Nutritional Status among Children under Five Years in Amman, Jordan

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Abstract: *Objectives*: There is scarcity of data on malnutrition among children in Jordan. Therefore, this study was conducted to assess the nutritional status and estimate the prevalence rates of stunting, underweight, and wasting and their associated factors among children under five.

Subjects and Methods: A cross-sectional study was conducted between January and April 2017 among children under five years in Amman, Jordan. All Jordanian children under five years who visited the selected health centers for vaccination or accompanied their mothers during the study period were included in this study. Mothers or caregivers of children were interviewed face-to face using the study questionnaire. Weight in kilograms and height in centimeters were measured for all children. Anthropometric indices were calculated using reference medians recommended by the World Health Organization.

Results: This study included a total of 923 (463 boys and 460 girls) children. The prevalence rates of stunting, underweight, and wasting were 6.2%, 3.8%, and 2.8%, respectively. Multivariate analysis showed that low birth weight was significantly associated with stunting (OR = 2.9, 95% CI: 1.4,6.0; p-value=0.003) and underweight (OR =5.6, 95% CI: 2.5,12.3, p-value <0.001). Compared to exclusive breastfeeding, mixed feeding was associated with increased odds of stunting (OR =2, 95% CI: 1.1-3.9, p-value =0.029) and underweight (OR = 2.2, 95% CI: 1.002, 5.0; p = 0.049). None of the variables were significantly associated with wasting.

Conclusions: The prevalence rates of stunting, wasting and undernutrition among children under five years in Jordan are low. Low birth weight and mixed feeding were associated with higher rates of malnutrition.

Keywords: Malnutrition, stunting, wasting, undernutrition.

INTRODUCTION

Childhood malnutrition is a significant public health problem in many countries of the world despite the economic development in many of these countries [1-3]. Malnutrition is preventable and treatable condition. It is caused by inadequate food intake, infections, psychosocial deprivation, lack of sanitation, and social inequality [4,5]. Malnutrition remained the leading cause of morbidity and mortality in children under five years of age, accounting for half of all death among childhood worldwide [1,4]. It impairs quality of life, cognitive ability and social skills and is associated with high economic burden [2, 6,7].

The nutritional status of children can be assessed by their growth [8]. Stunting (low height for age) is usually a result of inadequate food intake, poor dietary quality, and increased morbidity over extended period of time. Wasting (low weight for height) is associated with current and recent nutritional deficiency [8]. Underweight (low weight for age) represents both chronic and acute malnutrition [8]. Worldwide, the prevalence of stunting, underweight and wasting in children under-five years are 26%, 16%, and 8%, respectively [9].

Several studies had been carried out to assess the nutritional status of children under five years in the Arab world. Malnutrition was prevailing among rural children in Dakhalia in Egypt [11] and Gaza and Palestine [11,12]. In Jordan, a cross-sectional household survey in 2005 among children under five years of age in North Jordan Valley showed that 21.1%, 14.6%, 6% had stunting, underweight, and wasting, respectively [13].

There is scarcity of data on malnutrition among children under five years in Jordan. Recent data are highly needed for planning, allocation of resources, and decision making regarding nutrition for children under five. Therefore, this study was conducted to assess the nutritional status and estimate the prevalence rates of

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stunting, underweight, and wasting and their associated factors among children under five.

SUBJECTS AND METHODS

Study Design

A cross-sectional study was conducted between January and April 2017 among children under five years in Amman, Jordan. Five comprehensive health centers in the Health Directorate of Amman were selected by simple random sampling method. All Jordanian children under five years who visited the selected health centers for vaccination or accompanied their mothers during the study period were included in this study. Children whose parents did not give consents were not included in this study. The study was ethically approved by the ethical committee at Jordan Ministry of Health.

Data Collection

Mothers or caregivers of children were interviewed face-to face using the study questionnaire. The questionnaire included information about the socio-demographic characteristics including child's gender and age, mother's age, level of education, and job, father's level of education, family income, and number of children under five years in the family. Data about the type of feeding were collected. Moreover, the questionnaire sought information about birth weight, type of delivery, and gestational age.

Weight in kilograms and height in centimeters were measured for all children. Weight was measured using digital weighing scale (Seca, Germany) with 0.10 kg accuracy after getting off the outer clothes. Height board (Seca, Germany) was used for height and length measurement with 0.10 cm accuracy.

Anthropometric indices were calculated using reference medians recommended by the World Health Organization (WHO) and classified according to standard deviation units (z-scores), based on the WHO criteria [11]. Weight-for-age z-scores < - 2.0 were used to define underweight. Height-for-age z-scores <- 2.0 were used to define stunting and weight-for-height z-scores < - 2.00 were used to define wasting. Z-scores for the anthropometric indices were calculated using Epi Info 7.1. Pearson chi-square test was used to compare percentages. Binary logistic regression was used to determine factors associated with stunting, wasting and undernutrition. A P-value of less than 0.05 was considered statistically significant.

