



Evaluation of Infectious Complications of Child Malnutrition after Nutritional Therapy in Refugee Communities

Alp Yildiz* and Aybala Yildiz

Department of General Surgery, Yildirim Beyazit University, Yenimahalle Training and Research Hospital, Turkey

***Corresponding Author:** Alp Yildiz, Department of General Surgery, Yildirim Beyazit University, Yenimahalle Training and Research Hospital, Turkey.

Received: July 25, 2019; **Published:** August 12, 2019

DOI: 10.31080/ASMI.2019.02.0335

Abstract

Introduction: Developmental follow-up is considered as the most important factor in health status of children and adolescents. The smallest issue in health and nutrition directly affects the growth and development, quality of life and indirectly a whole society, regardless of its etiology

Patients and Methods: 212 children aged 12-16 months were included in the study. The files of children who presented to the hospital for any type of infection were reviewed. Their anthropometric measurements were recorded. The measurements following treatment-rehydration in children with dehydration and diarrhea were included. The results were assessed using Waterlow classification. **Results:** Infection recurrence rate on 0-3rd months of nutritional therapy was %8.9, which was statistically insignificant ($p=0.156$). Mean infection recurrence rate was %6.1 on the 3rd-6th month period, which was significantly different ($p<0.05$). Mean infection recurrence rate between 6th-9th months was measured as %5.4, which showed a significant difference both in initial time and 3rd-6th month period ($p<0.05$), but showed no significant improvement when compared to the prior 3-month period ($p=0.236$). Annual analgesic-antipyretic medications (acetaminophen and ibuprofen) usage rate was 1.2 bottle/box prior to nutritional therapy and this number was reduced to 0.54 bottles/box, which was a significant decrease.

Discussion: By showing this situation with a scientific study, we would like to increase the awareness on child hunger in countries especially who accept refugees and that minimalizing the effects it has on children with proper social policies is a medical, moral and humane responsibility.

Keywords: Pediatric Malnutrition; Waterlow Classification; Infection

Introduction

Developmental follow-up is considered as the most important factor in health status of children and adolescents. The smallest issue in health and nutrition directly affects the growth and development, quality of life and indirectly a whole society, regardless of its etiology [1,2]. Child malnutrition is defined as the all pathological conditions mainly caused by insufficient/incorrect nutrition. This is a bigger issue in children with bad socioeconomical status

[3]. All around the world, the most important mortality causes in young children include diarrhea, pneumonia, measles and malaria. It is thought that malnutrition plays an important role in the disease-related mortality and is seen to affect over 50% of all those mortalities. Relative mortality risk was calculated as 8.4 in severe malnutrition, 4.6 in moderate malnutrition and 2.5 in mild malnutrition, which are still very high rates. Over 80% of the mortalities are seen in children with mild-to-moderate malnutrition [3-5], and

a throughout assessment of “child hunger” entity is crucial, especially in children of families who were affected by the current crisis in the Middle East and became refugees in other countries. In this prospective study, our main objective is to assess chronic malnutrition incidence rates and its effect on infection rates in children.

Patients and methodology

212 children aged 12-16 were included in the study. The files of children who presented to the hospital for any type of infection were reviewed. Their anthropometric measurements were recorded. The measurements following treatment-rehydration in patients with dehydration and diarrhea were included. The results were assessed using Waterlow classification.

Waterlow classification

Waterlow classification classifies malnutrition status as “wasted, stunted, wasted + stunted” in 3 different groups, according to age-related height and height-related weight. Wasted is defined as acute malnutrition with weight loss in children with normal age-related height. Stunted is defined as loss of height with relatively normal height-to weight ratio and chronic malnutrition, and wasting + stunting is defined as loss of both measurements, as a result of acute malnutrition on a chronic base (Table 1).

