RESEARCH ARTICLE



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Prevalence of Anameia and malnutrition among hospitalized patients attending Al-Nasser paediatric hospital, Gaza, Palestine

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ABSTRACT

The present study aimed to determine the prevalence of anaemia and malnutrition and some risk factors among hospitalized children attending Al-Nasser paediatric hospital. A cross-sectional study among hospitalized children attending Al-Nasser paediatrics hospital. The study included 522 children during the period May 2002 to May 2003. Data collection was through blood specimens, anthropometric indices and the questionnaire. The present study included 522 children attending AL-Nasser Paediatric Hospital with 334 males (64.0%) and 188 females (36.0%). Those children are distributed into three regions; the city 316 (60.5%), the camp 181 (34.7%) and village 25 (4.8%). The present study showed that 326 (62.5%) were anaemic, while 220/522 (42.1%) were underweight, stunting were 172/522 (32.9%) and wasting 140/522 (26.8%). The present study indicated that underweight and wasting were lower among males (38.6%), (20.0%) compared to females (48.4%), (38.8%) with a significance level (p=0.02, p=0.001). Palestinian children at high risk of anaemia and malnutrition. These two conditions should be considered by health authorities and urgent need for immediate intervention should be taken to minimize the consequences.

Keywords: Anemia, Malnutrition, Prevalence, Gaza, Children

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INTRODUCTION

Iron deficiency anaemia is a decrease in the total hemoglobin levels caused by a lack of sufficient iron. It is the most common cause of anaemia worldwide. Iron is needed to form haemoglobin and is mostly stored in the body in the form of ferritin and hemosiderin¹. Anaemia is a serious global public health problem that particularly affects young children and pregnant women. WHO estimates that 42% of children less than 5 years of age and 40% of pregnant women worldwide are anaemic². In developing countries, low standards of living, low socio-economic conditions, restricted access to food and lack of knowledge for good dietary practices and personal hygiene contribute even more to a high occurrence of iron deficiency and hence anemia³. Intestinal parasitic infection, due to poor hygienic conditions also interferes with iron absorption, thus expanding the prevalence of iron deficiency anaemia in the developing world⁴. The prevalence of anaemia is estimated at 9% in countries with high development, in countries with low development the prevalence is 43%⁵.

The literature on anaemia and malnutrition from Palestine and neighbouring countries are presented in table 1.

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Country	Authors,	Methodology	%	Target/Sample	Disease/
	years				condition
Palestine (Gaza	6	A descriptive cross-	40.7%, 9.1%	preschool children	Anaemia, Stunting
Strip)		sectional			
Jordan	7	A national population- based household	4.9%, 19.3% 27.4%	Males, non-pregnant females and pregnant femeles	Anaemia
Refugee camps	8	A cross-sectional study	(Gaza, 29.3%; West Bank, 22.0%;	UNRWA schools in Gaza, West	Anaemia
outside Palestine			Syria, 30.0%; and Lebanon, 18.3%)	Bank, Syria, and Lebanon in 2017	
Tanzania	9	Random sampling	84.6%	436 children aged 6–59 months	Anaemia
		technique		in Arusha District	
Baghdad City,	10	A cross-sectional Study	18.2%.	3 to 5 Years Old Children	Malnutrition
Iraq					(Underweight)
Palestine	11	A cross-sectional Study	33.5%	kindergarten children	Anaemia
(Gaza Strip)				(marginalized areas of the Gaza)	
Palestine	12	MoH Annual report	38.5%	Children at age 12 month	Anaemia
(West Bank)					
Palestine	13	Retrospective cohort		children under 2 years	Stunting
(Gaza Strip)		study			
Egypt	14	A cross-sectional Study	39.6%	preschool children	Anaemia
Guinea-Bissau,	15	A cross-sectional,	21.8%, 9.4%, 3.7% and 80.2%.	children	stunted, wasted,
West Africa		population-based, door-to- door household survey			underweight children and anaemia
Palestine	16	In a national study	37.9%	pre-school children	Anaemia
(West Bank)		5		1	
Palestine	17	Retrospective cohort	39.5% IDA, 2.9% wasting, 4.7%	Palestinian preschool children	silent epidemic of
		study	underweight and 10.9% stunted	during the period 1998–2007	malnutrition
Palestine	18	A cross-sectional study	59.7%, 46.5% and 13.5% of which	preschool children	Anaemia
(Gaza Strip)		-	are mild and moderate, respectively	-	

Table 1: Literature on anaemia and malnutrition from Palestine and neighbouring countries

The present study was undertaken to identify the prevalence of anaemia, malnutrition among hospitalized children attending Al-Nasser Paediatrics Hospital as well as the association between anaemia and malnutrition.

