

Malnutrition and Associated Factors with Nutritional Status Among Orphan Children: An Evidence-Based Study From Nepal

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Abstract

Background: Malnutrition is common public health problem among children in low- and middle-income countries. Orphan's children are vulnerable and neglected group in the society and are more prone to malnutrition. The study aims to identify prevalence of underweight, stunting and thinness of children residing in slum area with its associated factors.

Method: Quantitative method & analytical cross-sectional research design were used to assess the nutritional status and its associated factors among orphan children in Pokhara, Nepal. The sample size of 160 children were obtained by simple random technique. Semi-structured questionnaire, digital bathroom scale, stadiometer was used as data collection technique. Data management and analysis was done from Epi-info, SPSS 25 version & WHO Anthro plus.

Result: Out of 160 children, majority 80% were malnourished & 55.1% were stunted whereas 13.8% were thinness & 6.9% were found to be overweight. Our study revealed a significant association between sex, age, ethnicity, duration of stay in children's home and education of caregiver ($p < 0.05$).

Conclusion: Malnutrition is highly prevalent in orphan children and need to be addressed. Nutritional status should be monitored regularly for early identification & timely intervention of malnutrition to promote the nutrition health status of children.

Introduction

According to (WHO), nutrition is the intake of food, considered in relation to the body's dietary needs. Optimum nutrition is required for the physical, mental growth and development of the children [1].

Malnutrition is the common public health problem among children in low and middle-income countries [2,3,4,5,6]. In many countries Demographic and Health Surveys (DHS) and national nutrition and surveillance systems have been measuring height and weight of children below the age of 5 years, starting in the early 1990s. However, there is a scarcity of anthropometric data for school-aged children (5–14 years) [3].

Orphan children may experience a reduction in health, nutrition, and psychological well-being [7]. They are vulnerable and neglected group [6, 8–12], in the society and are more prone to malnutrition [13]. Chronic undernutrition during childhood results slower cognitive development and serious health impairment in later phase of life [14]. Whereas inadequate dietary intake is the direct cause of malnutrition and indirectly household food security, maternal and child care, health services and environment [6, 15].

Methodology And Material

Quantitative methods and analytical cross-sectional study design were used for this study to assess the nutrition status of orphan children in Pokhara from June 2019 to October 2019. Study population was 6-14-year children from children's home. Simple random sampling was adopted. A semi structured pretested predesigned questionnaire was used to collect information regarding age, gender, hygiene practices etc. Details like orphan status, reasons for stay, duration of stay in orphanages, age at admission were taken from orphanage records. A child was subjected for anthropometric and personal hygiene assessment. Weight was measured with bathroom weighing scale. Weighing Machine was regularly standardized with known standard weights. Assessment of personal hygiene was done by scoring system, data was collected on important hygiene aspects like hair, skin, oral cavity, nails, etc. and depending on the scores different grading was done as good (> 8) fair (6–8) and poor (< 5).

Anthropometric data, namely weight for age was assessed through BMI classification and height for age, BMI for age Z-scores were assessed using WHO ANTHRO PLUS 2007 software and the Z-scores of the children were then compared to the existing World Health Organization growth standards (WHO, 2007). Ethical approval was taken from IRB of Pokhara University (IRB Ref. No. 127/076/077), orphan homes and respondents for conducting this study. Data entry, management and analysis was done with Epi Data, SPSS software and WHO Anthro plus.

Results & Discussion

Among 160 total population more than half of the participants were female. Majority of the respondents were the followers of Hindu religion i.e. (76.9%). The highest number of the participants 44.4% were of the age group 12–14 years, where mean age was 10.7 years, minimum age was 6 years, maximum age was 14 with SD 2.6. Majority 31.9% of the participants have only mother as parental status. Number of upper caste group among other ethnic groups was highest i.e. (28.1%). The highest number of the participants are in orphan home due to poverty (36.9).

