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International Journal of Pediatrics and Neonatal Health

Research Article ISSN 2572-4355

Knowledge, Attitude and Practice of Women Regarding Diarrheal Diseases in Children Under Five Years Old, In Emergency Pediatric Hospital, Khartoum, Sudan, 2017

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Abstract

Background: Diarrheal diseases remain a major public health burden in developing countries. It is estimated that around 1.7 million cases of diarrhea in children less than five years old reported annually and around 525000 of these are deaths each year. ORS therapy, zinc and continue breast feeding are low cost effective methods in decreasing morbidity and mortality. Children under five can't take care of themselves. so mothers had great role toward their children This study conducted to study Knowledge, attitude and practice of women regarding diarrheal diseases in children under five years old, in general Pediatric Hospital, Khartoum ,Sudan,2017

Methodology: This a descriptive cross-sectional hospital- based study conducted in the three major Emergency Pediatric hospitals in Khartoum state, 2017. Data was obtained from 184 mothers who had child admitted in hospitals and had child with diarrhea using structured questionnaire. Data was analyzed using SPSS 19 programme.

Results: 44%percentof mothers of children under-five were between 23-29 years old. Only 14.7% were university graduates .48.6% of children were less than one year and the majority of them58.2% were male. Regarding knowledge 51.7% of mothers didn't know the correct definition of diarrhea and 95.7% think that teething is the cause of diarrhea .Regarding practice of mothers during diarrheal attacks, only 29.6% of mothers seek medical help. About 14.3% of mothers use ORS and others give complementary fluids. About 30.9% of mothers use traditional method for diarrheal management and 16.8% give self-medication.

Conclusions: The study concludes that the knowledge, attitude and practice of mothers about diarrheal diseases were relatively good which may be influence by hospitals setting. Children less than one years old were more vulnerable to diarrhea than other age groups. Low knowledge regarding the correct definition of diarrhea and the possible causes of diarrhea .Large number of mothers believe that teething is a major cause of diarrhea in children under five years old. Regarding practice during diarrheal attacks ,mothers didn't increase the amount of fluids intake or breast feeding during diarrhea and they use antibiotic without medical advices. Very small numbers of mothers uses ORS in the management. Also the management was influenced by cultural and social misbelieve. Most mothers seek health services when home management was fail. So, we should increase knowledge of mothers about diarrhea and correct misconception through health education sessions.

Keywords: Children, Mothers & Diarrheal Diseases

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Citation: Reem Alfatih Thabit (2019), Knowledge, Attitude and Practice of Women Regarding Diarrheal Diseases in Children Under Five Years Old, In Emergency Pediatric Hospital, Khartoum, Sudan, 2017. Int J Ped & Neo Heal. 3:1, 7-26.

Received: March 05 , 2019
Accepted: March 12, 2019
Published: May 31, 2019

Introduction

Background

Diarrhea is a major cause of morbidity and mortality worldwide especially in children under five years in the developing countries. Diarrheal disease is the second leading cause of death in children below five years. Each year, Around 1.7 million cases reported each year of those 525000 deaths was reported in children under five years. Diarrhea is defined as passage of stool three times per day or more as it takes the shape of container or(change in person habit or the period between two episode is 48 hours of normal stools)(3, 17). Diarrhea is usually a sign of gastrointestinal infection .It can be caused by many organisms (17, 21). Bacteria like Escherichiacoli, campylobacter ,salmonella and shigella or viruses like adenovirus ,rotavirus and caliciviruses or parasites like entamoeba histolytica and giardia lamblia (3,21,32) The most fatal form of diarrhea is cholera which caused by vibrio cholera, a gram-negative entero-bacteriacea which lead to death due to sever fluid loss. Determining causative agent of diarrheal episode is difficult even at a modern hospital with good diagnostic labs (29,32). Diarrhea can be transmitted by different ways; from animal or person to person or through contaminated food and water as result

of poor hygiene. The major threat is dehydration when there is failure to replace the lost fluid. (17, 21) Diarrhea is a preventable disease through good hygiene, good disposable sewage, safe drinking water, and breast feeding and health education. ORS play a major role in treatment and most of the time no role for antibiotics in treatment (17, 18, 2). ORS can be prepared at home and can reduce mortality up to 93% (33). In addition to ORS therapy, zinc and continue breast feeding play major roles (3, 6.). Socio-demographic factors that contribute to the risk of diarrhea include maternal and child age, immunization status, hygiene and sanitary facility gender and birth weight. Around 780 million people lack access to improved drinking water and 2.5 billion lack improved sanitation. The high prevalence of diarrhea present at age 6 month to 18 month due to introduce of food at this age, so caregivers should care about food safety. Most of children die from diarrhea due to severe dehydration and the vulnerable group are malnourished and IC like HIV (3,17, 18, 21, 22, 29).