MATERIALS AND METHOD

Ethical considerations

Ethical approval was obtained from the Ministry of Health dated 2003. All children investigated were in accompanied with one of their parents and informed consent was filled by each sponsor after verbal explanation about the purpose of the study.

Sample selection

The information of 522 hospitalized children attending Al-Nasser Paediatric Hospital were obtained and permitted from ¹⁹ study.

Data collection

The study was during the period May 2002 to May 2003, where data collection included the collection of blood specimens, anthropometric indices and a questionnaire including; age, sex, residency, father education, and father occupation.

Measurement of Health Status

Blood specimen collection and analysis

After obtaining the parents consent, three ml of venous blood was drawn into an EDTA container for a complete blood count (C.B.C), to measure haemoglobin (Hb) suing the Cell-DYN 1700 in the Hospital laboratory.

Haematological criteria for anaemia

Each child was considered anaemic when the haemoglobin level was lower than 11 gm/dl by estimating haemoglobin mean²⁰.

Anthropometric measurements for Physical growth

Body weight

The weight of the child was measured by using Health Meter (Capacity 136Kg, UK), set on a constant platform with the initial point on the scale exactly at zero; each weight was taken to the nearest 0.5 Kg. With each child was standing on the balance and the observer recorded the reading of the weight. The average of two readings was taken for each child.

Body height

The measurement of height was made when a child was in full extension, standing on the platform of the balance, and the movable scaled meter extended and slides from a fixed position up to reach the head. Height was measured to the nearest 1.0 cm. These measurements were made with the children without shoes and accuracy was assured by taking an average of two readings.

Interpretation of height and weight

Weight for age, (W/A) defines the general nutritional status, weight for height, (W/H) means wasting, and height for age, (H/A) means stunting, have been recommended for use as indicators of nutritional status of children. These indicators were expressed as percentages of the reference values (percentiles) for weight, height and age using Cole's Growth Assessment Slide Rule. The Gomez classification for W/A and Water low classification for W/H and H/A were applied²¹.

Statistical analysis of data

Data was computer analyzed using SPSS/PC (Statistical Package for the Social Sciences Inc, Chicago, Illinois)²². Simple distribution of the study variables, cross-tabulation and Chi-square tests were used to identify the significance of the relationships (associations and interactions) among the dependent variables, blood indices and physical growth. The independent variables included the general rate of anaemia, age, sex, residence, father occupation.

RESULTS AND DISCUSSION

The present study included 522 children attending AL-Nasser Paediatric Hospital with 334 males (64.0%) and 188 females (36.0%). Those children are distributed into three regions; the city 316 (60.5%), the camp 181 (34.7%) and village 25 (4.8%). The present study showed that 326 (62.5%) were anaemic, while 220/522 (42.1%) were underweight, stunting were 172/522 (32.9%) and wasting 140/522 (26.8%). The sociodemographic characters are represented in Table 2.

The present study indicated that males were found to be more anaemic 66.5% than females 55.9% with a significance difference (p=0.001). The rate of anaemia among children in the age categories tend to decrease with increasing age with a significance level (p=0.001). Anaemia was high among children who are residing in the city 65.2%. Out-patients were found to be less anaemic than in-patients with a significance level (p=0.001). Anaemia was high 66.5% among children belong to fathers with secondary education. Children belongs to un-employed fathers had high rate of anaemia 64.9%. Children who are drinking tea had lower anaemia 40.1% than who do not 59.9% with a significance level (p=0.001) Table 3.

Table	2:	Anaemic	and	non-anaemic	children	with	relation	to	sociodemographic
charte	rers	5							

Anaemic	Not-anaemic	$(\chi^2, p-value)$		
No. (%)	No. (%)			
222 (66.5)	112 (33.5)	(5.79, 0.001)*		
105 (55.9)	83 (44.1)			
154 (76.3)	48 (23.7)			
140 (62.5)	84 (37.5)	(21.40, 0.001)*		
	Anaemic No. (%) 222 (66.5) 105 (55.9) 154 (76.3) 140 (62.5)	Anaemic Not-anaemic No. (%) No. (%) 222 (66.5) 112 (33.5) 105 (55.9) 83 (44.1) 154 (76.3) 48 (23.7) 140 (62.5) 84 (37.5)		

