



EVALUATION OF THE NUTRITIONAL STATUS OF SYRIAN REFUGEE CHILDREN AGED FROM 6 TO 59 MONTHS AT ZAATARI CAMP IN JORDAN

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ABSTRACT

Introduction: This study is to assess the nutritional status of children aged between 6 and 59 months of Syrian refugees at Zaatari camp in Jordan.

Materials and methods: This is a descriptive cross-sectional survey carried out at the military field hospital in Zaatari camp between January and December 2016. It covers children aged from 6 to 59 months and born in Zaatari camp. The evaluation of the nutritional status of those children was assessed by measuring those variables: sex, age in months calculated from the medical booklet issued by the camp authorities, Mid Upper Arm Circumference (MUAC) and Presence of edema.

Results: This survey involved 6986 children between 6 and 59 months of whom 3219 were boys (46.1%). The overall prevalence of malnutrition was 4.3%, 27 of whom were severely malnourished and 276 of them are moderate malnutrition. 79.9% of malnourished children were aged between 6 and 12 months. Malnutrition declined with age, girls were the most affected with a prevalence of 5.3% versus 3.3% among boys. This trend was statistically significant with $p < 0.001$. No cases of edema were detected.

Conclusion: Refugee children were most affected by malnutrition. Our work suggests strengthening the promotion of breastfeeding and family planning programs.

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INTRODUCTION

Child malnutrition is widespread over the world, it is defined as a medical condition due to a deficiency or an excess of one or more nutrients, linked to inadequate feeding in quantity and / or quality regarding to the nutritional needs of the child [1]. Malnutrition is particularly common among children under 5 years old. According to WHO, in 2014, more than 50 million children under five years old in the world suffer from malnutrition [2]. The common consequences of malnutrition include lack of growth, slow cognitive development, specific micronutrient deficiencies, decreased disease resistance and impaired quality of life. The prevalence of malnutrition for children is an indicator of the state of health in different countries. In developing world, malnutrition among children is mainly a major public health problem: its current prevalence is estimated to 7.5% and it's associated to more than the half of under 5 years old children deaths per year [2]. According to experts from the United Nations High Commissioner for Refugees (UNHCR) and the World Food Program, there is a worrying trend of increasing severe malnutrition in refugee camps: more than 20% of refugees

suffer from severe malnutrition in refugee camps in Kenya, Ethiopia and Chad, and children under 5 years are the most affected [3].

Actually, nutritional assessments are mainly based on anthropometric surveys aimed to provide the prevalence of malnutrition: low MUAC < 11.5 cm, low weight-for-height (< -3 z-scores of WHO standards) and / or the presence of edema, are independent internationally recognized diagnostic criteria for the diagnosis of severe acute malnutrition [4]. Myatt and al recommend the use of the MUAC to detect severe malnutrition because it is better in terms of simplicity, precision, sensitivity and specificity [5].

The objective of our study is to evaluate the nutritional status of children aged 6 to 59 months of Syrian refugees at Zaatari camp in Jordan.

MATERIALS AND METHODS

This study is a typical cross-sectional descriptive survey conducted at the military field hospital in Zaatari camp over a 12-month period between January and December 2016. It covers children aged 6-59 months Born in the camp Zaatari. Located 15 kilometers from the Syrian border, Zaatari camp is the largest refugee camp in the Middle East and the second

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largest camp in the world, opened in 2012, welcomes nearly 80,000 Syrian residents, 18.8 per cent of whom are Children under 5 years of age according to UNHCR 2016 data [6]. The average birth per day is 10 to 13 newborns [7].

In order to determine the prevalence of malnutrition and to characterize vulnerable groups in relation to malnutrition, the assessment of the nutritional status of children was carried out by studying the following variables: sex, exact age in months from the booklet Issued by the camp authorities, the value of the MUAC in cm and the presence of edema.

The primary endpoint was the nutritional status assessed by the MUAC measurement and classified into 3 groups according to WHO standards published in 2009 [4]. For example, severe acute malnutrition (SAM) is defined as MUAC less than 11.5 cm, moderate acute malnutrition (MAM) if MUAC was between 11.5 cm and 12.5 cm and MUAC was greater than 12.5 cm children were considered normal.

The statistical analysis was carried out using the SPSS version 19 software, the qualitative variables were described in terms of numbers and percentage, the comparison of the groups was studied by the chi-square test and the degree of significance p was 0.05.

RESULTS

This cross-sectional survey carried out at the military field hospital in Zaatari involved 6986 children between 6 and 59 months of whom 3219 were male, 46.1% and 3767 female, 53.9%. The mean age of the children was 20.8 months with extremes ranging from 6 months to 59 months. The age classes of the whole population were unequally in size: the 6 to 12-month class was the largest with 42% of the total, whereas children over 24 months represented only 30.3%.

On the different age groups there was a female predominance except for the age group of 37 to 59 months with a sex ratio of 0.9. Table 1 shows the Repartition of children by age and sex.