Problem statement

In Sudan, diarrheal diseases consider a major danger to the people especially children less than five years. Diarrheal diseases ranked the second prevalence disease in Sudan the annual reported deaths of children less than five year due to diarrhea was 10.3% of deaths. About 31.4% of Sudanese population had no access to sanitary facilities and about 54% are drinking from unimproved water sources (5,34). Mothers have pivotal role so, if we educate them and increase their awareness, they will increase the total awareness of their family and can play a major role in preventing disease especially their children. There is strong association between diarrheal diseases and mother's education and socioeconomic status. Every one year in mothers education reduces mortality of children under 5 year old about7-9%(18,21,22).. KAP studies aimed to assess and improve knowledge of communities regarding diseases which had marked deficiency in level of education in population at risk. So, Health education programme aimed to evaluate community participation to control preventable diseases like diarrhea. This study performed to assess knowledge, attitude and practice of women regarding diarrheal diseases in children under five years, in general Pediatric Teaching Hospital, Khartoum, Sudan 2017.

Justification

In my study these hospitals are the major hospital in Khartoum state so, can provided different ethnic group traditions, beliefs, practices and culture habit and almost all studies have been done regarding mothers knowledge on diarrheal diseases at community level. So if we find that their awareness is poor we shall stress medical staff to take awareness issue in consideration with students participant

Objectives

General objectives

To determine Knowledge, attitude and practice of women regarding diarrheal diseases in children under five years old, in Emergency Pediatric Hospital, Khartoum, Sudan, 2017

Specific objectives

1. To assess the knowledge of mothers on diarrheal diseases regarding
- Definition.
- causes.
- Method of transmission.
- Complication and body loses.
- Sign of danger.
- Method of prevention.

2.To identify the attitude of mothers regarding diarrheal diseases and its causes, prevention and management.

3.To determine the practice of mothers on management of diarrheal diseases.

4.To find out the association between knowledge, attitudes and practices of mothers regarding diarrheal disease with selected demographic variables.

Literature Review

Burden of diarrhea

MDGs were implemented by countries in 2000 to decrease the gap between rich and poor countries. MDG4 is considered to reduce mortality rate of children under five years old by two third in 2015, valid information about causes of deaths in children less than five years old help decision makers to prioritize needs for treating and evaluation of health problems in developing countries. Unfortunately there's scare of data in low income population where they are needed assessment and evaluation.

Synder and merson in 1980, one of earlier studies to assess burden of diarrheal disease worldwide, but they doesn't consider the epidemiological difference between countries. So WHO and UNICEF coordinated CHERG whom are independent technical specialist group in 2001 to estimate main causes of childhood deaths by reviewing the literature. They found that 19% of deaths in 2004 are due to diarrheal disease, 78% in Africa and South East Asia. (1) three quarters of deaths was found mainly in 15 countries listed in Pic 1(4).

FIGURE 4 Nearly three quarters of child deaths due to diarrhoea occur in just 15 countries

RANK	COUNTRY	TOTAL NUMBER OF ANNUAL CHILD DEATHS DUE TO DIARRHOEA
1	India	386,600
2	Nigeria	151,700
3	Democratic Republic of the Congo	89,900
4	Afghanistan	82,100
5	Ethiopia	73,700
6	Pakistan	53,300
7	Bangladesh	50,800
8	China	40,000
9	Uganda	29,300
10	Kenya	27,400
11	Niger	26,400
12	Burkina Faso	24,300
13	United Republic of Tanzania	23,900
14	Mali	20,900
15	Angola	19,700

CDC report in 2012, Diarrheal disease is a second leading cause of deaths approximately 1 in 9 child deaths worldwide. The risk of death increase 11 times in HIV+ child. diarrhea can be prevented by low cost, effective methods. In 2012 diarrheal disease kill around 11% of children fewer than five years old 88% of them are due to WASH. 40% of cases in hospital are due to rotavirus. Prevention of diarrhea is a multidisciplinary work including governmental, non-governmental facilities and communities through vaccination, safe WASH,, breast feeding and mothers education.(2)

UNCIEF 2016, 8% of child deaths is due to diarrhea around 450000 children per year. Most of cases occur in Africa and South Asia and the highest incidence occur in children below two year. From 2000 to 2016, there's decrease in total number deaths by more than 50% they estimate the reduction in death despite insignificant reduction in incidence due to improvement in management and education of mothers and nutrition(6). GAPPD set frame to save children lives (protect, prevent and treat). Protection methods are exclusive breast feeding for the first six months protect child from disease and reduce diarrhea by half, continue breast feeding and starting complementary feeding by age of six month increase immunity and protect child from diarrhea and vitamin A which reduce diarrhea by 15% and deaths by 24% by giving 2 high doses of vitamin A in countries with high death rate of under five years old. Prevention through immunization, safe WASH. Hand washing alone reduces risk by 40%. Recommended treatment methods are ORS, continue feeding and zinc supplements. Only 40% of children receive this package and mostly in urban area than rural area (3).