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-	5-8 year (n=64)	22 (34.4)	42 (65.6)	
	9-12 year (n=32)	11 (34.4)	21 (65.6)	
	Residency			
	City (n=316)	206 (65.2)	110 (34.8)	
	Camp (n=181)	108 (59.7)	73 (40.3)	(2.77, 0.250)
	Village (n=25)	13 (52.0)	12 (48.0)	
	Patient classification			
	Out-patient (n=187)	105 (56.1)	821 (43.9)	
	In-patient (n=335)	222 (66.3)	113 (33.7)	(5.25, 0.001)*
	Father education			
	Primary education (n=106)	64 (60.4)	42 (39.6)	
	Prepatory education (n=124)	81 (65.3)	43 (34.7)	(3.74, 0.291)
	Secondary education (n=173)	115 (66.5)	58 (33.5)	
	Higher education (n=119)	67 (56.3)	52 (43.7)	
	Father occupation			
	Employed (n=146)	90 (61.6)	56 (38.4)	
	Laborer (n=302)	189 (62.6)	113 (37.4)	(0.21, 0.896)
_	Un-employed (n=74)	48 (64.9)	26 (35.1)	

**p* <=0.05 is significant

The present study indicated that underweight and wasting were lower among males (38.6%), (20.0%) compared to females (48.4%), (38.8%) with a significance level (p=0.02, p=0.001). While stunting was higher among males 37.4% compared to females 25.0% (p=0.003). Underweight, stunting and wasting were found to be high among children aged from 5-8 months, 58.1%, 47.2% and 40.5% with a significance level. While children aged <1y years had high rates of anthropometric deficiencies. Similar rate (48.0%) of underweight, stunting and wasting was found among children who are residing in the village and higher than who are residing in the city and the refugee camp with a significance level. Lower rate of underweight and stunting were noticed among children whom belong to fathers of high education Table 3.

Table 3:	underweight,	stunting	and	wasting	among	children	with	relation	to	different
variables	5									

Variable	Underwei	ght	Stunting	5	Wasting		
	No	(%)	No	(%)	No	(%)	
Sex							
Males (n=334)	129	(38.6)	125	(37.4)	67	(20.0)	
Females (n=188)	91	(48.4)	47	(25.0)	73	(38.8)	
	$(\chi^2 = 4.72;$	p=0.029)	$(\chi^2 = 8.40)$; p=0.003)	$(\chi^2 = 21.59)$; p=0.001)	
Age		-		-		-	
<1y	94 (46.5)		75 (37.1)		64 (31.8)		
1-4 year (n=224)	98 (43.7)		72 (32.1)		61 (27.2)		
5-8 year (n=64)	18 (28.1)		20 (31.2)		8 (12.5)		
9-12 year (n=32)	10 (31.2)		15 (15.6)		7 (21.8)		
	$(\chi^2 = 6.074)$	•	$(\chi^2 = 3.65; p = 0.161)$		$(\chi^2 = 6.03; p = 0.048)$		
	p=0.047)					. ,	
Residency	-						
City (n=316)	122 (38.6)		93 (29.4)		77 (24.3)		
Camp (n=181)	86 (47.5)		67 (37.0)		51 (28.1)		
Village (n=25)	12 (48.0)		12 (48.0)		12 (48.0)		

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	$(\chi^2=4.11; p=0.127)$	$(\chi^2 = 5.69; p = 0.058)$	$(\chi^2 = 6.85; p = 0.032)$	
Father education				
Primary education (n=106)	45 (42.4)	39 (36.7)	27 (25.5)	
Prepatory education	55 (44.3)	46 (37.1)	27 (21.7)	
(n=124)	82 (47.3)	54 (31.2)	55 (31.8)	
Secondary education	38 (31.9)	33 (27.7)	31 (26.1)	
(n=173)				
Higher education (n=119)				
-	$(\chi^2 = 7.30; p = 0.062)$	(χ ² =3.37; p=0.337)	$(\chi^2 = 3.66; p = 0.300)$	
Father occupation				
Employed (n=146)	55 (37.7)	55 (37.7)	39 (26.7)	
Laborer (n=302)	132 (43.7)	96 (31.8)	76 (25.2)	
Un-employed (n=74)	33 (44.6)	21 (28.4)	25 (33.8)	
	(χ ² =1.68; p=0.431)	(χ ² =2.35; p=0.307)	(χ ² =2.25; p=0.324)	

Children of employed fathers had lower rates of underweight while stunting was lower among children belongs to un-employed father. Wasting was lower among children belong to labourer fathers. Underweight of 3rd degree was found lower among anaemic and non-anaemic children. Severe stunting was similar among anaemic and non-anaemic children 6.4% and 6.2%. Severe wasting was lower among among anaemic children 3.1% compared to non-anaemic children 4.1% Table 4.

