

The Nutritional Status of under 59 months Children in Afghanistan: An Observational Study

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Abstract

Background: Afghanistan is a landlocked multiethnic country located in the heart of south-central Asia, where the lack of access to food, poor care, feeding practices, and illness are the major causes of undernutrition in Afghanistan. To be honest, there is not any study to reveal the nutrition status under five years in Afghanistan.

Method: National Nutritional Survey (NNS)-2013 was an Observational survey at the household level across Afghanistan. The survey used both quantitative and qualitative methods to achieve the information. The survey consisted of interviews, measurement of anthropometric indices, and collection and testing of biological specimens. A multi-stage cluster methodology was adopted for the survey. The sample size was calculated to provide national and provincial representative estimates. The survey was conducted in all 34 provinces of Afghanistan targeting 18,360 households.

Result: At national level, 40.9% (95% CI 39.3-42.5) children were stunted (HAZ <-2SD). The prevalence of severe stunting in children was an alarming 20.9% (95% CI 19.7-22.2) and was higher than moderate stunting (19.7%). Across the country, 9.5% (95% CI 8.7-10.4) of children were wasted (WHZ <-2SD). The prevalence of moderate and severe wasting was 5.5% and 4.0% respectively. Overall 25.0% children (95% CI 23.7-26.2) were underweight; 9.7% (95% CI 8.8-10.5) were severely underweight and 15.2% were moderately underweight.

Conclusion: We can say with great conviction after the analysis and report on the nutritional status that 40.9% of children were stunted, 9.5% were wasted, and 25% of children were underweight.

Keywords: Nutritional status; 59 months children; An Observational study

Introduction

Afghanistan is a landlocked multiethnic country located in the heart of south-central Asia. Afghanistan is bordered by Pakistan to the east and south; Iran to the west; Turkmenistan, Uzbekistan, and Tajikistan to the north; and China to the northeast. Occupying 652,000 square kilometers. It is a mountainous country with plains in the north and southwest. Kabul is the capital and largest city. The population is around 38,928,341, composed mostly of ethnic Pashtuns, Tajiks, Hazaras, Uzbeks and others [1,2]. The country's current health and nutrition situation indicates that progress towards the achievement of Millennium Development Goals (MDGs) is relatively slow. Afghanistan's under-five mortality rate was reported at 102 deaths per 1,000 live births in Multiple Indicator Cluster Surveys (MICS) 2010 [3].

According to recent studies, the demographic and health survey in Pakistan shows that about 44.4% of under-five children were stunted, 29.4% were underweight and 10.7% were wasted [4]. Additionally, a cross-sectional study in Iran demonstrated that stunting was 17.1%, wasting was 1% and underweight was 3.2% [5]. Furthermore, the national Survey double burden of childhood malnutrition in China revealed that the currently stunting is the primary indicator to measure the extent of child malnutrition in China, the stunting prevalence of children under five decreased from 33.1% of recent 8.1% while in poor rural areas the stunting prevalence of children under five was as high as 18.7% in 2013, and the prevalence of overweight among boys increased

from 5.1% to 10.9% and the prevalence of anemia among children under five decreased from 12.6% to 10.9% in 2013 [6]. The national survey in Tajikistan demonstrated the prevalence of stunting was 20.9%, wasted was 2.8%, underweight was 6.2%, iron-deficient was 52.4% and anemia was 25.8% [7]. According to National Nutritional Survey (NNS 2004), the prevalence of chronic malnutrition (stunted linear growth or low height-for-age) amongst children aged 6 to 59 months was 60.5% [8]. In the same age group, the prevalence of acute malnutrition (wasting) was 8.7% [8]. According to the National Nutrition Survey 2004, 48.4% of non-pregnant women were iron deficient and 24.7% suffered from anemia, while over 71.5% of children 6-59 months were iron deficient and nearly 38% were anemic. Iodine Deficiency Disorder (IDD) also emerged as a major public health issue, particularly in mountainous provinces of the north and central highlands. The survey found that