Diarrheal disease is transmitted feco-orally. Many pathogens can cause it like viruses, bacteria, protozoa and helminthes. Many genetic method are able to identify and differentiate organisms and their virulence factors. There's strong relation between poverty and diarrheal disease which associated with poor house setting, lack of clean sufficient water, presence of domestic animals and poor sanitation and its decrease ability to provide balanced food for their infected child and seek medical care. They mainly depend on traditional treatment. They found that increase incidence in Africa and Latin America mainly in infant age .Early childhood age are more susceptible to decrease growth and cognitive functions. Kotloff in 1999 estimate that113 million episodes are due to shigella infection which is a cause of severe diarrhea and threaten 600000 children per year. In 1980 modern management guidelines was introduced which include mother counseling to start home fluid replacement, ORT therapy, continue breast feeding, limit the use of medication, encourage mothers to increase intake (6). Study in 2000 by victora about the effect of ORT in mortality rate reduction found that there's dramatic reduction in mortality rate due to increase in ORT (7). Cohort study in Brazil 2002

found that diarrhea can affect cognitive and psychomotor function of children as long term effect with early childhood diarrhea (8).

Breastfeeding's provide satisfactory nutrients for survival, growth, and development of children. . WHO recommended exclusive breastfeeding for the first six months of life and introduction of complementary foods after that with breastfeeding to two years of age (9). Exclusive breast feeding prevents from exposure to pathogens and provides antimicrobial factors so it protect from diarrheal episodes in first six month of life. Meta analysis by WHO 2000 reduce mortality infant rate by 61times than non breast feed infant. Complementary feeding after six month protect child from malnutrition which is a risk factor for diarrhea and vice versa (6, 7). In large trials in 14 countries they attempt to provide complementary food for different cultural setting and poor families to be willing to prepare it. In 2003, Rotaviurs account of one third of sever fatal diarrhea in developing countries (6).

According to WHO programme safe water better health, 88% of diarrheal cases worldwide are due to unsafe water inadequate sanitation and poor hygiene practice. Worldwide 780 million lack accesses to safe water and 2.5 lack access to good sanitation in developing countries. In Sudan 54% has access to safe water 31.4 % adequate excreta disposal .Unfortunately, communities where diarrhea is a leading cause of morbidity and mortality they lack the capacity and the resources to water free from sewage(5,15). A primary source of diarrheal pathogens is human feces (6). Water, sanitation and hygiene (WASH) focus in six element safe water for drink, improve sanitation and hygiene, responsibility to international emergencies and outbreaks, controlling and eliminating diseases, identify and characterize disease, educating and training global. WASH aim to reduce poverty and improve socioeconomic status. Improvement in water sources, sanitation and hand washing reduce morbidity by 21% ,37.5% and35% respectively (15). CDC define hygiene as behavior to improve health through frequent face and hand wash and bathing with soap and water it estimated that washing hand with water and soap reduce mortality by 50% and incidence by 33% (6, 11). In 2008 a World Bank Release on Hand Washing with Soap (HWWS) programme in Kenya was aimed to curb diseases like cholera and diarrhea infections(12) WHO in 2005 reported that Household Water Treatment and Safe Storage (HWTS) that more than 1 billion has no access to safe drinking water, simple and cheap method can make an immediate impact like Household water treatment and safe storage (HWTS) techniques which dramatically increase water quality and reduce the spread of waterborne diseases so if we prevent contamination of water during collection, transport, and storage at home this will prevent a serious risk to health for millions of households in developing countries. The Water and Sanitation Extension Programme (WASEP) project, which undertook in some villages in northern Pakistan between 1997 and 2001, was design method to improve water supply, sanitation and awareness and practices about hygiene behavior. Children doesn't live in WASEP villages had increase incidence of diarrhea than those doesn't live in WASEP villages (13).

WHO recommended method for diarrheal management including ORS, zinc supplement, continued breastfeeding and complementary food and selective appropriate antibiotics. (6) Only 38% of sub-Saharan countries provides ORS and 4% receive zinc worldwide about 45% in urban areas receive ORS compare to 39% in rural areas. WHO/UNICEF recommended a new Oral Rehydration Solution (ORS) formula and zinc supplementation to offer much improved outcomes for the management of childhood diarrhea. This recommendation looks to decrease child susceptibility to diarrhea after episodes and prevent deaths by increase awareness of health-care providers and mothers about zinc supplementation. . Zinc supplement should be given for 10 to 14 days during and after diarrhea (6). Even though ORS formula was proven to be effective, the researches continued to develop an improved formula that provides more hydration and decreasing the output. As a result, new ORS formula with low glucose and sodium concentrations was developed and this is proved to be more effective to decrease the need for intravenous therapy, reduce stool output, and vomiting(6).