Table 1: The Socio-Demographic, Clinical, and Relevant Characteristics of Children under Five Years

Variable	n	%
Gender		
Male	463	50.2
Female	460	49.8
Age (year)		
<1	542	58.7
1-<2	177	19.2
2-<3	87	9.4
3-<5	117	12.7
Mother's age (year)		
< 25	241	26.1
25-29	329	35.6
> 29	353	38.2
Mother's education		
Less than high school	184	19.9
High school	423	45.8
Diploma or more	316	34.2
Mother's job		
Not employed	841	91.1
Employed	82	8.9
Father's education		
Less than high school	191	20.7
High school	405	43.9
Diploma or more	327	35.4
Monthly income (Jordan Dinars)		
≤350	486	52.7
>350	437	47.3
Number of children under five		
1	327	35.4
2	507	54.9
3	89	9.6
Birth weight		
Normal	851	92.2
Low	72	7.8
Type of delivery		
Normal	698	75.6
Cesarean section	225	24.4
Gestational age		
<37	46	05.0
≥37	877	95.0
Types of feeding		
Exclusive breast feeding	512	55.5
Formula	193	20.9
Mixed	218	23.6

Table 2: The Prevalence Rates of Malnutrition among Jordanian Children under Five Years According to Gender

Nutritional status	Child's gender				P-value (chi-square test)
	Male (n = 463)		Female (n = 460)		
	Mean Z-score (SD)	n (%)	Mean Z-score (SD)	n (%)	
Stunting	-0.1 (1.30)	27 (5.8)	-0.2 (1.32)	30 (6.5)	0.663
Underweight	-0.03 (1.11)	15 (3.2)	-0.17 (1.07)	20 (4.3)	0.378
Wasting	-0.1 (1.22)	12 (2.6)	-0.19 (1.25)	14 (3)	0.678

Table 3: The Prevalence Rates of Malnutrition According to the Studied Characteristics

Variable	Total	Stunting		Underweight		Wasting	
		n	%	n	%	n	%
Age							
<1	542	36	6.6	26	4.8	23	4.2
1-<2	177	13	7.3	5	2.8	3	1.7
2-<3	87	6	6.9	3	3.4	0	0.0
3-<5	117	2	1.7	1	0.9	0	0.0
Sex							
Male	463	27	5.8	15	3.2	12	2.6
Female	460	30	6.5	20	4.3	14	3.0
Mother's age							
<25	241	16	6.6	9	3.7	11	4.6
25-29	329	21	6.4	12	3.6	8	2.4
≥30	353	20	5.7	14	4.0	7	2.0
Type of feeding							
Exclusively breast feeding	512	22	4.3*	13	2.5*	11	2.1
Formula feeding	193	16	8.3	8	4.1	8	4.1
Mixed feeding	218	19	8.7	14	6.4	7	3.2
Mother's education							
<High school	184	14	7.6	7	3.8	5	2.7
High school	423	19	4.5	14	3.3	12	2.8
Diploma or more	316	24	7.6	14	4.4	9	2.8
Father's education							
<High school	191	12	6.3	5	2.6	6	3.1
High school	405	21	5.2	18	4.4	13	3.2
Diploma or more	327	24	7.3	12	3.7	7	2.1
Father's job							
Self-employed	111	8	7.2	8	7.2	4	3.6
Employed	812	49	6.0	27	3.3	22	2.7
Income (JD)							
≤350	486	29	6.0	21	4.3	15	3.1
>350	437	28	6.4	14	3.2	11	2.5
Delivery							
Normal	698	38	5.4	19	2.7	18	2.6
Cesarean section	225	19	8.4	16	7.1	8	3.6
Gestational age							
Preterm	718	48	6.7	30	4.2	18	2.5
Full term	205	9	4.4	5	2.4	8	3.9
Birth weight							
Normal	851	46	5.4*	23	2.7*	24	2.8
Low birth weight	72	11	15.3	12	16.7	2	2.8

*P-value <0.05.

RESULTS

Participants' Characteristics

This study included a total of 923 (463 boys and 460 girls) children. More than half of children (58.7%) aged less than one year. About one quarter (26.1%) of children had mothers younger than 25 years. Table **1** shows the socio-demographic, clinical and relevant characteristics of children under five years. About 8% of the children were born with low birth weight, 5% were delivered prematurely, and 24.4% were delivered via cesarean section. More than half of children (55.5%) were exclusively breast fed.

Nutritional Status

Table **2** shows prevalence rates of malnutrition among Jordanian children under five years according to gender. The prevalence rates of stunting, underweight, and wasting were 6.2%, 3.8%, and 2.8%, respectively. There were no significant differences in the prevalence rates between boys and girls. The prevalence rates of malnutrition according to the studied characteristics are shown in Table **3**.