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74.7% of non-pregnant women of reproductive age and 71.9% of school-age children (7-11 years) were iodine deficient. Access to iodized salt is low in Afghanistan. Only 15.0% of households were found to have iodized salt in the Multiple Indicator Cluster Survey (MICS) 2003 and 28.3% of households had salt which tested positive for iodine content in National Nutritional Survey (NNS) 2004 [9]. The results of the National Risk and Vulnerability Assessment (NRVA) 2011/2012 showed that 31% of households across the country do not meet their daily caloric needs (2,100 kcal/person/day), and 35% of households had inadequate food consumption. As well, they found that 36.5% of the Afghan population is living below the poverty line. Multiple Indicator Cluster Survey (MICS) 2010 found that 22.9% of children under 5 years of age had diarrhea in the past two weeks [10, 11]. Malnutrition is a common consequence as well as a contributing factor to non-communicable diseases [12]. Poor hygiene, sanitation, and limited water supply are other major causes of infectious illnesses. 56.7% of the population had access to improved drinking water sources Multiple Indicator Cluster Survey (MICS) 2010 and 28.5% of the population used improved sanitation services [13]. To the best of our knowledge. This is the first study to examine the nutrition survey among children in Afghanistan. Therefore, we aimed to observe the nutrition survey of under-five year's children in Afghanistan.

Subject and Method

This is an observation study at the household level across Afghanistan. The survey used both quantitative and qualitative methods to achieve the information. The survey consisted of interviews, measurement of anthropometric indices, collection, and testing of biological specimens. A multi-stage cluster methodology was adopted for the survey. The sample size was calculated to provide national and provincial representative estimates. The survey was conducted in all 34 provinces of Afghanistan targeting 18,360 households. Household information was captured from eligible respondents to assess infant and young child feeding and care practices, including exclusive breastfeeding rate and timely complementary feeding rate, the morbidity of diarrhea and pneumonia, and feeding practices during illness. Data on socio-economic status were also collected.

Anthropometric measurements: Height weight, Mid-upper arm circumference (MUAC), and bi-pedal edema measurements were obtained to determine the nutrition status of different target age groups. Height and weight measurements were taken from all survey target age groups (Children 0-59 months, index mother, Machine-Readable Cataloging (MARC) measurements were obtained from index mothers and children (0-59 months). Bi-pedal edema assessments were done only for children (0-59 months).

Age determination of children under five years of age the date of birth of children less than five years of age was determined in two sections (2a and 4a). At first, as part of section 2a, the age of children five-five years of age was determined by other family members of the household by the team leader. After that, the age of the children was re-confirmed in the Infant and Young Child Feeding (IYCF) module (section 4a) from the mother of a respective child. Different sources (identification and immunization cards, birth certificates) were used to ascertain the accurate age of the eligible children at both stages.

Sampling frame: The sampling frame and enumeration areas for National Nutritional Survey, 2013 were provided by Afghanistan Central Statistics Office, (CSO) from available 21,194 enumeration areas (EA). Of those, 107 EAs were excluded by CSO from the sampling frame due to security concerns (Annex- list of unreachable clusters).

Sample Design: A stratified two-stage sample design was adopted for the survey. Enumeration areas were taken as primary sampling units (PSUs) and households within each PSU as the secondary sampling units (SSUs).

Sample Size Calculations: The sample size for the survey was estimated assuming two children per household based on reasonable estimates of the national prevalence of children aged 0-59 months per household. The calculations accommodated a 2% design effect. A sample size of 534 (rounded up to 540) households was estimated to ascertain the provincial prevalence of malnutrition. It was estimated that 18 households per cluster were sufficient to achieve provincial specificity for malnutrition indicators assuming an 80% response rate. A total of 18,360 households were required for data collection across the country. The sample size for household food security was calculated considering the latest National Risk and Vulnerability Assessment (NRVA) 2011-12 survey, which reported 30.1% of households as food insecure, according to calculation 500 households per province were estimated and information was gathered from all targeted 18360 households to achieve the target

Data collection activity: On the day of the visit, the survey team identified each selected household using the fresh household listing. Informed consent was taken from respondents before data collection. A total of 18 households from each enumeration area were selected and data collection on the structured instrument was carried out.

Duration of data collection activities: National Nutritional Survey (NNS) 2013 activities started in the second week of June 2013 simultaneously in all 34 provinces of Afghanistan. Teams completed data collection in 786 clusters by July 10, 2013. The progress was reviewed by Trans Alanyl Glutamine (TAG) and advised to suspend activities for 50 days due to the month of Ramadan considering a change in food habits and eating patterns. Data collection was re-started in the first week of September 2013 to complete the data collection in the remaining 240 clusters. By the end of October 2013 teams were able to cover 210 clusters. The remaining 16 clusters were not surveyed due to various reasons: 4 clusters were Inaccessible due to non-availability of Tajikistan visas), 8 due to security concerns, 3 clusters were unidentifiable and 1 due to duplication.