A hospital based study in Karachi, Pakistan showed that72% of mothers can define diarrhea correctly and they consider teething, falling, eating mud and devil eye as causes of diarrhea. 25% of mothers give ORS to their children and 30% of them give self medication (27)

A cross sectional hospital based consecutive study in India found that 78.7% of mother was illiterate and had poor knowledge .Only 4% of mothers know the correct definition of diarrhea. The home management during diarrhea influenced by social and cultural misbelieves, 42.7% believe that solid food worse condition.92% of mothers consider bottle feeding during diarrheal episodes. 73.9% of mothers continue breast feeding during diarrheal attack, 80% of mothers were aware about ORT but only 63.4% practice it because the mothers complained that their children didn't taste it. 69.5% of those practicing ORT they over diluting solution (14)

A systemic review was done toward diarrheal disease among children in India 2012 found that major risk factors for diarrheal diseases were young age, poor socioeconomic status, malnutrition, poor maternal literacy, sibling under five, birth weight, breast feeding, poor WASH. Knowledge of ORT therapy was 73% and only 43% of women use ORT for management.16% and 30% of children were treated by antibiotic and unknown drugs, respectively. 86% have improved drinking water sources. (16)

Study conducted in Bengal about risk correlates of diarrhea in children less than five years. Most of participants are female below the age of one year and they found that the prevalence is higher in those who are bottle feeding compared to those who exclusive breast fed less than six months. There's greater impact of immunization, nutritional status and socioeconomic factors on child health. Under nutrition increases diarrheal risk by 14.4 than normal child. (19)

A study was in Saudi Arabia in primary health center in Abha they reported that higher incidence of diarrhea in children age7-12 months and female gender. (20)

A community based study in Ethiopia2012, reported that there's significant association between diarrheal disease and mother education, child age and maternal hand washing and there's no association between WASH principles and diarrheal occurrences. In this study children age between 6 to 23 are more vulnerable to diarrhea. Proper hand washing before giving food has great impact in diarrheal disease prevention. Regarding the management of diarrhea at home large numbers of respondents didn't do anything. 62%of mothers were illiterate (18). Other study in Ethiopia found that mothers age, education and occupation affect mothers knowledge about diarrhea and its management, mothers above 45 years old because of current accessibility to education aren't available at that time .66.6% of mothers think poor hygiene is a cause of diarrhea. Most of mothers give hard and dry food and decrease the amount of fluids intake. The mothers lack knowledge about ORS and correct method for usage (21).

Sierra Leone is ranked with the worst countries of maternal and child health with high incidence of mortality rate a community based study in rural Sierra Leone conducted. About 55% of mothers was illiterate. Only one household had washing hands with soaps practice , 57.8% had tap water sources and 93.9% had sanitary latrines. 43.9% of mothers

knew that they should increase fluid intake during diarrhea and only 1.1 knew how to prepare ORS. 26.6% don't how to prevent diarrhea. (22)
Hospital based cross sectional study in Assiut hospital, Egypt showed that there's association between mothers education and their Knowledge. 68.7% of respondent live in rural areas despite that mothers had positive attitude regarding diarrhea (28)
WHO reported that mortality rate of children under five in Sudan, 2009 were 13.1 (24). A study conducted in Northern Sudan in 2000 .They found that diarrhea is significantly associated to sex and age of child, residence, crowding, income, sanitation, water sources and vaccination. Being male at age of 6-35 months living in rural area and low standard level of living increase vulnerability to diarrhea. Also they notice 58.5 % of mothers was illiterate and 50.9% lived in rural area, 38% has no sanitation (23)
Other study conducted in Sudan to reduce child mortality by preventing diarrhea. They study sanitary condition, education level of mothers, water cleanness and regional difference. Sanitation and proper sewage disposal is significantly associated with diarrheal incidence. Despite good sanitary latrines, they found individual level sanitation decrease diarrheal episodes but shared community latrines increase rates of diarrhea. Also the education level of mothers without good socioeconomic situation doesn't decrease diarrheal rates. (24)
An interventional study conducted in ALGezira to assess the effect of health education on mothers to improve care during diarrhea and this yield to positive impact on child home care (25). . In contradict to other study conducted in Sudan found the education level of mothers without good socioeconomic situation doesn't decrease diarrheal rates (29).
Across sectional community based study conducted in Shendi town, high educational level of women despite that 22% of mother think that teething cause diarrhea and only35% prepare home fluid and 18% using ORS (26)

Malnutrition and Diarrhea

Malnutrition is a common nutritional problem in developing countries (29). It contributes to half of deaths in Asia and Africa. 15.3 % in Middle East and northern Africa (30) Malnutrition is a leading cause of diarrhea and vice versa (17). WHO (2007) mentioned that water, sanitation and hygiene (WASH) are linked to child malnutrition. WASH is a major risk for repeated infectious diarrheal attack which may lead to decrease absorption of nutrients and causes malnutrition. . In turn malnutrition may contribute to child death from infection like diarrheal diseases and parasite infestations and delayed recovery (30, 31). A study in Bangladesh showed that malnutrition increase susceptibility of diarrhea and it is severity due to increase risk of shiglla infection (10). Study in Bengal showed that 7.65% increase risk in malnourished child increase is attributable to under-nutrition, which exacerbates the impact of diseases such as malaria, diarrhea and acute respiratory infections (19). A study in Khartoum showed that low socioeconomic status, mother education level and poor nutrition and practice increase prevalence of diarrhea prevalence of wasting was 21.1 % and stunting 24 (29).

Methodology

Materials and Method

Study design

a cross-sectional descriptive hospital based study conducted to study Knowledge, practice and attitude of women regarding diarrheal disease in children under five years in Emergency Pediatric hospital,2017 .

