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Prevalence of Anemia among Children Aged 6 Months - 12 Years Attending Emergency Room in Princess Rahma Teaching Hospital for Children, North of Jordan

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Abstract

Objectives: The purpose of this study was to use the computerized database of princess Rahma teaching hospital for children to analyze the prevalence of anemia among children aged 6 months - 12 years attending emergency room of the hospital.

Methods: This was a cross-sectional retrospective study from May to August 2014 using the computerized database of princess Rahma teaching hospital for children for 1728 children aged 6 months to 12 years attending the emergency room. Children with abnormal white blood counts at the time of the hemoglobin test and with chronic diseases were excluded. The data were analyzed for age, gender, hemoglobin level and severity of anemia. Anemia was defined as hemoglobin level < 11 g/dL in children aged 6-59 months and <11.5 g/dL in children aged 5-12 years, according to cut-off levels of hemoglobin suggested by the World Health Organization.

Results: The overall prevalence of anemia in children aged 6 months-12 years was 24.9% (N= 431). The overall prevalence of anemia in children aged 6 months to 5 years was 32% (N=351); with children below 2 years were at highest risk of anemia 39% (N=241). The majority of anemic cases in children from 6 months to 5 years 67.5% (237/351) were of the mild type followed by 31.3% (110) cases of moderate anemia and 1.1% (4) severe anemia. Mean hemoglobin value for children from 6 months to 5 years was 11.4 g/dl. The overall prevalence of anemia in children age 5 -12 years was 12.7% (N=80). The majority of anemic cases in children age 5-12years 57.5% were of moderate type followed by 40% cases of mild type and 2.5% severe anemia. Mean hemoglobin value for children from 5years to 12 years was 12.8 g/dl.

Conclusion: Given the high prevalence of childhood anemia observed in north of Jordan, particularly among those less than 5 years old, and given the negative consequences on their cognitive and behavioral development even in later years, there is an urgent need for effective and efficient public health interventions. In April 2002, Jordan began a wheat flour fortification program that included iron and folic acid, but despite this national fortification program there was no statistically significant change in the prevalence of anemia, indicating that other causes (in addition to iron deficiency) are responsible for anemia.

Keywords: Anemia; Jordan Population Family Health Survey (JPFHS); Ministry of Health of Jordan (Moh); The World Health Organization (WHO); Children

Introduction

Anemia is a disorder in which the number of red blood cells or their oxygen-carrying capacity is insufficient to meet physiologic needs, which vary by age, sex, altitude, smoking, and pregnancy status. Iron deficiency is considered the most common cause of anemia worldwide, although other conditions, such as folate, vitamin B12 and vitamin A deficiencies, chronic inflammation, parasitic infections, and inherited disorders can all be a cause of anemia. Children are particularly at risk [1].

In 1985, the World Health Organization (WHO) reported that around thirty percent (30%) of the world population was anemic [2]. It was noted in 2008 WHO analysis that anemia affected 24.8% of the world's population and 47% of preschool children [3]. At a recent time, global anemia prevalence was estimated at 43% in children, with reductions since mid-nineties of the last century [4].

Anemia in children is a major global public health problem. It is associated with serious consequences including growth retardation, impaired motor and cognitive development, and increased morbidity and mortality [5].

Five Jordanian national surveys document the prevalence of anemia in children less than 5 years of age:

1. The National baseline survey on iron deficiency anemia and vitamin A deficiency conducted in 2002 [6].
2. JPFHS (Jordan population and family survey) 2002 (DoS and ORC Macro, 2003) [7].
3. JPFHS 2009 (DoS and ICF Macro, 2010) [8].
4. Micronutrient survey 2010 (MoH et al., 2011) [9].
5. JPFHS 2012 (DoS and ICF Macro, 2013) [10].

Looking at these studies, The Jordan population and family surveys 2002 and 2009 studied children aged 6-59 months, while the ministry of health surveys 2010 and 2002 studied children aged 12-59 months. Owing to differences in age-groups, trends are difficult to estimate accurately. When comparing results from the 2010 micronutrient survey with those of the 2002 survey (children aged 12-59 months), there is only a minimal decrease in the prevalence of anemia from 20% in 2002 to 17% in 2010. It is obvious that there is a large difference in prevalence of anemia, when comparing these results with data of JPFHS 2002 and 2009 even when taking into consideration the difference in age-group. According to JPFHS 2002 and 2009, the prevalence of anemia among children aged 6-59 months was about 33-34% and remained stable between these two surveys. These Inconsistencies may be justified by Methodological issues [11]. This study was carried out to determine the prevalence of anemia in children in north of Jordan and to compare the results with the data of the Jordan population and family survey 2012 [10].