Results

The demographic status of the participants in Table 1 demonstrated that 49.1% are female and 50.9% are male. Additionally, at national level, 40.9% (95% CI 39.3-42.5) children were stunted (HAZ <-2SD). The prevalence of severe stunting in children was an alarming 20.9% (95% CI 19.7-22.2) and was higher than moderate stunting (19.7%). Across the country, 9.5% (95% CI 8.7-10.4) of children were wasted (WHZ <-2SD). The prevalence of moderate and severe wasting was 5.5% and 4.0% respectively. Overall 25.0% of children (95% CI 23.7-26.2) were underweight; 9.7% (95% CI 8.8-10.5) were severely underweight and 15.2% were moderately underweight were showed in figure 1. Furthermore, children under 59 months of age were underweight (WAZ <-2SD), and 9.7% (95% CI 8.8-10.5) were severely underweight. Analysis by age group showed a similar pattern among different age groups, highest (27.1%; 95% CI 24.9-29.3) in 24-35 months and the lowest (21.4%; 95% CI 19.0-23.9) in 0-5 months. Male children are more likely to be underweight (26.4%; 95% CI 24.8 - 27.9) than female children (23.6%; 95% CI 22.1-25.0). Underweight showed a positive relationship with wealth index quintiles. The poorest were more likely to be underweight (30.7%; 95% CI 28.0-33.5) than the richest (17.7%; 95% CI 15.6-19.8) revealed in table 2. Overall 25% of children were

underweight at the national level as per WHO classifications. In 24 out of 34 provinces, more than 20% of the children were underweight. The figure below shows the province-wise prevalence of underweight with variations by the province in figure 2. Table 3 showed the nutritional status of children 0-59 months of age as measured by height-for-age. Nationally, 40.9% (95% CI 39.3-42.5) of children were stunted, with 20.9%; (95% CI 19.7-22.2) severely stunted. Analysis by age groups showed that stunting increased with age, peaking at 47.4% (95% CI 44.8-49.9) among children aged 36-47 months with a similar pattern for severe stunting. Stunting was significantly high with p-value of <0.001) in male children (42.3%; 95% CI 40.5-44.1) than in female (39.4%; 95% CI 37.5-41.3). Associations were found between stunting and wealth index quintiles. The poorest were more likely to be stunted (49.4%; 95% CI 47.0- 51.7) than the richest (31.1%; 95% CI 28.2-33.9). As well, table 4 showed the nutritional status of children 0-59 months of age, as measured by weight for height. Overall, 9.5% (95% CI 8.7-10.4) of children in Afghanistan were wasted. Wasting was 13.2% (95% CI 11.1-15.5) at 0-5 months, it decreased with age and at 48-59 months of age, only 6.3% (95% CI 5.0-7.9) were wasted. Positive associations were observed between household wealth and waste patterns. The prevalence of overweight was 5.4% (95% CI 4.7- 6.0) at the national level. Provincial variations in the prevalence of wasting ranged from 3.7% in province Faryab to 21.6% in Uruzgan. In nine provinces more than 15% of children aged 0-59 months were wasted (figure 4) as per WHO Classifications (Tables 1-4) (Figures 1-4).

Discussion

In our current study, we found at the national level, 40.9% (95% CI 39.3-42.5) of children were stunted (HAZ <-2SD). The prevalence of severe stunting in children was an alarming 20.9% (95% CI 19.7-

22.2) and was higher than moderate stunting (19.7%). Across the country, 9.5% (95% CI 8.7-10.4) of children were wasted (WHZ <-2SD). The prevalence of moderate and severe wasting was 5.5% and 4.0% respectively. Overall 25.0% children (95% CI 23.7-26.2) were underweight; 9.7% (95% CI 8.8-10.5) were severely underweight and 15.2% were moderately underweight. To the best of our knowledge, there is no study to examine the nutrition survey of children in Afghanistan. Therefore, we aimed to observe the nutrition survey under five years in Afghanistan.