Study area

The study was conducted in the three major Emergency Pediatric hospital in Khartoum state, Sudan. Muhammad Alamin Hamid children emergency hospital – Omdurman, Ahmad Qasim children emergency hospital – Bahri and Ibrahim Malik Teaching Hospital at Pediatric ward - Khartoum
They are national hospitals giving medical care to people coming from all parts of Sudan in addition to delivering medical education to students of medical colleges and other health institutions. Muhammad Alamin Hamid children emergency hospital – located in Omdurman city, Southeast in Almorda Street. It contain general pediatric ward, PICU, renal unit and nursery. Ahmad Qasim children emergency hospital – located in Bahri it contain general pediatric ward, PICU, renal unit and nursery. Ibrahim Malik Teaching Hospital- El Sahafa, south of Khartoum. The hospital comprises all medical specialties in addition to supporting units. The hospital capacity is 231 beds. The working staffs in hospitals are composed of doctors and other medical staff members, in addition to non-medical administrative staff as well as ancillary staff.

Study population

All mothers of the admitted children in pediatric wards who wished to participate in the study having at least one child less than five year who had diarrhea.
Inclusion: All mothers had children admitted to general pediatric hospitals at time of study. Mothers should had at least one child under five years old and he/she had diarrhea or admitted with diarrhea
Exclusion criteria: Mothers who were refused to participate or psychologically ill or had hearing or speaking problems were excluded from this study

sample size and sampling

The sample size was estimated, based on the prevalence of diarrheal diseases in children under five years old which was 13% (Federal Ministry of Health) and a rounded to 185 sample size were included at 95%confidence interval .

$n= (z^2 x\ px1-p)/ d^2$
$=1.96^2 x0.13x\ 1-0.13/0.05^2= 174$
$=174 \times 0.05 =184$

n: sample size, Z : standard error, D: confidence level, P: prevalence of disease
The sample size was divided into the three hospital based on proportion of children who admitted to hospitals in 2016. The study sample was obtained from each hospital from those who are admitted in the ward on the time of the survey (consecutive, non-probability sample).

Data collection

A structured questionnaire was designed and refined to collect data on Socio-demographic, knowledge, attitudes and practices of mothers towards diarrhea and how they define & manage diarrhea for their affected children. The question was translated into Arabic for ease of delivery and piloted before proceeded into data collection for responses and clarification. Data collection was established in November to December. Direct interviewing of mothers was done after having an oral consent of mothers. Before having the consent, mothers were well informed about the nature of the study and were told that it was up to them to answering the questions or not. Attribute variables: Age, educational qualification, occupation, number of children, family income per month, gender of the child and residence

Data analysis

The data obtained was entered into Microsoft excel database analyzed based on the objectives of the study using descriptive statistics in the form of frequency, percentage, means and standard deviation, score were used to quantify the level of knowledge, attitudes and practice and chi-square test and regression were worked out to determine the association of socio-demographic factors with knowledge, attitudes

and practice with significant value using statistical package for social sciences SSPS version 19

Ethical considerations

Ethical approval obtained from the department of community medicine, faculty of medicine, university of Khartoum

Ethical approval was obtained from Khartoum Ministry of Health

A verbal consent was taken from each mother separately. Every participant has a right and free hand to participate in the study or refuse.

Limitation of study:

More detailed questions about knowledge, attitude and practices of mothers towards diarrhea and its management could give better results.

Lack of standardized questionnaire for scoring KAP

Community based study with health educational messages could even be better

Strong limitation in transporting, funding, internet quality, time and response of mothers

Results

Socio-demographic characteristics

About 44 % of the respondents their ages ranged between 23-39 years, 22.5% of them ranged between 30-46 years and 20.9% were aged between 16-22years (table 1).

Most of the mothers had primary education 28.8%, where illiterate was 25.5 %, 10.9% had intermediate education, 20.1% had secondary education and 14.7% had university education as shown in (table 2).

The majority of mothers were housewives 83.2%, 7.6% were employee, 5.4% were business and 2.4% Laborer (table3).

The majority of respondents 59.4% had monthly income less than 2000 SDG while only 15% had monthly income ranged from >3000 SDG and 25.6% had monthly income of 2000-3000as shown in (table 4).

Age group	Frequency	Percent
16-22	38	20.9
23-29	80	44.0
30-36	41	22.5
37-43	21	11.5
44-50	2	1.1
Total	182	100.0

Table 1: Age of the mothers in years, Emergency Pediatrics Hospital in Khartoum State, 2017:

Mothers education	Frequency	Percent
Illiterate	47	25.5
Primary	53	28.8
Intermediate	20	10.9
Secondary	37	20.1
graduate & above	27	14.7
Total	184	100.0

Table 2: Mothers education, Emergency Pediatrics Hospital in Khartoum State, 2017:

Mothers occupation	Frequency	Percent
Laborer	7	3.8
Business	10	5.4
house wife	153	83.2
Employee/government/private	14	7.6
Total	184	100.0

Table 3: Mothers occupation, Emergency Pediatrics Hospital in Khartoum State, 2017:

monthly income	Frequency	Percent
<2000	107	59.4
2000 – 3000	46	25.6
>3000	27	15.0
Total	180	100.0

Table 4: Respondents monthly income of the family per month in SDG, Emergency Pediatrics Hospital in Khartoum State, 2017:

Most of the respondent's live in urban area 60.9% while 39.1%, of them live in rural (chart 1).