Table 1 Repartition of children by age and sex

Age	Female		Male		Total	
	N	%	n	%	n	%
6-12 months	1621	55.5	1301	44.5	2922	41.8
13-24 months	1058	54.4	888	45.6	1946	27.9
25-36 months	586	54.2	496	45.8	1082	15.5
37-59 months	502	48.5	543	51.5	1036	14.8
Total	3767	53.9	3239	46.1	6986	100

The overall prevalence of malnutrition was 4.3% (303 children), 27 of whom were severely acutely malnourished (0.4%) and 276 of moderate acute malnutrition (4%), children most affected by malnutrition Between 6 and 12 months, which means 79.9% of malnourished children.

Table 2 Repartition of children by age and nutritional status

Age	SAM		MAM		NORMAL		Total	
	n	%	n	%	n	%	n	%
6-12 months	25	0.9	217	7.4	2680	91.7	2922	41.8
13-24 months	2	0.1	54	2.8	1890	97.1	1946	27.9
25-36 months	0	0	3	0.3	1079	99.7	1082	15.5
37-59 months	0	0	2	0.2	1034	99.8	1036	14.8
Total	27	0.4	276	4	6683	95.7	6986	100

SAM: Severe acute malnutrition, MAM: Moderate acute malnutrition

Malnutrition declined with age, from 8.3% in children aged 6-12 months to 2.9% in children aged 13-24 months, and remained below 0.3% in the rest of the classes. This trend is statistically significant with $p < 0.001$ (Table 2).

Girls were more affected by malnutrition with a prevalence of 5.3% versus 3.3% in boys, this difference being statistically significant at $p < 0.001$ (Table 3). Note that no cases of edema have been detected.

Table 3 Repartition of children by sex and nutritional status

Nutritional status	Female		Male		Total	
	N	%	n	%	n	%
SAM	17	0.5	10	0.3	27	0.4
MAM	181	4.8	95	3	276	4
NORMAL	3569	94.7	3114	96.7	6683	95.6
Total	3767	53.9	3219	46.1	6986	100

DISCUSSION

Child malnutrition is a major public health problem in developing countries, causing 45% of deaths among children under five years of age in the developing world [8]. In an emergency situation malnutrition assessments using functional and metabolic tests are neither practical nor effective. Rather, we use anthropometric measurements. Four commonly used nutritional indices are weight / height, height / age and weight / age and MUAC.

In a refugee camp, the main benefit of MUAC compared to other nutritional indices, is that it is good or even better than others to identify children at high risk of death and detect SAMs earlier, before the onset of complications, which increases the effectiveness of management. It also has the highest ROC curve, making it the most efficient as a diagnostic tool [5]. Another advantage of the MUAC is that it is simple to use in refugee camps. The result is easy to interpret by staff as well as by mothers or families, unlike weight-for-height. The simplicity of MUAC measurement also makes it possible to do several measures, which is very important for detecting children at risk [5-9].

Children aged 6 to 59 months are vulnerable to malnutrition in refugee camps. By 2015, of the 93 UNHCR refugee sites, children aged 6 to 59 months were around 336 000, the prevalence of overall acute malnutrition was less than 10% in 54 sites, which means 58%, while 21 sites (22.6%) exceeded the emergency threshold by 15% or more [10]. In the present study, the prevalence of acute global malnutrition was 4.3% and remained in the figures targeted by the World Health Assembly to 2025 to reduce and maintain below 5% malnutrition in Children under 5 years of age [2]. The prevalence of malnutrition in our survey decreased with age in both sexes, unlike the children of Kahitar in India and Sanghar in Pakistan [11-12]. Girls were more affected by malnutrition than boys, and the age group most vulnerable to malnutrition was 6-12 months, the same results were seen in Khartoum in Sudan (13).

The low prevalence of global malnutrition among children from 6 to 59 in Zaatari camp compared to other camps and regions of the world where malnutrition remains a public health problem such as India, Bangladesh and sub-Saharan Africa Is due to the field work of all public health stakeholders: UNHCR, health facilities, UNICEF. The malnutrition management system at Zaatari camp is

composed of 11 health facilities offering care services for all syrian refugees and, in this case, children aged 59 months. These health structures are organized as a network in which the military hospital plays the role of the reference hospital for the management of diarrhea and malnutrition. This collaboration has enabled the success of programs to prevent malnutrition among children at Zaatari camp.

Infants in the 12-month-olds had the highest value of malnutrition, hence the need to promote breastfeeding, enhance dietary diversification and family planning programs.

CONCLUSION

The prevalence of malnutrition among 5-year-olds found in the Zaatari camp remained within the targets set by the World Health Assembly by 2025 (under 5%). Nevertheless, infants aged 6-12 months were more affected and the prevalence was higher at 8.3%. Our study suggests field work for the promotion of breastfeeding and the strengthening of dietary diversification practices in infants and family planning programs.

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