Comparing the current nutrition situation with last the National Nutritional Survey (NNS) 2004, there was an apparent reduction in stunting and underweight amongst children of 0-59 months of age. Stunting in children 0-59 months reduced from 60.5% as reported in National Nutritional Survey (NNS) 2004 to 40.5% in 2013. However, there was no improvement in wasting; in fact, it has increased from 8.7% National Nutritional Survey (NNS) 2004 to 9.5% National Nutritional Survey (NNS) 2013. Whereas, the prevalence of underweight was reduced from 33.7% in National Nutritional Survey (NNS) 2004 to 24.6% in National Nutritional Survey (NNS) 2013. While reviewing the above comparison, it is important to consider the difference in the study design and sampling methodology of the two surveys. The sample achieved for National Nutritional Survey (NNS) 2004 was 950 children of 6-59 months of age and 32 clusters; whereas in 2013, the 22,000 children 0-59 months and 1,020 clusters were included in the survey and provided provincial estimates in addition to the national estimates. Comparison can be made by stratifying National Nutritional Survey (NNS) 2013 data by selecting subset of the same enumeration areas done in 2004 to assess real change in the nutrition status of children under five years of age [11].

Furthermore, the National Diet and Nutrition Survey in the UK revealed children aged 4–10 years had significantly lower consumption of soft drinks (not low calorie), crisps and savory snacks, and chocolate confectionery in 2008–09 than in 1997 (all $P < 0.0001$). The percentage contribution of non-milk extrinsic sugars to food energy was also significantly lower than in 1997 in children aged 4–10 years ($P < 0.0001$) [14]. These changes were not as marked in older children and there were no changes in these foods and nutrients in adults. There was still a substantial proportion (46%) of girls aged 11–18 years and women aged 19–64 years (21%) with mean daily Fe intakes below the lower reference nutrient intake [14]. However, further attention is required in other groups, in particular adolescent girls. Additionally, a cross-sectional study of rural areas in 10 provinces of China demonstrated

Table 1: The Demographics of participants.

Variables		Frequency	Percentage
Sex	Male	12498	50.9%
	Female	11850	49.1%
Total		24348	100%
Age	Less than 6 months	2720	11.6%
	6-11 Months	2621	10.8%
	12-23 months	4425	18.7%
	24-35 months	5011	19.9%
	36-47 months	4864	20.0%
	48-59 months	4693	19.1%
Total		24334	100%

Table 2: The Weight for age (Underweight).

N			Weight for age (Underweight)				Mean
			2Sd	95%Ci	3SD	95%CI	
Overall		21922	25.0%	23.8-26.3%	9.7%	8.9-10.6%	-1.16 (1.44)
sex	Male	11248	26.4%	24.8-28%	10.2%	9.3-11.3%	-1.22 (1.44)
	Female	10674	23.6%	22.2-25.1%	9.2%	8.3-10.2%	-1.1 (1.43)
Age	0-5 months	2472	21.4%	19.1-24%	8.6%	7.2-10.4%	-0.8 (1.65)
	6-11 Months	2429	24.2%	21.5-27%	10.0%	8.3-11.9%	-1.01 (1.63)
	12-23 months	4044	25.8%	23.9-27.9%	10.6%	9.4-12%	-1.21 (1.46)
	24-35 months	4580	27.1%	25-29.3%	10.3%	9-11.7%	-1.21 (1.42)
	36-47 months	4318	25.5%	23.5-27.7%	10.0%	8.6-11.6%	-1.26 (1.32)
	48-59 months	4079	24.2%	22.2-26.3%	8.3%	7.1-9.7%	-1.27 (1.21)
Wealth index quintile	Poorest	4513	30.7%	28-33.5%	13.1%	11.3-15.2%	-1.41 (1.38)
	Second	4361	29.9%	27.8-32%	11.9%	10.5-13.4%	-1.36 (1.44)
	Middle	4550	28.8%	26.7-31%	12.1%	10.4-13.9%	-1.29 (1.5)
	Fourth	4401	24.1%	22-26.3%	9.1%	7.8-10.5%	-1.13 (1.41)
	Richest	4064	17.7%	15.7-19.8%	5.7%	4.7-6.8%	-0.86 (1.38)

Table 3: The height-for-age.