(Insert Table 1 here)

Table 1
Sociodemographic characteristics of the participants (n = 160)

Gender	Frequency	Percent%
Male	76	47.5
Female	84	52.5
Age		
6–8	38	23.8
9–11	51	31.9
12–14	71	44.4
Mean = 10.7, Min = 6, Max = 14, SD = 2.6		
Education		
Illiterate	2	1.3
Informal	20	12.5
Basic	138	86.3
Religion		
Hindu	123	76.9
Buddhist	25	15.6
Christian	12	7.5
Ethnicity		
Upper caste group	45	28.1
Relatively advantaged Janajati	33	20.6
Disadvantaged Janajati	35	21.9
Disadvantaged Non-Dalit Terai	7	4.4
Dalit	40	25
Orphan status		
Only father	28	17.5
Only mother	51	31.9
No one	50	31.3
Both present	31	19.4
Duration of stay		
6 month-3 year	47	29.4
3–6 year	60	37.5
> 6 year	53	33.1
Reason of stay		
Parents are not alive	47	29.4%
Poverty	59	36.9%
Abandoned	39	24.4%
Streets children	12	7.5%
Parents in prison	10	6.3%
Others	13	8.1%

Prevalence of underweight was 80.6% which was more among boy's comparison to girls. (85.5% vs 72.2%) Prevalence of stunting, thinness and overweight was 55.1%, 13.8% and 6.9% respectively. Moderate and severe stunting is found more in boys about 22.4% and 3.9% comparison to girls

13.1% and 3.6% respectively whereas moderate and severe thinness is also high among boys about 15.8% and 6.6% but overweight is high among girls about 7.1% comparison to boys 6.6%.

(Insert Table 2, 3, 4, 5 here respectively)

Table 2
Food Frequency Distribution

Food Groups	Every day (%)	Once a week (%)	Once a fortnight (%)	Once a month (%)
Cereals	100	-	-	-
Pulses and lentils	100	-	-	-
Green leafy vegetables	68.8	31.3	-	-
Other vegetables	100	-	-	-
Roots and tubers	100	-	-	-
Fruits	37.5	53.8	8.8	-
Milk and Milk products	26.3	57.5	7.5	8.8
Fish and meat products	-	100	-	-
Sugar and jiggery	100	-	-	-
Fats and Oils	100	-	-	-
Fried snacks/Sweet snacks	-	63.7	-	36.3

Table 3
Personal hygiene characteristics of children

Wash hand before eating(n = 160)	Frequency	Percent %
Yes	160	100
No	0	0
Wash hand after using toilet (n = 160)		
Yes	160	100
No	0	0
Wash hand by (n = 160)		
Soap water	160	100
Only water	0	0
Brush teeth regularly (n = 160)		
Yes	141	88.1
No	19	11.9
Weekly bath (n = 160)		
Daily	18	11.3
4-6 times	12	7.5
< 4 times	130	81.3
Weekly tidy clothes (n = 160)		
Daily	91	56.9
Sometimes	69	43.1
Trim nail regularly (n = 160)		
Yes	84	52.5
No	76	47.5

Table 4
Gender wise grading of under-nutrition & personal hygiene score

Nutrition status	Total children		Gender			
			Boys (n1)		Girls (n2)	
Body Mass Index (kg/m ²)	N (n1 = n2)	%	N	%	N	%
Underweight (< 18.5)	129	80.6	65	85.5	64	76.2
Normal (18.5–24.9)	29	18.1	11	14.5	18	21.4
Stunting (height for age)						
Mild stunting (>-2S.D to <-1 S.D)	54	33.8	24	31.6	30	35.7
Moderate stunting (>-3 S.D to <-2S.D)	28	17.5	17	22.4	11	13.1
Severe stunting (<-3 S.D)	6	3.8	3	3.9	3	3.6
Total	88	55.1	44	57.9	44	52.4
Thinness (BMI for age)						
Moderate thinness (>-3 S.D to <-2 S.D)	16	10	12	15.8	4	4.8
Severe thinness (<-3 S.D)	6	3.8	5	6.6	1	1.2
Over weight (+1 S.D to +2 S.D)	11	6.9	5	6.6	6	7.1
Total	33	20.7	22	29	11	13.1
Status of personal hygiene						
	Good	Moderate	Poor	Total		
	N (%)	N (%)	N (%)	N (%)		
Boys	6(7.9)	63(82.9)	7(9.2)	76 (100)		
Girls	13(15.5)	65(77.4)	6(7.1)	84 (100)		
Total	19(11.9)	128(80.0)	13(8.1)	160 (100)		