Objectives & Methods

Purpose of this study is to analyze the prevalence of anemia among children aged 6 months - 12 years attending the emergency room of the Princess Rahma teaching hospital for children using their computerized database. A Cross-sectional retrospective study from May to August 2014 was considered to select 1728 children from the database. Children with abnormal white blood count (WBC) and with chronic diseases were excluded from the study.

Data were analyzed for age, gender, hemoglobin level and severity of anemia using SPSS statistical package version [19]. Anemia is defined as hemoglobin level <11 g/dL in children aged 6-59 months and < 11.5 g/ dL in children aged 5-12 years, according to cut-off levels of hemoglobin suggested by WHO [1]. The blood collected in EDTA vacutte and based on readings from automated cell counter.

Haemoglobin levels to diagnose anaemia at sea level (g/l)[‡]

Population	Non -Anaemia*	Anaemia*		
		Mild[a]	Moderate	Severe
Children 6 - 59 months of age	110 or higher	100-109	70-99	lower than 70
Children 5 - 11 years of age	115 or higher	110-114	80-109	lower than 80
Children 12 - 14 years of age	120 or higher	110-119	80-109	lower than 80

Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity 2011(WHO) [7]

Results

According to the study, the overall prevalence of anemia in children aged 6 months-12 years was found to be 24.9% (N=431), whereas for the children aged 6 months to 5 years the prevalence was 32% (N=351) (Figure 1a,b and Table 1a,b). The highest risk of anemia 39% (N=241) was more pronounced in children below 2 years. It is to be noted that the majority of anemic cases in children from 6 months to 5 years 67.5% (N=237) were of the mild type followed by 31.3% (110) cases of moderate anemia and 1.1% (4) severe anemia (Table 2). Mean hemoglobin value for children from 6 months to 5 years was 11 g/dl.

			Anemia condition		Total
			Anemic< 5years	Non-anemic<5years	
Age	from 6 month-5years	count	351	746	1097
		% within age	32.0%	68.0%	100.0%

Table 1a: From 6month-5 years* anemia condition

			Gender		Total
			male	Female	
Age	from 6 month-5years	count	662	435	1097
		% within age	60.3%	39.7%	100.0%

Table 1b: From 6month-5 years* Gender

			Severity of anemia			Total
			mild	moderate	severe	
Age	from 6month-5years	count	237	110	4	351
		% within age	67.5%	31.3%	1.1%	100.0%