N			Height for age (Stunting)				Mean
			2Sd	95%Ci	3SD	95%CI	
Overall		20880	40.9%	39.3-42.5%	20.9%	19.7-22.2%	-1.55 (1.88)
sex	Male	10637	42.3%	40.5-44.2%	21.6%	20.2-23%	-1.61 (1.85)
	Female	10243	39.4%	37.5-41.4%	20.3%	18.8-21.8%	-1.5 (1.91)
Age	0-5 months	2301	24.5%	22.1-27.1%	11.7%	10-13.7%	-0.79 (2.02)
	6-11 Months	2295	31.4%	28.6-34.4%	15.5%	13.3-18%	-1 (2.08)
	12-23 months	3811	42.6%	40.1-45.1%	20.8%	18.9-22.8%	-1.57 (1.89)
	24-35 months	4377	45.6%	42.9-48.3%	24.7%	22.6-26.9%	-1.78 (1.85)
	36-47 months	4145	47.4%	44.8-49.9%	25.2%	23.3-27.3%	-1.88 (1.73)
	48-59 months	3951	43.3%	40.4-46.2%	21.7%	19.5-16.3%	-1.77 (1.64)
Wealth index quintile	Poorest	4342	49.4%	47.1-51.7%	26.5%	24.6-28.6%	-1.9 (1.78)
	Second	4137	48.5%	46-51%	26.1%	24-28.3%	-1.79 (1.91)
	Middle	4288	44.7%	42.5-46.9%	23.7%	21.8-25.7%	-1.71 (1.9)
	Fourth	4202	39.1%	36.1-42.1%	19.6%	17.3-22.1%	-1.49 (1.93)
	Richest	3880	31.1%	28.3-34%	14.4%	12.6-16.3%	-1.19 (1.82)

Table 4: weight-for-height.

N			Wasted				Overweight				Mean
			2Sd	95%Ci	3SD	95%CI	2Sd	95%Ci	3SD	95%CI	
Overall		21141	9.5%	8.7-10.4%	4%	3.51-4.62%	5.4%	3.5-4.6%	2%	1.65-2.37%	-0.27 (1.44)
Sex	Male	10827	10.3%	9.4-11.4%	4.5%	3.9-5.22%	4.9%	3.9-5.2%	1.7%	1.38-2.11%	-0.32 (1.45)
	Female	10314	8.7%	7.8-9.7%	3.5%	2.93-4.24%	5.8%	2.9-4.2%	2.3%	1.82-2.8%	0.21 (1.43)
age	0-5 months	2326	13.2%	11.2-15.5%	6.3%	5-8%	8.1%	5-8%	2.9%	2.13-3.87%	-0.32 (1.69)
	6-11 Months	2339	13.9%	12.1-16%	5.8%	4.56-7.4%	5.9%	4.6-7.4%	1.8%	1.29-2.59%	-0.42 (1.56)
	12-23 months	3927	11.4%	10.13%	4.7%	3.81-5.82%	5%	3.8-5.8%	1.7%	1.19-2.32%	-0.43 (1.44)
	24-35 months	4405	8.9%	7.6-10.4%	3.6%	2.85-4.5%	4.9%	2.9-4.5%	2%	1.42-2.71%	-0.25 (1.4)
	36-47 months	4174	6.6%	5.5-8%	2.6%	1.84-3.54%	5.1%	1.8-3.5%	1.7%	1.24-2.35%	-0.13 (1.33)
	48-59 months	3970	6.3%	5-7.9%	2.8%	1.98-3.91%	4.4%	2-3.9%	2.1%	1.46-3.04%	-0.19 (1.31)
Wealth index quintile	Poorest	4375	9.8%	8.4-11.5%	5%	3.79-6.47%	4.1%	3.8-6.5%	1.3%	0.99-1.71%	-0.31 (1.42)
	Second	4215	10.2%	8.8-11.9%	4.5%	3.6-5.72%	5.6%	3.6-5.7%	1.8%	1.34-2.49%	-0.31 (1.46)
	Middle	4363	11.4%	10-13.1%	4.5%	3.66-5.6%	7.1%	3.7-5.6%	2.9%	2.16-3.9%	-0.27 (1.55)
	Fourth	4254	11.1%	9.5-13%	4.9%	3.89-6.19%	5.9%	3.9-6.2%	2.1%	1.51-2.86%	-0.32 (1.5)
	Richest	3902	6.8%	5.5-8.4%	2.4%	1.72-3.2%	4.4%	1.7-3.2%	1.7%	1.22-2.32%	-0.19 (1.31)

