

ORIGINAL ARTICLE

Treatment Outcome of Kwashiorkor in Children as Per World Health Organization Guideline at Nutrition Stabilization Center Multan, Pakistan

Saadia Khan, Reema Arshad, Muhammad Tauseef Sultan, Summera Tabasum, Nazia Batool, Tehseen Ikram

ABSTRACT

Objective: To assess the treatment outcomes and associated factors among children with kwashiorkor (Edematous Severe Acute Malnutrition) at Nutrition Rehabilitation Centre the Children Hospital and The Institute of Child Health, Multan.

Study Design: Retrospective Descriptive research.

Place and Duration of Study: This study was planned at the nutritional rehabilitation center of The Children Hospital and The Institute of Child Health, Multan from 01 January 2012 till 30 December 2020.

Materials and Methods: The record register of stabilization center was utilized to gather the required information for the study. Baseline statistics and medical signs and symptoms of kwashiorkor, complications and treatment outcome of children were recorded. Patients of age 1 month to 60 months with kwashiorkor (weight/height less than -3SD with edema) were included who were treated according to WHO guidelines for Severe Acute Malnutrition (SAM).

Results: during the year 2012-2020, a total of 2393 children were admitted with severe acute malnutrition out of which 222 (9.4%) were edematous SAM (Kwashiorkor). 222 kwashiorkor patients 25 (11.2%) were less than 6 months while 197(88.7%) were more than 6 months old. 120 (54%) were males and 102 (46%) were females. Out of total kwashiorkor patients, 40% presented with diarrhea, about 30% had pneumonia, hypoglycemia was recorded in 10% children, Urinary Tract Infection 15% and other diseases like celiac disease nephrotic syndrome and complication included the 5% of total. Almost 90% of patients recovered and got discharged and 8% passed away, only (2%) patients left against medical advice (LAMA).

Conclusions: Kwashiorkor is the second most prevalent form of severe acute malnutrition in south Punjab and usually difficult to diagnose due to masking effects of edema. Kwashiorkor can be successfully managed by using the WHO guidelines for sever acute malnutrition. WHO guidelines also show treated patients discharged mostly with a lower percentage of mortality and comorbidities.

Key Words: *Edema, Kwashiorkor, Protocols, Severe Acute Malnutrition, Treatment Outcome, World Health Organization Guidelines*

Introduction

Malnutrition is a significant universal issue and nearly 20 million children under five years of age are facing this disastrous problem mainly in third world countries.^{1,2} Malnutrition is also a major contributor in about half of pediatric mortalities in under five years of children. Malnutrition in children below 5 years suffers the most from severe acute

malnutrition as it hinders their growth, physical and mental development and decreases their IQ levels as well.^{3,4}

According to National Nutrition Survey 2018, in Pakistan 28.9% of children are underweight, 17.7% are wasted and while 40% are stunted.⁵ Severe acute malnutrition and protein energy malnutrition works havoc on every physiological system of the human body. All the bodily systems start shutting down and slowing leading to reductive adaptation of all body functions.^{6,7} In 1999, WHO established protocols for the treatment and handling of under five-year-old pediatric population suffering from SAM. For the meticulous treatment special therapeutic formulas and diets were designed with all the macro and micronutrients in the desired amount to facilitate the rehabilitation of SAM children. WHO protocols

*Department of Preventive Pediatrics
The Children's Hospital and the Institute of Child Health, Multan*

Correspondence:

Reema Arshad

Research Associate

Department of Preventive Pediatrics

The Children's Hospital and the Institute of Child Health, Multan

E-mail: reemaarshad0@gmail.com

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are roughly classified in a couple of stages, the initial stage of management is known as stabilization phase and the second phase of recovery and weight gain is known as the rehabilitation phase.^{8,9}

Malnutrition is dominantly classified into marasmus, kwashiorkor, and marasmic kwashiorkor.^{10,11} Kwashiorkor (Edematous malnutrition) is a severe form of childhood malnutrition defined by oedema. If advanced, there may be vomiting, diarrhea, anorexia, loss of muscle mass, growth, loose subcutaneous tissues, dermatitis, and increased susceptibility to infections, and edema which can mask the weight loss.¹² Eventually, there is stupor, coma, and death due to Infection, sepsis, electrolyte imbalances, and heart failure.^{13,14}