Multivariate Analysis

Multivariate analysis showed that low birth weight was significantly associated with stunting (OR = 2.9, 95% CI: 1.4-6.0; p-value=0.003) and underweight (OR =5.6, 95% CI: 2.5-12.3, p-value <0.001). Compared to exclusive breastfeeding, mixed feeding was associated with increased odds of stunting (OR =2, 95% CI: 1.1-3.9, p-value =0.029) and underweight (OR = 2.2, 95% CI: 1.002-5.0; p = 0.049). None of the variables were significantly associated with wasting.

DISCUSSION

This study determined the prevalence rates of stunting, underweight, and wasting. Stunting is the result of poor nutrition during early childhood. Wide variations in the prevalence rates of stunting were observed among regions. The prevalence of stunting in Africa in 2010 was 38% and it was projected to stagnate in the coming decade [14]. In contrast, the prevalence was substantially lower in Asia and it was predicted to decrease from 28 % in 2010 to 19% over a period of ten years [14]. In 2016, more than 50% of all stunted children under five years lived in Asia and more than 30% lived in Africa [15]. This study showed that the prevalence of stunting among children under five years was 6.2%. According to WHO classification of severity of malnutrition [16], Jordan is classified as having low prevalence of stunting. This rate is much lower than the rate of 21.1% [13] that had been reported in the North Jordan Valley. The difference between the two rates is explained by the low socio-

Table 4: Multivariate Analysis of Factors Associated with Malnutrition

Variables	OR	(95% confidence interval)	P-value
Stunting			
Birth weight			
Normal	1		
Low birth weight	2.9	(1.4 ,6.0)	0.003
Type of feeding			
Exclusively breast feeding	1		
Formula feeding	1.8	(0.96,3.7)	0.066
Mixed feeding	2	(1.1,3.9)	0.029
Underweight			
Birth weight			
Normal	1		
Low birth weight	5.6	(2.5,12.3)	<0.001
Type of feeding			
Exclusively breast feeding	1		
Formula feeding	0.96	(0.4 ,2.6)	0.964
Mixed feeding	2.2	(1.002,5.0)	0.049

economic status of people living in North Jordan Valley. Moreover, the rate is lower than the prevalence rate of 14.2% that had been reported by a study in East Jerusalem in 2014 [12]. The differences in the prevalence rates between different populations are explained by differences in economic status, feeding practices, and access to nutritious food.

On the other hand, more than 60% of all wasted children under five years lived in Asia and more than 25% lived in Africa in 2016 [14]. Our study showed a very low prevalence of wasting of 2.8%. The rate of wasting was worse in the study that was conducted in North Jordan Valley [13]. Much higher rates of wasting were reported in other countries [17]. Moreover, the study reported a low rate of underweight of 3.8%. The low rate of underweight is expected because children in the capital of Jordan have a good access to food in terms of quantity and quality. This rate is lower than that reported in many countries [10,13,14]. The rate of underweight in Egypt was 14.2% [10].

In disagreement with the fact that boys receive more parental care than girls, our study did not show significant gender difference in the prevalence rates of malnutrition. Other studies had reported that boys are more likely to be stunted, wasted and underweight [18,19]. Moreover, our study did not show significant difference in the prevalence rates according to age groups. However, the association between child's age and malnutrition had been reported in other studies [11,18].

In agreement with previous studies [20-21], our study showed significant association between low birth weight and both stunting and underweight. This finding could be explained by the increased susceptibility of children with LBW to infections and other complications [23]. The significant relationship between low birth weight and malnutrition suggests the importance of implementing intervention strategies among low birth weight babies. The present study showed a significant relationship between mixed feeding and both stunting and underweight. This finding is explained by the fact that babies are not having their nutritional needs found in exclusive breast feeding. This has stressed the fact that breast feeding has a vital role for growth and development of the baby. There is a persistent need to educate mothers about exclusive breast feeding and its proper practices. None of the other studied characteristics had been associated with malnutrition. Other studies showed the importance of other characteristics to predict malnutrition including maternal education levels and monthly income [24,25]. The lake of the association between socio-economic factors and malnutrition might be explained by the small number of malnutrion cases in our sample that might diminish the power of the study to detect this association.

This study was limited in its ability to establish a causal relationship between the studied variables and malnutrition and stunting. However, most of the factors observed have already been proven by other study designs with strong plausibility and consistency. Another limitation is that one can't generalize the findings of this study to the population of children under five years in other parts of the country. A national study is needed to have a complete picture on the nutritional status of children in Jordan. In conclusion, the rates of stunting, wasting and undernutrition among children under five years in Jordan are low. Low birth weight and mixed feeding were associated with higher rates of stunting and underweight in children less than five years. It is recommended to promote exclusive breast feeding among Jordanian women. Interventions aimed at reducing prevalence of low birth weight are highly needed.

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CONFLICT OF INTEREST

The authors declare no potential conflicts of interests.

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