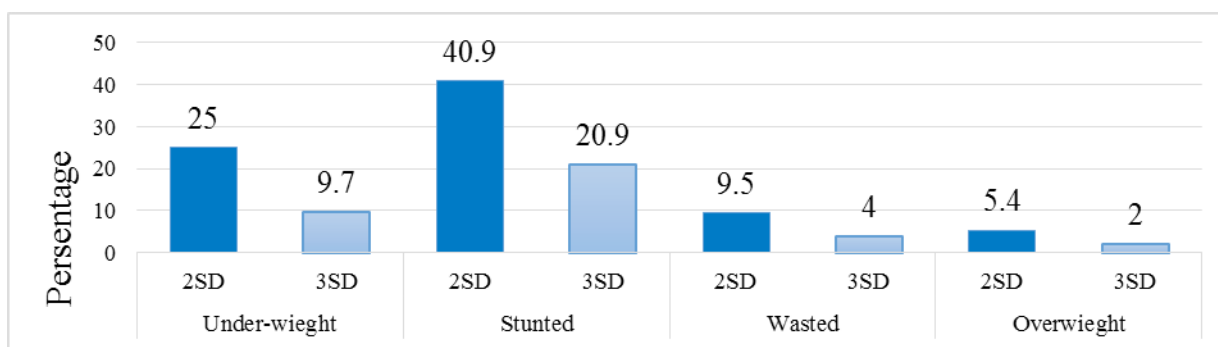


Figure 1: The Nutrition status of children 0-59 months.

that the total of 17.92% of children have at least one form of under nutrition, and the prevalence of stunting, underweight, and wasting, were 14.59%, 7.19%, and 3.07%, respectively [15]. A Decomposition Analysis of Inequality in Malnutrition among under-five children in Iran revealed the obtained concentration indices of stunting, underweight, and wasting were respectively 0.177, 0.092, and 0.031. Socioeconomic inequality in stunting and underweight was statistically significant, however, this socioeconomic gradient was not observed in wasting. More than 50% of the inequality in stunting and about 63% of the inequality in underweight was influenced by socioeconomic status.

Furthermore, maternal education was associated with 19% and 22% of inequality in stunting and underweight respectively [16]. A cross-sectional study conducted in Tehsil Takht Bhai Pakistan demonstrated that 26.7% population was malnourished, and the prevalence of malnutrition was very high in females as compared to males. In males, the prevalence was 28%, while in females the prevalence was almost 42%. As well, there is a positive association between malnutrition and different study variables [17].

A nutritional survey was undertaken among children aged 6-59 months within two villages in Kibera, where the Kenya Medical Research