The numbers of sibling less than 3 children were 57.7%, while 39% have 4-7 children and 3.3 have >8 children, most of responders had 3 children (20.9%) (Table 5).

Most of the children were male 58.2%, while 41.8% of them were female, chart 2.

About 48.6% of the respondents have children aged less than one year, 21.3% were aged 1-2 years, 13.7% were aged2- 3 years, 9.8% aged 3-4 years and about 6.6% of them aged 4-5 years, (table6).

Knowledge of respondents regarding diarrheal disease:

Regarding the correct definition of diarrhea disease around 48.4% define diarrhea correctly while 48.4% define it diarrhea as think that loose stool or change in its color or one time per day is considered as diarrhea and about 3.3 couldn't define diarrhea (table7).

Regarding the causes of diarrhea disease most participants think that contaminated food and water is the cause of diarrhea around 76.6%, microorganism 69.6, mud 57.6%, evil eye 52.2%, warm 51.6% and around 8.7 they didn't know the cause (table8).

81.5% think that diarrhea transmitted through contaminated food and water, 74.5% through contaminated mothers o children hands, 46.7% through bottle feeding, 51.1% poor sanitation and 9.2% didn't know the correct answer (table9).

Most of mothers notice that the most danger sign is increase frequency of stool per day77.2%, 75% for recurrent vomiting, 73.9% bloody diarrhea, 71.2% dehydration and 66.8% fever (table10).

Only 38% of mother notice that the child loss water and electrolyte during attack, 44% think that only water loss, 8.2% electrolyte loss and 8.2% they don't know the answer (table11).

The serious complications of diarrhea were described by mothers as loss of weight 80.4%, 72.8% fatigue and lethargy, anemia 66.8%, death 65.8% and 4.9% didn't know the serious symptoms (table12).

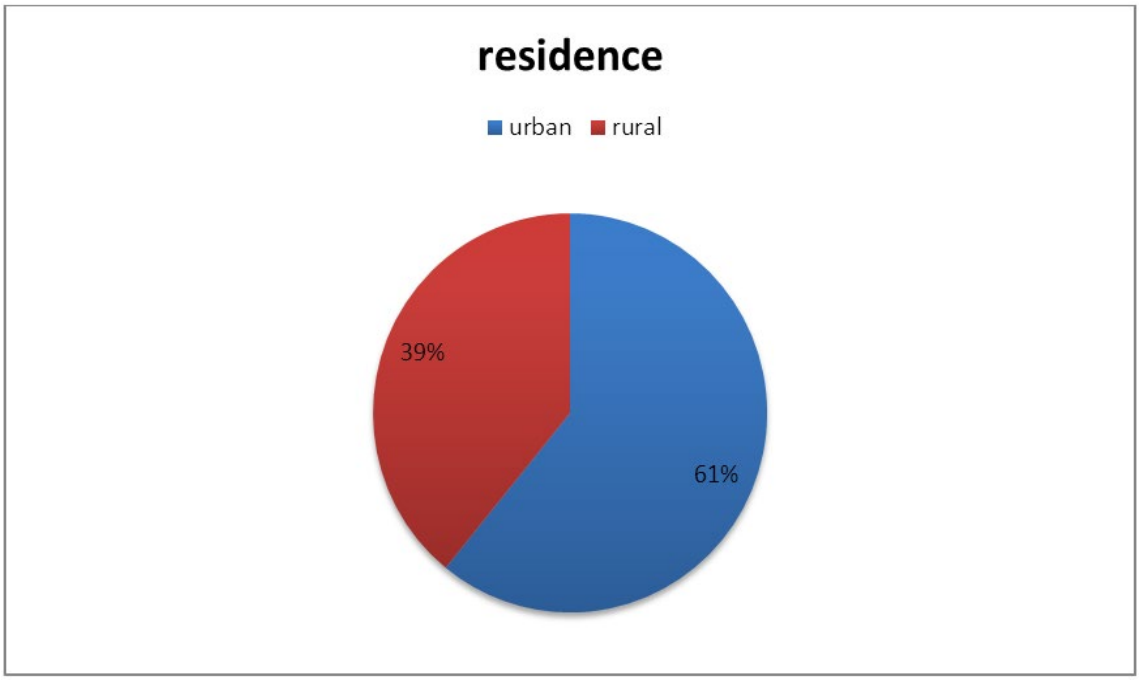

Chart 1: Respondents residence, Emergency Pediatrics Hospital in Khartoum State, 2017:

numbers of sibling	Frequency	Percent
0-3	105	57.7
4-7	71	39.0
8-11	6	3.3
Total	182	100.0

Table 5: represent the numbers of sibling, Emergency Pediatrics Hospital in Khartoum State, 2017:

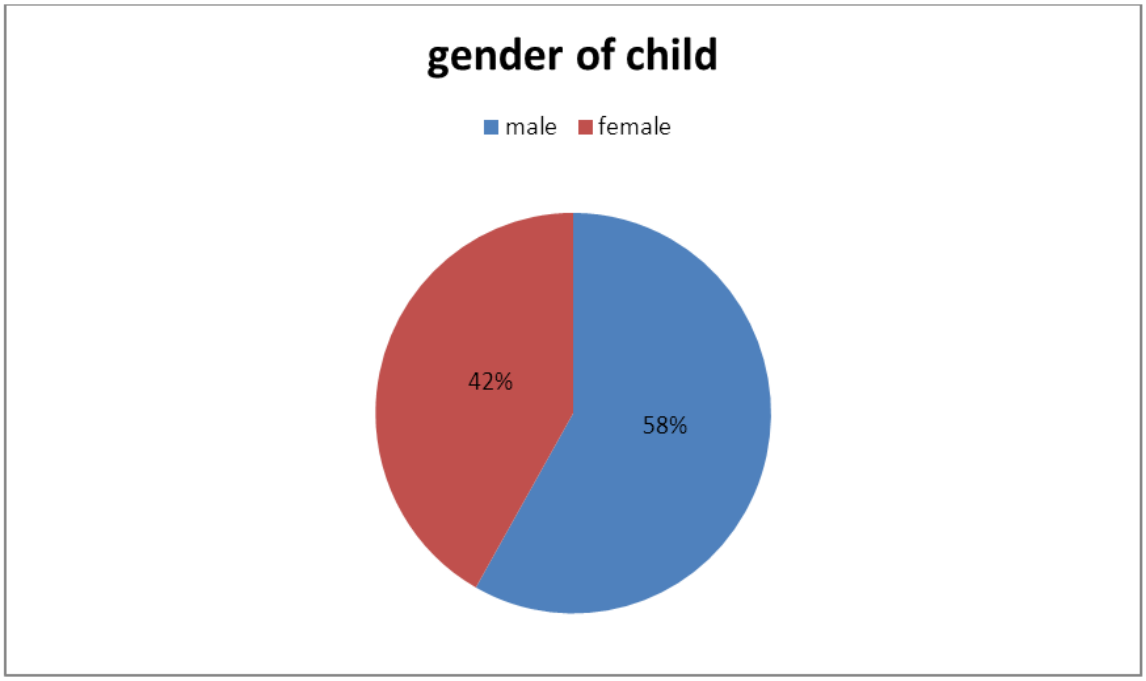

Chart 2: sex of the child, Emergency Pediatrics Hospital in Khartoum State, 2017:

age of the child	Frequency	Percent
<1	89	48.6
1-2	39	21.3
2-3	25	13.7
3-4	18	9.8
4-5	12	6.6
Total	183	100

Table 6: Respondents age of the child, Emergency Pediatrics Hospital in Khartoum State, 2017:

definition of diarrhea	Frequency	Percent
One time stools per day	7	3.8
Three or more loose watery stools per day	89	48.4
change in shape	82	44.6
don't know	6	3.3
Total	184	100.0

Table 7: indicates the knowledge of respondents regarding correct definition of diarrhea disease, Emergency Pediatrics Hospital in Khartoum State, 2017:

causes of diarrhea	Frequency	Percent
Microorganism	128	69.6
contaminated food and water	141	76.6
evil eye	96	52.2
Mud	106	57.6
Warm	95	51.6
Don't know	16	8.7
Total	184	100

Table 8: indicates the knowledge of respondents regarding causes of diarrhea disease , Emergency Pediatrics Hospital in Khartoum State, 2017:

Transmission	Frequency	Percent
bottle feeding	86	46.7
contaminated food and water	150	81.5
Improper sewage disposal	94.0	51.1
unclean mother or child hand	137	74.5
don't know	17	9.2
total	184	100

Table 9: indicates knowledge of respondents regarding the transmission of diarrhea in children, Emergency Pediatrics Hospital in Khartoum State, 2017:

Danger sign	Frequency	Percent
Dehydration	131	71.2
Fever	123	66.8
Bloody diarrhea	136	73.9
Frequent diarrhea more than 8 times/day	142	77.2
Recurrent vomiting	138	75
Don't know	7	3.8
Total	184	100

Table 10: represents knowledge of respondents regarding the dangerous sigs of diarrhea, Emergency Pediatrics Hospital in Khartoum State, 2017:

Body losses	Frequency	Percent
Water	81	44.0
water and salt	70	38.0
Salt	18	9.8
I don't know	15	8.2
Total	184	100.0

Table 11: indicates knowledge of respondents regarding the transmission of diarrhea in children, Emergency Pediatrics Hospital in Khartoum State, 2017:

Complications	Frequency	Percent
Death	121	65.8
weight loss	148	80.4
Anemia	123	66.8
Fatigue and lethargy	134	72.8
I don't know	9	4.9
Total	184	100

Table 12: indicates the knowledge of respondents regarding the serious complications of diarrhea, Emergency Pediatrics Hospital in Khartoum State, 2017:

Knowledge of respondents regarding preventive methods toward diarrheal disease 93.7% of mothers think that personal hygiene of mothers and children prevent diarrhea disease,85.9% due to clean food and water, 82.6 with hand washing with soap and water, 79.4%de to healthy food ,72.8% exclusive breast feeding and food,70.1 vaccination and 66.8% good weaning practice (table13).