The CH & ICH, Multan is providing health care facilities to the SAM children of South Punjab as well as Baluchistan as burden of SAM is high in these areas due to illiteracy, myths, food insecurity and recent natural disasters. There isn't much data available regarding treatment outcomes of kwashiorkor using WHO guidelines in hospital facilities and in outpatient departments as well. Our study research was carried out to figure out the occurrence, presentation and treatment outcomes of kwashiorkor using WHO guidelines for SAM among the children who were admitted and treated in Nutrition Rehabilitation Center of the CH & ICH, Multan by using WHO feeding protocols.^{15,16}

Materials and Methods

Retrospective descriptive research was organized at Nutrition Rehabilitation Centre the Children Hospital and The Institute of Child Health, Multan from 1st January 2012 to 30th December 2020. The samples were children suffering from severe acute malnutrition as defined by WHO: "a very low weight for height (below -3 z scores of the median WHO growth standards), by visible severe wasting, or by the presence of nutritional oedema."³ Permission was taken from the IRB committee of the institute (reference #CHC200120). A questionnaire was designed by the lead investigator to collect the desired information and trained staff nurses of nutrition rehabilitation center collected the data. The required data was collected from record registers and files of nutrition rehabilitation center also known as the stabilization center. Main variables were age, gender, and treatment outcomes. The

patients were treated as per protocols defined by the world health organization for SAM. The treatment of SAM patients is divided into two phases the initial phase is known as Management phase and the second phase is known as Rehabilitation phase predominately characterized by reduction of oedema and weight gain in child with return of appetite. Therapeutic feeds F75 and F100 were given to patients during hospital stay. F-75 is a starter formula fed to children who cannot intake regular food, it contains 75 kcal/100 ml and 0.9g protein/100 ml and F- 100 is the 'catch-up' diet started after the child the child has been stabilized and enters rehabilitation phase. F-100 has 100kcal and 2.9g protein per 100 ml. Upon admission at nutrition rehabilitation center, 2hourly F75 feed was started, 100ml/kg/day.^{7,8} The therapeutic feed intake of every patient was recorded on a 24-hour intake chart. F100 was added in transition phase. Throughout the recovery stage, also known as rehabilitation, phase the number of feeds were decreased to only six times/day and the quantity was increased up to 220ml/kg/day. The feeding pattern and amount consumed during each feed was written on the daily feeding chart. All the patients admitted to nutrition rehabilitation center were examined for anthropometry daily including weight, height and MUAC on WHO standardizes anthropometric equipment, and the appetite and general demeanor of patients was also noted. When all the food related complaints were resolved, appetite improved, the intravenous antibiotics were finished, , the child started gaining weight 10gm/kg/day and edema settled and caregiver of child was trained to feed and look after the child at home, to look out for danger signs, the child started smiling, the patients were discharged from the nutrition stabilization center. Treatment outcomes comprises of whether the child reached desirable weight/height (wt/ht) ratio i.e., less than -2SD or resolution of edema, discharged after treatment, discharged on request DOR, expired/death, left against medical advice LAMA. The data was analyzed statistically using SPSS version 20.0, Mean, medians and percentages were calculated accordingly.

Results

Overall, 222 children with kwashiorkor were included in the research (Fig1). Of the 222

respondents 120 (54%) were males and 102 (46%) were females. 25 (11.2%) were less than 6 months while 197(88.7%) were more than 6 months (Table I). 70% were from rural areas while 90% of the total belonged to poor socio-economic status. Out of total kwashiorkor patient 40% were presented with diarrhea, 30 % children had pneumonia, (table II). Total of 198 (90%) children were discharged from ward after being treated and stabilized and 8% passed away due to complications, rest of 2% Left against medical advice (LAMA) and discharge on request. Only 5 patients developed refeeding syndrome while the majority 75% developed pneumonia, 50% diarrhea as complication.