Table 2: From 6month -5 years * severity of anemia

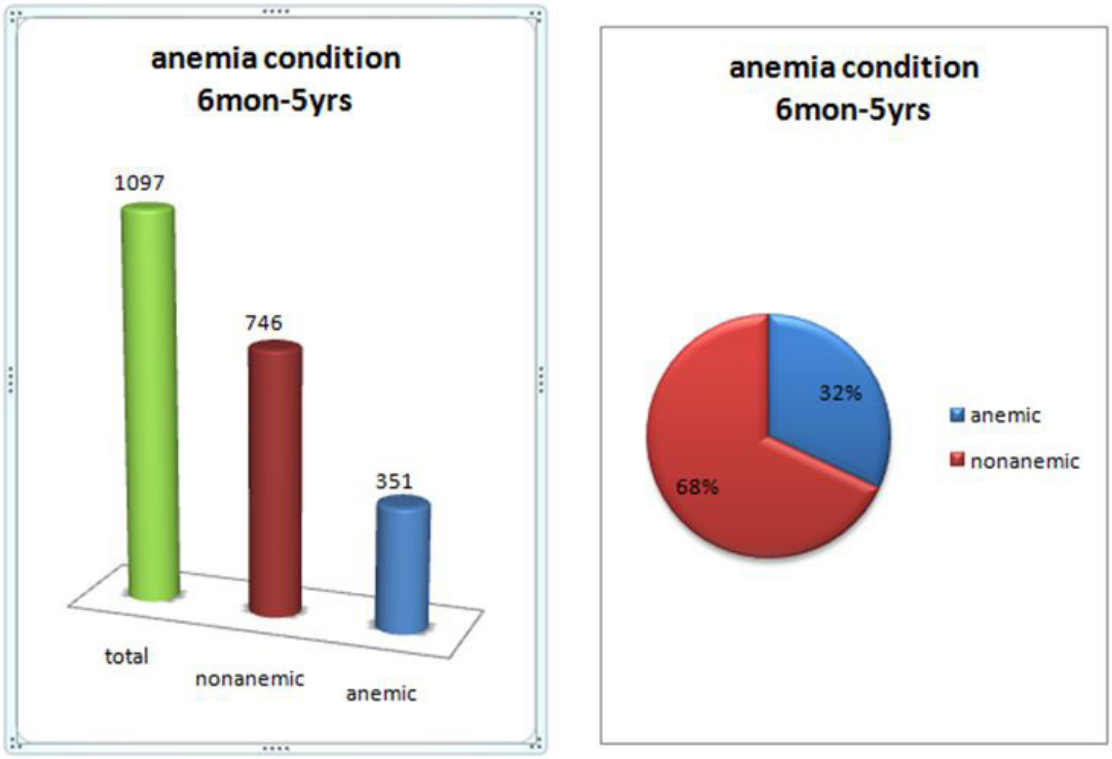


Figure 1a and 1b

In the age group 5 -12 years, it was found that the overall prevalence of anemia was 12.7% (N=80) (Figure 2a,b and Table 3a,b). The majority of anemic cases in children age 5-12 years 57.5% were of moderate type followed by 40% of mild type and 2.5% of severe type (Table 4). Mean hemoglobin value for children from 5-12 years was 12.8 g/dl.

			Anemia condition		Total
			Anemic>5years	Non-anemic	
Age	5-12 YEARS	count	80	551	631
		% within age	12.7%	87.3%	100.0%

Table 3a: 5-12 years * anemia condition

			Gender		Total
			male	female	
Age	5-12 years	count	374	257	631
		% within age	59.3%	40.7%	100.0%
		% of Total	59.3%	40.7%	100.0%

Table 3b: 5-12 years * Gender

			Severity of anemia			Total
			mild	moderate	severe	
Age	From 5-12yrs	count	32	46	2	80
		% within age	40.0%	57.5%	2.5%	100.0%

Table 4: 5-12 years * severity of anemia

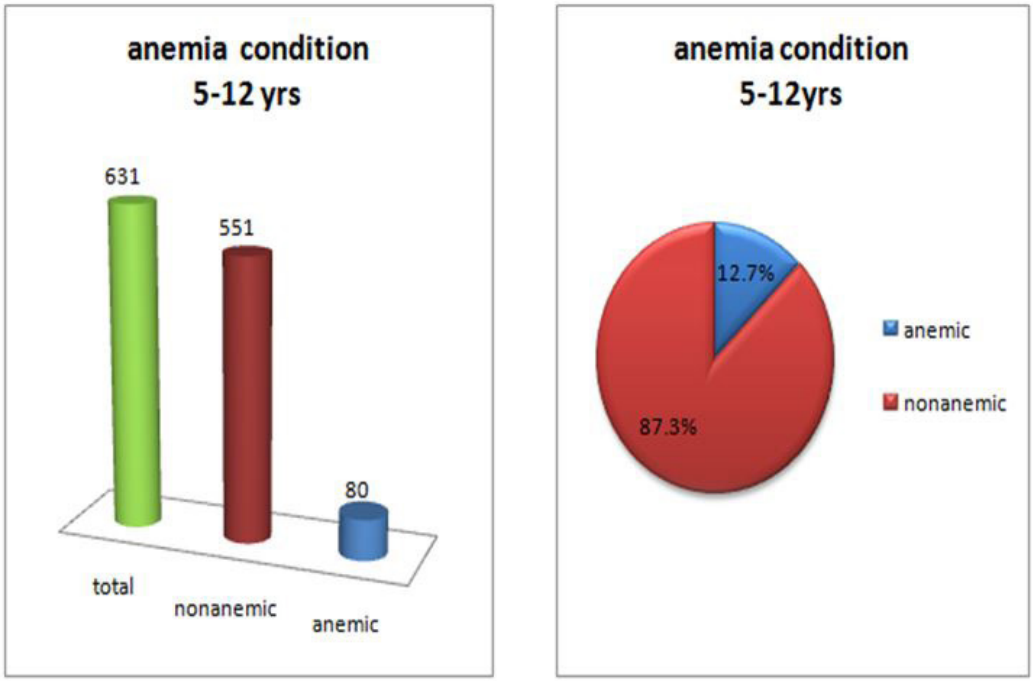
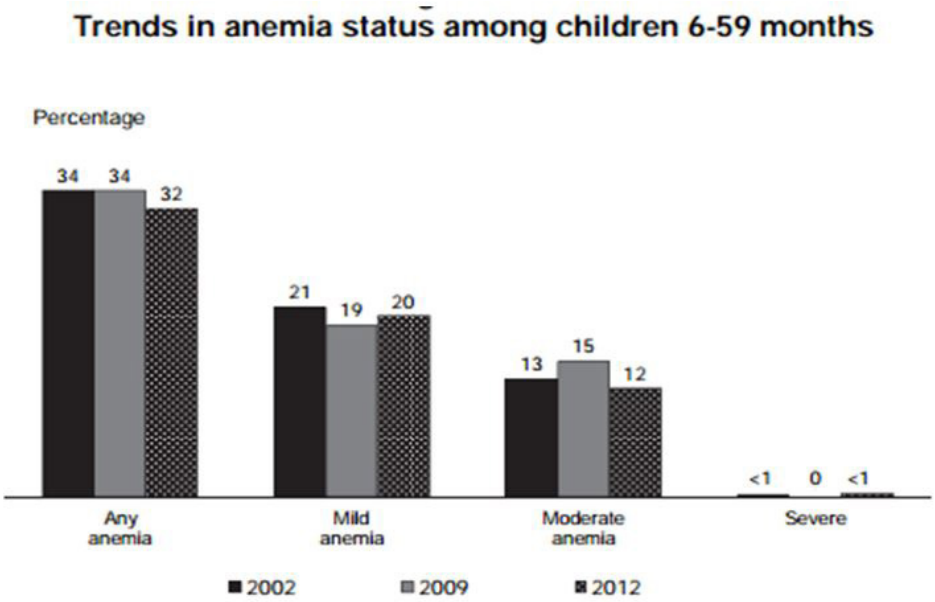