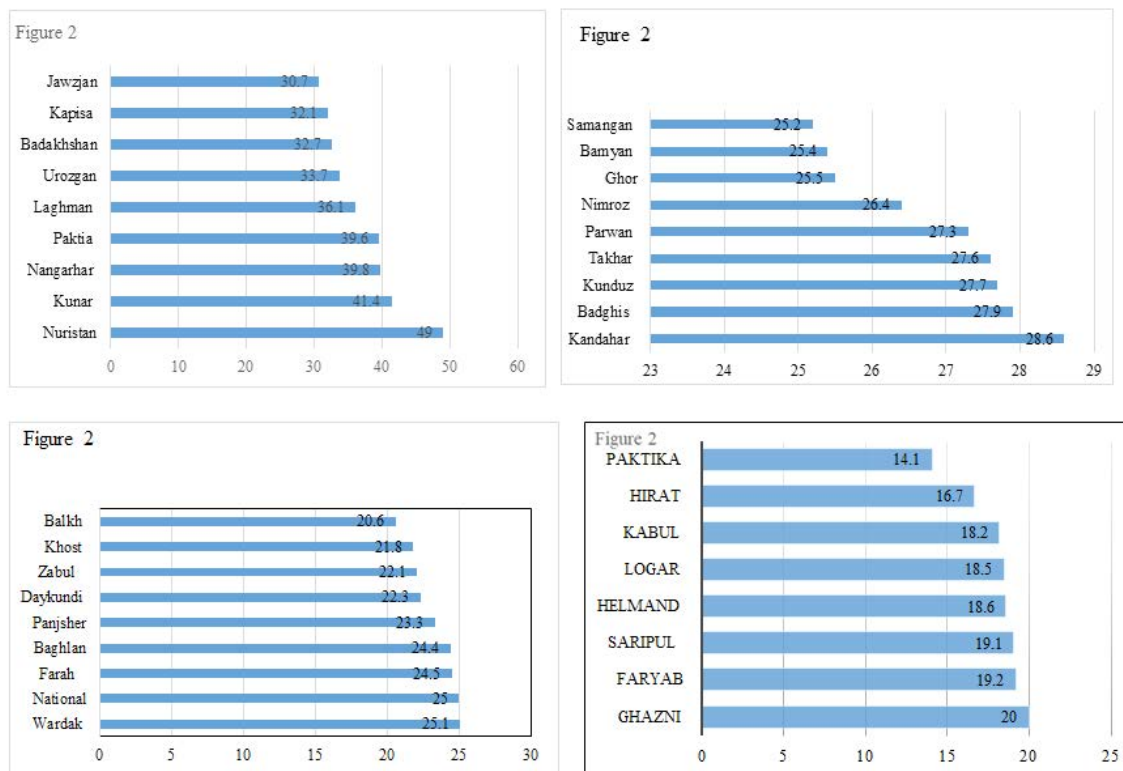


Figure 2: The Underweight.

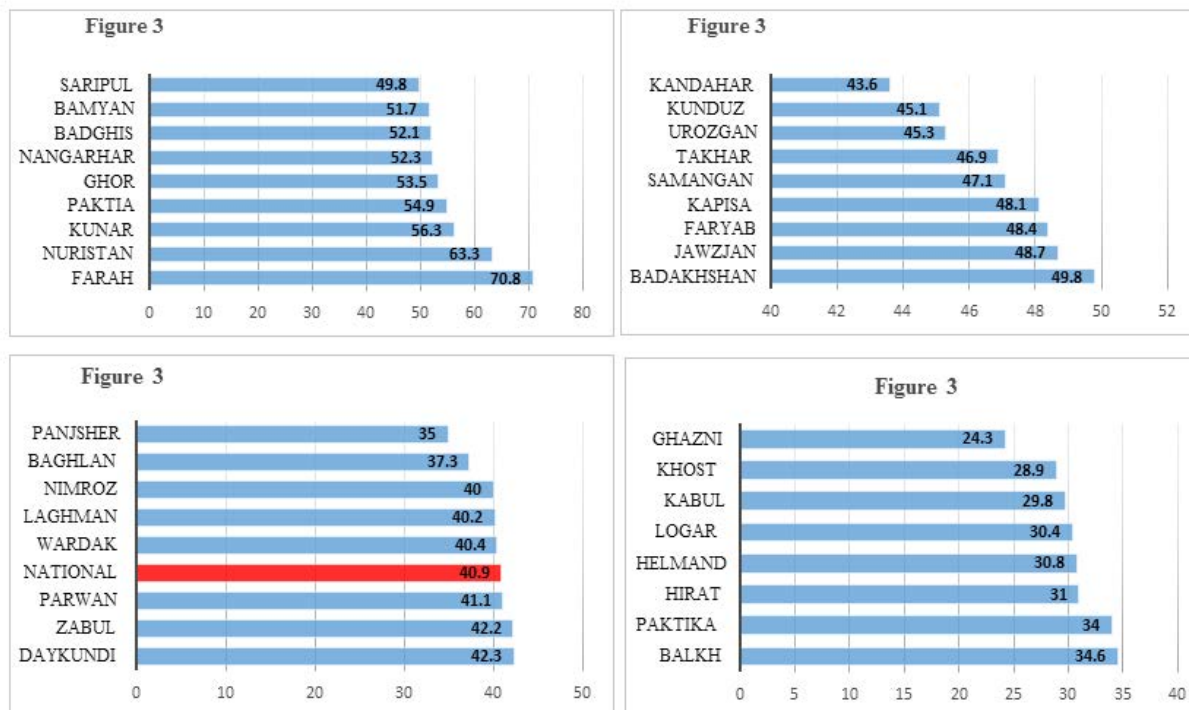


Figure 3: The Province wise prevalence of under-nutrition (children 0 to 59 months) Stunting.