Table I: Demographic Characteristics (n=222)

	Total	Percentages
Gender		
Male	120	54%
Female	102	45%
Residence:		
Urban	67	30%
Rural	155	70
Age:		
Age under 6 months	25	11%
Age more than 6 months	197	89%

Table II: Clinical Presentation at Time of Admission (n=222)

Illness	Total
Diarrhea	97 (44%)
Pneumonia	69 (31%)
Urinary tract infection	54 (24%)
Hypoglycemia	23 (10%)
Other complications (celiac disease, nephrotic syndrome)	11(5%)

Discussion

Current study assessed the presentation and treatment outcomes of kwashiorkor according to WHO guidelines at nutrition center Multan. In our study among all the children admitted during study period only (9.4%) were edematous SAM (Kwashiorkor) and among the kwashiorkor children majority were boys from rural areas with low socioeconomic level. This signifies the socio-economic indicators affecting the nutrition level of under children. Most of the patients were discharged after getting treated successfully. While a study reported (8.1%) cases of kwashiorkor.¹⁷ Lack of proper knowledge regarding feeding and

complimentary diets, and poor socio-economic status were major factors associated with kwashiorkor.

In this study the majority of patients were between 6 to 24 months. Among all , 11.2% were below six months of age while 88.7% were between 6-60 months, 54% were boys and 46% were girls contrasting to study where (64.3%) were females.^{18,19} Similar results were shown by a study where majority of patients were between 13 to 60 months.⁴ Among the results by different studies conducting in Pakistan on severe acute malnutrition, more boys are documented to be suffering from Severe acute malnutrition as compared to girls.^{20,21} Which is contrasting to the social context and gender discrimination and cultural significance given to boys. In common households in Pakistan, boys are given preference over girls regarding everyday care, and well-balanced nutritious meals comprising of proteins and meat. Still more boys are documented with kwashiorkor and SAM than females. It can also be since girl child is not brought the hospitals for treatment, and they expire due to untreated SAM in homes. More in depth data regarding this gender disparity of Kwashiorkor children is required to make apt analysis.

In our study 90% of children were discharged after getting recovery and treated. 8% of patients expired due to complications, however another study showed 60% of children getting discharged and 10 % expiries .¹⁵ The usual duration of admission in our study was 10-12 days with the weight gain of 10mg/kg/day with F-75 formula feed. Same numbers were also noted regarding limited hospital stay and low income by Aliyu et al but contrasting to a study in which avg stay was 24.5 days.^{22,23} The need for shorter hospital stays has been reported by numerous studies and thus a new CMAM program was introduced to address this issue.

Sepsis and infections were significant risk issues in our study and comparable findings were noted by Aliyu et al.^{24,25} The most common infections included 40% diarrhea/loose motions and 30% children had pneumonia 30%, hypoglycemia was present in 10%, UTI in 15% and other disease like celiac disease nephrotic syndrome and complication included the 5% of total. Major presenting symptoms were grading 3 edema 90.9%, followed by poor appetite

85.5%, fever 69.8%, diarrhea and dermatitis 67.5% each similar results were reported by study.¹⁹ 52.2% developed eye signs with the majority having eye redness, 51.8% had hepatomegaly while 33.7% had hair changes.

The WHO guidelines for treatment for kwashiorkor are beneficial and prove to be effective. However, limited health facilities, less awareness, low socioeconomic status, and short hospital stay are major factors that hinder effective outcomes. Our study has limitations regarding time duration and limited resources. A major study on the national level including all nutritional rehabilitation centers following WHO protocols needs to be conducted to provide more accurate details about the application, implementation, and results of WHO Community management of acute malnutrition program.

Conclusions

Kwashiorkor is the second most prevalent form of severe acute malnutrition in south Punjab and usually difficult to diagnose due to masking effects of edema. Kwashiorkor can be successfully managed by using the WHO guidelines for severe acute malnutrition. WHO guidelines also show treated patients discharged mostly with a lower percentage of mortality and comorbidities.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

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DATA SHARING STATEMENT

The data that support the findings of this study are available from the corresponding author upon request.

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