Figure 2a and 2b

Discussion

Childhood anemia is a major public health problem worldwide. It is associated with serious consequences including growth retardation, impaired motor and cognitive development, and increased morbidity and mortality. Anemia is common in children in Jordan. Among the children (6 months to 5 years), one-third (32%) of them are anemic, twenty percent (20%) are classified as having mild anemia and twelve percent (12%) have moderate anemia, whereas less than one percent (<1%) of these children are classified as having severe anemia. It has been found that among infants, prevalence of any anemia is at peak at age 6-8 months (61%), low at age 9-11 months (41%) and again high at age 12-17 months (54%), after which it declines linearly to a low of 17% for the age group 48-59 months. Anemia levels are having small differences between boys and girls, in rural and urban areas, and by region [10].

There has not been any significant change in overall prevalence of anemia in Jordan in the last ten years; only a minor decrease of two percent from 34% between 2002 to 2012 [10]. Our results are consistent with the result of Jordan population family survey 2012 [10] (Graph 1).



Graph 1: Jordan population family health survey (JPFHS), 2012 [10]

Anemia is one of the most common nutritional disorders among children in the Middle East and North Africa region [12]. Previous studies reported the prevalence of anemia in Saudi school-aged children to be 11.6%, where as 39.6% in Egyptian preschool children [13,14]. As per WHO classification, the prevalence of anemia is a global public health issue, that describes a mild problem at 5%–19.9%, a moderate problem at 20%–39.9%, and a severe problem at ≥40% [1]. Majority of Arab Middle East countries are found to be in the group of moderate to severe deficiency [15].

Based on our study findings and the reported results in the regions, to control and prevent anemia, a long-term plan can be developed as suggested by WHO i.e. a) Surveying the anemia problem, b) Assessing related programs and c) suggesting improvements to current programs or introducing new programs [16].

Conclusion

Given the high prevalence of childhood anemia observed in north of Jordan, particularly among those less than 5 years old, and given the negative consequences on their cognitive and behavioral development even in later years, there is an urgent need for effective and efficient public health interventions. In April 2002, Jordan began a wheat flour fortification program that included iron and folic acid, but despite this national fortification program there was no statistically significant change in the prevalence of anemia, indicating that other causes (in addition to iron deficiency) are responsible for anemia in preschool children.

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