Table 5
Association between underweight and socio-demographic variables

Variable	Underweight					Chi-square χ^2	p-value	OR	OR 95% CI
	Yes		No						
	N	%	N	N	%				
	129	80.6	31	19.4					
Sex									
Male	65	85.5	61	14.5	76	2.23	0.136	1.847	0.82- 4.16
Female	64	76.2	20	23.8	84				
Age									
<=11	80	89.9	9	101	86	11.016	0.001**	3.99	1.70- 9.36
> 11	49	69	22	31	71				
Education									
Illiterate	2	100	0	0	2	0.49	1.00#	1.24	1.15- 1.34
Literate	127	80.4	31	19.6	158				
Religion									
Hindu	102	82.9	21	17.1	123	1.80	0.179	1.799	0.76-4.27
Non-Hindu	27	73	10	27	37				
Ethnicity									
Privileged	45	93.8	3	6.3	48	7.56	0.006**	5.00	1.44-17.36
Non-Privileged	84	75	28	25	112				
Time of stay in children's home									
6 months-3 years	44	93.6	3	6.4	47	10.59	0.005**	-	-
3-6 years	49	81.7	11	18.3	60				
> 6 years	36	67.9	17	32.1	53				
Orphan status									
Having parents	90	81.8	20	18.2	100	0.32	0.57	1.27	0.56- 2.89
Not having parents	39	78	11	22	50				
Reason of stay									
Parents are not alive	37	78.7	10	21.3	47	0.15	0.69	0.84	0.36- 1.96
Parents are alive	92	81.4	21	18.4	113				
<i>*p-value significant at $\alpha < 0.05$, **significant at $\alpha < 0.01$, ***significant at $\alpha < 0.001$, # Fisher's exact test</i>									

Table 2 elicited the consumption pattern in terms of different food groups. It was seen that cereals, protein rich food like pulses and lentils, other vegetables, roots and tubers, sugar and fats and oil were consumed in everyday basis. Fried snacks and milk and milk product are maximally consumed once a week. Personal hygiene was observed regarding washing hand before eating, washing hand after using toilet and washing had by soap water was found to be 100%. The status of personal hygiene was assessed using ten-point grading system [13], which was graded as > 8 points as good, (6-8) points as moderate and ≤ 5 as poor. It was found that out of 160 total study population 11.9% (19) had good personal hygiene score

while 80% (128) had moderate hygiene score and 8.1% (13) were found to have poor hygiene. There was statistically significantly association between nutrition status and age, ethnicity and time of stay in children's home with p-value < 0.01 in both age and time of stay in children's home and OR of age with 3.99 and C.I about 1.70–9.36. Ethnicity of respondents (p-value < 0.05) and OR with 5.00 and C.I (1.44–17.36).

In the present study unlike the common perception that children's home includes orphaned children, in our study only 31.3% of the children had neither of their parents. Interestingly 36.9% of them cited poverty and education as a reason for seeking children's home. Only 6.3% of children were there because their parents are in prison for years. A study done in Kaski in 2017, found that 34.5% of people are in orphanages because their parents are not alive [16]. Almost similar to our study result that may be due to same area and same study population. On the contrary, a study conducted in orphanages in Bhubaneswar India in 2018, found that highest percentage of people (47.1%) are in orphanages because their parents are not alive [13]. A study conducted in orphanages in Bangladesh in 2013 found that highest percentage of people (50.7%) were living in orphanages for educational purpose and this may be due to poor economic status of parents [17].

