behavioural change. Still, knowledge wasn't sufficient to guarantee healthy practice. Attitude and behaviour change were necessary to improve eating habits. Most children ate fast food and sugary drinks based on taste and convenience. 95% of children took the menu exactly as it came, usually having cereals, pulses, and vegetables. Comparison with studies demonstrated similar patterns of consumption of staple foods but different consumption of green vegetables and dairy [19, 20]. The mean caloric intake (1787 ± 89.6 kcal) fell short of recommended daily allowances (RDAs). Protein as a percentage of total calories was 17-18%, suggesting possible protein-energy malnutrition, particularly in children aged more than 10. Fat and carbohydrate consumption differed according to age but was generally adequate. 14-year-old children had very low energy consumption, covering only 68-71% of RDAs, and this poses a problem for their nutritional status. Findings on diet diversity and risk of malnutrition indicated that orphans who ate from all food groups were at reduced risk of malnutrition. Starchy food- and legume-based diets were prevalent because they are bulky and satiating, but such diets can be lacking in critical micronutrients if not well balanced. Malnourishment is a significant public health problem among institutionalized and orphan children, especially in middle- and low-income nations. Orphan children are at high risk because they have limited

access to well-nourished diets, inferior care, and limited health services. This is likely to result in both undernutrition (stunting, wasting, and thinness) and micronutrient deficiency, most notably iron-deficiency anemia. Malnutrition in orphans is often aggravated by unstable food availability, poorly thought-out menus, and lack of nutritional knowledge among caregivers. Irregular supply of food was observed in orphanages where the children were served loads of fruits and calorie-rich foods at some times and only fruits for months at others.

The cross-sectional design of this study limits causal interpretation between nutrition knowledge, dietary practices, and nutritional status. The relatively small sample size and inclusion of selected orphanages may restrict the generalizability of findings to all institutionalized children in the region. Additionally, reliance on 24-hour dietary recall may introduce reporting bias. Future studies should adopt longitudinal and multi-center designs to explore long-term nutritional trends and evaluate the effectiveness of structured nutrition education and menu-planning interventions. Policy-driven strategies focusing on caregiver training and standardized institutional dietary guidelines are recommended to improve the nutritional wellbeing of orphan children.

CONCLUSIONS

It was concluded that the general nutritional and health condition of 5-15-year-old orphan children living in institutions all over Peshawar was moderately good as compared to the set standards.

Authors' Contribution

Conceptualization: IA

Methodology: AB, IA

Formal analysis: AB, IA

Writing and Drafting: AB, IA

Review and Editing: AB, IA

All authors approved the final manuscript and take responsibility for the integrity of the work.

Conflicts of Interest

All the authors declare no conflict of interest.

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