Variable		Underweight									
		>=90%	6	75-89	%	60-74	%	<60%	/ 0		
		(Norm	al)	(1 st de	egree)	(2 nd d	egree)	(3 rd degree)			
		No.	%	No.	%	No.	%	No.	%		
Anaemic	(n=327)	177	(54.1)	110	(33.6)	28	(8.6)	12	(3.7)		
Not-anaemic ((n=195)	125	(64.1)	53	(27.2)	10	(5.1)	7	(3.6)		
		$(\chi^2 = 5.)$	71; p=0.12	6)							
		Stunted									
		>=95%	6	90-94	%	85-89	%	<85%			
		(Norm	al)	(Mild	stunting)	(Mod	erate	(Severe			
	× , ,					stunting)		stunting)			
		No.	%	No.	%	No.	%	No.	%		
Anaemic	(n=327)	216	(66.1)	61	(18.7)	29	(8.9)	21	(6.4)		
Not-anaemic ((n=195)	134	(68.7)	32	(16.4)	17	(8.7)	12	(6.2)		
		$(\chi^2 = 0.4)$	49; p=0.92	1)							
		Waste	d								
		>=90%	0	80-89	%	70-79	%	< 70 %	⁄ 0		
		(Norm	al)	(Mild	wasting)	(Mod	erate	(Seve	ere		
						wastii	ng)	wasti	ng)		
		No.	%	No.	%	No.	%	No.	%		
Anaemic (n=327)	235	(71.9)	52	(15.9)	30	(9.2)	10	(3.1)		
Not-anaemic ((n=195)	147	(75.4)	25	(12.8)	15	(7.7)	8	(4.1)		
		$(\chi^2 = 1.0)$	69; p=0.63	9)							

Table 4: Underweight, stunting and wasting among children with relation to anaemia

The findings of the present study showed that the prevalence of anaemia among children was high (62.5%) compared to other regions of Palestine. Our findings for the prevalence of

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underweight (42.1%), stunting (32.9%) and wasting (26.8%) were different to that reported by^{23} in the same area and may reflect increasing of underweight. Where their study showed that the prevalence of anemia among 102 children attending the main four primary health care centers in Gaza Strip was 72.8%. Anthropometrical indices showed that the prevalence of wasting, stunting, underweight were 34.3%, 31.4%, 31.45% respectively.

Where a study among pre-school children 6–59 months indicated that anaemia was 37.9 % in the West Bank¹⁶. Through evaluation project's impact they performed two random surveys in West Bank: one before and one after the project. Before the project 30.1% of children (CI 95% = 24.5–35.6%) were found anaemic (<11 g/dl), while after the prevalence was 18.8% (CI 95% = 14.8–22.8%; decrease of 38%, p = 0.001)²⁴. In rural Wardha, central India the prevalence of nutritional anaemia was 80.3% among children aged 6-35 months²⁵.

Our results regarding the prevalence of anaemia and sex are different from that reported by²⁶ where he reported that the prevalence of anaemia was high among females.

In the present study there was evident that the prevalence of anaemia decreasing with increasing age and these results were consistent with that reported by²⁷.

The prevalence of iron deficiency, and IDA among females students between the ages of 6 to 12 years old were randomly selected from a governmental school in northern Jeddah was 25.2% and 10.6%, respectively. At the same time, underweight affected 14.2% of the students, and stunting affected 12.2%. Moreover, 9.8% of the students were obese and 13.8% suffered from wasting²⁸.

The prevalence of anaemia was high among children who are coming from the city compared to the camp and the village; these un-explained findings may need further and future study. While there was a statistical significance in the prevalence of stunting (p=0.058) and wasting (p=0.032) regarding residency where increasing was noticed in the camp and village as indicated in table 2. This may be attributed to less availability of food in both camp and village. The education and occupation of the father did not make a big variation in the prevalence of anaemia and anthropometric indices. The high prevalence of anemia and anthropometric indices in the present study may be contributed to high poverty rates which led to increased food insecurity based on limited access to food due to curfews and closures, as well as high unemployment, depletion of resources. According to World Food programme (WFP) 38% of the occupied Palestinian territory population were food insecure²⁹. The study showed that 33.6% of 1st degree underweight was anaemic where 2nd and 3rd degree of underweight tends to decrease among anemic children the same findings for stunting and wasting. So children under the study are at high risk for anaemia and malnutrition due to many reasons; insecurity of food, quality and health food, unemployment, closure and siege on Palestinian territories.

CONCLUSION

Palestinian children at high risk of anaemia and malnutrition. These two conditions should be considered by health authorities and urgent need for immediate intervention should be taken to minimize the consequences.

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