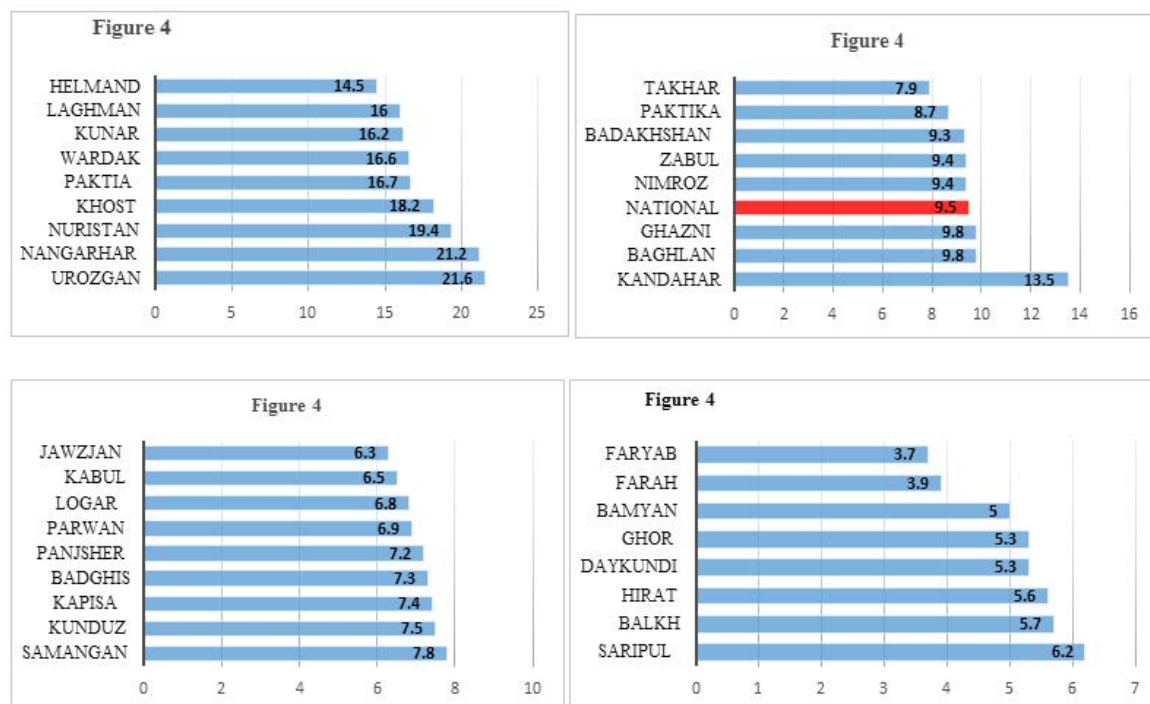


Figure 4: The wasting.

Institute/Centers for Disease Control and Prevention conducts population-based surveillance for infectious disease syndromes revealed that the stunting was found in 47.0% of the children; 11.8% were underweight, and 2.6% were wasted. Severe stunting was found in 23.4% of the children; severe underweight in 3.1%, and severe wasting in 0.6%. Children aged 36-47 months had the highest prevalence (58.0%) of stunting while the highest prevalence (4.1%) of wasting was in children aged 6-11 months. Boys were more stunted than girls ($p < 0.01$), and older children were significantly ($p < 0.0001$) stunted compared to younger children. In the third year of life, girls were more likely than boys to be wasted ($p < 0.01$) [18].

Conclusion

We can say with great conviction after the analysis and report on the nutritional status that 40.9% of children were stunted, 9.5% were wasted, and 25% of children were underweight.

Acknowledgments

We all thank full from the data collection team

Conflict of Interest Statements

All authors declared no potential personal or financial conflicts of interest.

Ethical Approval Statement

This study was ethically approved by the medical bioethics committee of the SIHE ethics committee (code: 1386-1408). The patients/participants provided their written informed consent to participate in this study.

Author contributions

ASK, NAS, and AJA were involved in the study's conception,

design, statistical analysis, and interpretation of the data. AMB, and SS, were involved in data collection, data cleaning, statistical analysis, and manuscript drafting. AMB supervised the study. All authors approved the final manuscript for submission.

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