In the present study, food frequency consumption pattern of respondents 100% are found to have cereals, pulses and lentils, vegetables, sugar and fat product in daily basis. A study conducted in Bhopal India in 2013, founds that 100% of people have cereals, vegetables, fat and oil product in daily basis which is similar to our study but least people were found to have green vegetable about 4% in daily basis and 100% in milk and milk product which is higher than ours, this may be due to small age group of children [18]. A study conducted in orphaned adolescents' girls of children's home in Uganda in 2018 found that 97.7% have cereals product in daily basis whereas vegetables are found half than ours about 50% and dark green vegetables are found to be 15% which is one-quarter to ours [19].

In the present study found that girls were following hygiene practices better than boys. Similar findings were found in India's orphanages (2018) children's study [13]. Another similar finding was found in study conducted in 2010 among primary school children (5–10 year) in South Kolkata [20].

In the present study prevalence of underweight was 80.6% among the study population. A study done in Bangladesh in 2013 among (5–14 year) orphan children founds that 65% children were underweight which were similar to our findings [17]. A study done among orphan children (6–14) year in 2018 in India founds that 55.7% were underweight [13]. Also, another study from India done in 2013 among orphan and non-orphan children (6–16) years founds that 45.7% were underweight [1]. This study seems to have less underweight than ours, this might be due to less sample size as it was pilot study and also consist of non-orphan children. From annual report of Nepal, it was found that total 27% under five children population are found to be underweight [6, 21], which is least than our study as it is under five age group and it is obvious that children from children's home came from poor economic family where children could not get adequate nutritious food.

In the present study prevalence of stunting was 50.1% among the study population. Our study is supported by a study done in India in 2019 in orphan children of (6–14 year) founds that 53.3% of stunting prevalence [13]. A study done in Uganda among (10–19 years) adolescents' girls in 2018 found that 18.9% were stunting [19]. A study done in India in 2013 among orphan and non-orphan children (6–16) years founds that 37.1% were stunting [1], which is quite similar to our study findings. The high rate of stunting was not surprising as the children's home participants are more likely to have grown up in poor condition. According to Nepal Demographic & Health Survey (NDHS), stunting is relatively high among children from lowest wealth quintile (49%) compared with highest wealth quintile (17%) [22]. From Annual Report of Nepal, it was found that total 36% under five children population are found to be stunted which is near similar to our study [21].

In the present study prevalence of thinness was 13.8% among the study population. A study done in India in 2019 in orphan children of (6–14 year) founds that 25.3% had thinness [13], While a study done on orphans in Bangladesh found that 48% children had thinness and this difference may be due to poor standards of living and nutrition in Bangladesh [17]. A study done in Gondar city, Ethiopia in 2014 among orphan children below age five was found to be 9.9% which is similar to our study result [23]. It was found that total 10% under five children population are found to be wasted which is near similar to our study [21]. .

In the present study prevalence of overweight was 6.9% among the study population. A study done among orphan and vulnerable children in Kaski district in 2017 among (6–18 age) found 4.3% overweight [16]. A study done in Douala, Cameroon in 2019 found that 1.7% were overweight which was done among orphan children up to 18 years which is similar to our findings [2].

Conclusion

Malnutrition is highly prevalent in children living in orphanages and need to be addressed. Nutritional status should be monitored regularly, which helps in early identification and timely intervention will improve nutritional status of children living in orphanages. Many interrelated factors were found to be associated with malnutrition of orphan children. Age, ethnicity was found to be associated with underweight Among orphan children one third were found to have underweight, whereas half were found to be stunted and about 11% were found to be thinness. Interestingly about high percentage of children are in children's home for poverty and education.

Declarations

Ethical Approval and Consent to participate

Ethical Approval was taken from IRB of Pokhara University (IRB Ref. No. 127/076/077), orphan homes and respondents for conducting this study. The information about the study was shared with the all participants and orphan home authorities.

Consent for publication

Not applicable.

Availability of data and materials

Not applicable.

Competing interests

We declare that we don't have any competing interests.

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Authors' contributions

Formal analysis, review and editing was done by SRA, SP, SA. Data Management and analysis was conducted by SP and SA. Final draft review was done by DHM, YCS and SRA. All authors read and approved the final version of the manuscript.

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