H/A W/H	>m-2 SD	<m-2 SD
>m-2 SD	Normal	Wasted
<m-2 SD	Stunted	Wasted and Stunted

Table 1: Waterlow’s Classificaion.
m=mean, SD=Standard deviation

In all children with acute or chronic malnutrition, Ministry of Health provides nutritional products. We only included 212 children with Waterlow Classification “stunted”. Their files were reviewed and the infections which require hospitalization in the last year were classified as acute upper and lower respiratory infections (AURI-ALRI), acute gastroenteritis (AGE) and acute urinary tract infections (AUTI). In all those patients, a nutritional supplement solution with a composition of 15.9% protein, 30.3% fat, 53.8% carbohydrates, osmolality 288 mOsm/kg water, osmolarity 244 mOsm/l, renal solute load 342 mOsm/l was used for treatment. Infection numbers and anthropometric measurement differences on the 3rd, 6th, 9th and 12th months were reassessed.

Children with metabolic and systemic/local diseases that cause an affinity for AGE, AUTI, AURI-ALRI, patients with systemic/local diseases which may cause immune system deficiency were excluded from the study. Also, patients who did not show up for regular check-ups, patients who did not follow the controlling recommendations during disease and patients whose families expressed that they would be unable to get their children to 3-month period follow-up visits were also excluded despite receiving nutritional support.

The results were assessed using chi-square and student-t tests in SPSS 17 software and significance level was set as p<0.05.

Results

In all children, total malnutrition occurrence rate was 42.2% in girls and 34.1% in boys, which showed a significant difference (p<0.05) and the mean rate was 38.15%. Out of 212 included children, 118 (55.6%) were female and 94 (44.3%) were male. Mean infection numbers which require hospitalization in a year was between 4 to 18 with a mean of 9.4 before nutritional therapy. Infection recurrence rate on 0-3rd months of nutritional therapy was 8.9, which was statistically insignificant (p=0.156). Mean infection recurrence rate was 6.1 on the 3rd-6th month period, which was significantly different (p<0.05). Mean infection recurrence rate between 6th-9th months was measured as 5.4, which showed a significant difference both in initial time and 3rd-6th month period (p<0.05), but showed no significant improvement when compared to the prior 3-month period 9-12 5.1(p=0.236) (Table 2).

	Pre-treatment	0-3 months	3-6 months	6-9 months	9-12 months
MIR	9,4	8,9	6,1	5,4	5,1
AA	1,2	1,1	0,81	0,84	0,54

Table 2: Mean infection rate per year (MIR) and Analgesic-antipyretic drug usage per year as bottle(AA) has shown.

Annual analgesic-antipyretic medications (acetaminophen and ibuprofen) usage rate was 1.2 bottle/box prior to nutritional therapy and this number was reduced to 0.54 bottles/box, which was a significant decrease.

When anthropometric values were assessed, 74 (34.9%) children showed improvement from stunted to normal growth.

Discussion and Conclusion

For a better understanding of the importance of child malnutrition, we must first carefully analyze the effects of malnutrition on the child's body. When the body is unable to get sufficient nutrition, the weight loss is usually muscle loss as the subcutaneous fat tissue is not enough in those children [2,6,7]. They have low muscle reserves, insufficient bone reserves and a relatively larger abdominal structure. This general reserve insufficiency might cause a very wide spectrum of pathologies, according to the specificity of the insufficiency [2]. The most important pathology and the one associated with highest mortality rates are infections. With increased infection frequency, morbidity and mortality risks also increase and this causes a vicious cycle as those conditions deepen the malnutrition. After this level, it becomes serious as it paves the way to life-threatening opportunistic infections. Latest studies showed that malnutrition negatively affects almost all working steps of immune system by negatively affecting cellular immunity, non-specific and antigen-specific immune response [8-10]. Savino., *et al.* study reported that this immune suppression is seen with severe thymic atrophy, thymocyte apoptosis and lymphopenia [11].

A group of classification methods were developed for assessing child malnutrition [12]. In this study, we used Waterlow Classification system for its simplicity and strong projective properties. The current status of the area and language and cultural barriers prevented us from conducting a more detailed assessment, which can be interpreted as a limitation of the study. However, as this is the first study that deals with the child hunger status of refugee communities, we think that we made important points in assessing the situation.

When the general status of refugee communities was reviewed, we can see that they are in a very bad place in terms of child hunger. Although special camps and hygienic living conditions were provided for refugees with free healthcare in every step and regular meal distribution, malnutrition rate among children were found to be 38.15%, which is very significant for projection, considering the children who were not yet relocated to a camp. This situation can probably be explained by the increased population growth, injustice among food distribution, bad nutritional habits

and poor educational levels [13]. We would like to underline that these educational and cultural differences are the main cause for the significantly higher malnutrition rates amongst girls.

Another subject we would like to discuss is the consumption of analgesics-antipyretics. Huemer's article published in 2015 reported that acetaminophen and ibuprofen might have complex immunological effects on cell proliferation, migration, antibody and cytokine production when used in pediatric period [14]. In this situation, in a group with such frequent infections and high usage of analgesic-antipyretic usage, malnutrition is another factor which deepens the immunosuppression caused by this condition.

To sum up, in communities with bad socioeconomical status, nutritional status of those children, who were dragged into these bad conditions due to the current refugee crisis with political reasons, is alarming and is causing serious infective occurrences, as shown in our study. Again as shown in our study, this improves dramatically with proper nutritional therapy. By showing this situation with a scientific study, we would like to increase the awareness on child hunger in countries who accept refugees and that minimizing the effects it has on children with proper social policies is a medical, moral and humane responsibility.

Bibliography

1. Dündar N and Dündar B. "Malnütrisyonlu çocuğun değerlendirilmesi". *SDÜ Tıp Fakültesi Dergisi* 13.4 (2006): 39-42
2. Rashidian F, *et al.* "Malnutrition in hospitalized children aged 3-18 years". *Journal für Ernährungsmedizin* 9.2 (2007): 13.
3. Pelletier DL, *et al.* "Epidemiologic evidence for a potential effect of malnutrition on child mortality". *American Journal of Public Health* 83 (1993): 1130-3
4. Balkan Ç E, *et al.* "Erzurum'da 0-5 yaş arası çocuklarda rotavirus ve adenovirus sıklığının araştırılması". *Türk Mikrobiyol Cem Derg* 42.2 (2012): 51-54.
5. Jonesm K D, *et al.* "Perinatal nutrition and immunity to infection". *Pediatric Allergy and Immunology* 21.4 (2010): 564-576.
6. Keusch G T. "The history of nutrition: malnutrition, infection and immunity". *The Journal of nutrition* 133.1(2003): 336-340.

7. Zapatera B., *et al.* "Inmunonutrition: methodology applications". *Nutricion Hospitalaria* 31.3 (2015): 145-154.
8. Chandra R Kumar. "Nutrition, immunity and infection: from basic knowledge of dietary manipulation of immune responses to practical application of ameliorating suffering and improving survival". *Proceedings of the National Academy of Sciences of the United States of America* 93.25 (1996): 14304-14307.
9. Gaayeb L., *et al.* "Effects of malnutrition on children's immunity to bacterial antigens in Northern Senegal". *The American Journal of Tropical Medicine and Hygiene* 90.3 (2-14): 566-573.
10. Akuzawa N and Naito H. "Nutritional parameters affecting severity of pneumonia and length of hospital stay in patients with pneumococcal pneumonia: a retrospective cross-sectional study". *BMC Pulmonary Medicine* 2015, 15.1: 149.
11. Savino W and Dardenne M. "Nutritional imbalances and infections affect the thymus: consequences on T-cell-mediated immune responses". *Proceedings of the Nutrition Society* 69(2010): 636-643.
12. Grover Z. "Protein energy malnutrition". *Pediatric Clinics of North America* 56.5(2009): 1055-68
13. Güleç SG., *et al.* "Hastanede yatan üç yaş altı çocuklarda malnütrisyon durumunun değerlendirilmesi". *Şişli Etfal Tıp Bülteni* 45.4 (2011): 124-129
14. Huemer HP. "Possible Immunosuppressive effects of drug exposure and environmental and nutritional effects on infection and vaccination". *Mediators of inflammation* 7(2015):1-7

Volume 2 Issue 9 September 2019

© All rights are reserved by Alp Yildiz and Aybala Yildiz.