Attitude of respondents regarding diarrheal disease:

Attitudes of the respondents towards diarrheal diseases 52.7% of mother think that exclusive breast feeding for 6 month prevent from diarrheal disease. Around 95.7 % think teething is a cause of diarrhea, 43.3 % weaning can cause diarrhea.57.9% think that antibiotic only can treat diarrhea 94% and more agree that proper hand wash, safe drink water and cleaning surround prevent from diarrhea (table 14).

Practice of respondents regarding diarrheal disease:

Practice of the respondents toward management of diarrheal diseases 29.6% of mothers seek medical help, 28.1% prepare fluid at home 16.8% use medication for treatment, only 14.3% use ORS in the management while 11.2% use sugar and salt solution. 67.9% of mothers using ORS because it can replace the deficit and 57.1% prepare it correctly (table 15).

Practice of the respondents toward amount of oral intake during diarrheal diseases. Around 41.2% of mothers increase oral intake during diarrheal attacks, 33.5% give their children the same amount of food, 20.3% stop feeding during episodes and 4.9% decrease amount (table 16).

Preventive method	Frequency	Percent
Healthy food	146	79.4
clean food and water	158	85.9
Exclusive breast feeding	134	72.8
Good weaning practices	123	66.8
personal hygiene for mother and child	154	93.7
Hand washing with soap and water	152	82.6
Vaccination	129	70.1
Do not know	2	1.1
Total	184	100

Table 13: indicates the knowledge of respondents regarding preventive methods toward diarrheal disease, Emergency Pediatrics Hospital in Khartoum State, 2017:

Attitudes items	Frequency	Percent
Do you think breast-feed your child exclusively for 4-6 months of life prevent diarrhea disease?		
Yes	97	52.7
No	76	41.3
Don't know	11	6
Total	184	100
Do you think that teething phase in child causes diarrhea?		
Yes	176	95.7
No	8	4.3
Don't know	0	0
Total	184	100
Do you think weaning cause diarrhea to your child?		
Yes	78	43.3
No	89	49.4
Don't know	13	7.3
Total	180	100

Do you think washing your hands after defecating prevent your child from diarrheal infection?		
Yes	**174**	**94.6**
No	**7**	**3.8**
Don't know	**3**	**1.6**
Total	**184**	**100**
Do you think cooking food without proper washing hands cause diarrheal disease		
Yes	**175**	**95.1**
No	**5**	**2.7**
Don't know	**4**	**2.2**
Total	**184**	**100**
Do you think hand washing before and after eating prevent your child from diarrheal disease infection?		
Yes	**176**	**95.7**
No	**5**	**2.7**
Don't know	**3**	**1.6**
Total	**184**	**100**
Do you think drinking clean and clean water preventing diarrheal infection?		
Yes	**174**	**94.6**
No	**9**	**4.9**
Don't know	**1**	**0.5**
Total	**184**	**100**
Do you think that clean surrounding and proper garbage disposal is preventing diarrhea disease?		
Yes	**178**	**96.7**
No	**2**	**1.1**
Don't know	**4**	**2.2**
Total	**184**	**100**
Do you think giving medication is enough to treat diarrhea?		
Yes	**106**	**57.9**
No	**64**	**35**
Don't know	**13**	**7.1**
Total	**183**	**100**

Table 14: indicates the attitude of respondent's diarrheal disease, Emergency Pediatrics Hospital in Khartoum State, 2017:

Initial management during attack	Frequency	Percent
fluid at home	55	28.1
ORS	28	14.3
sugar & salt solution	22	11.2
Medication	33	16.8
medical advice	58	29.6
Total	184	100.0

Advantages of ORS	Frequency	Percent
found easily as powder	1	3.6
used when there is vomiting	2	7.1
gain losses	19	67.9
don't know	1	3.6
Total	184	100.0

ORS dissolve in	Frequency	Percent
1 liter of water	16	57.1
1 bottle	6	21.4
500 ml of water	1	.3.6
Total	184	100.0

Table 15: Practice of the respondents toward management of diarrheal diseases, Emergency Pediatrics Hospital in Khartoum State, 2017:

amount of fluid was given	Frequency	Percent
Discontinued	37	20.3
Increased in frequency	75	41.2
Decreased in frequency	9	4.9
Usual amounts	61	33.5
Total	182	100.0

Table 16: Practice of the respondents toward management of diarrheal diseases regarding the amount of fluid was given during diarrheal attacks, Emergency Pediatrics Hospital in Khartoum State, 2017:

Practice of the respondents toward type of complementary fluids during diarrheal diseases, 88.6% give their child complementary fluids during attack like yoghurt, rice water and salt, soup and juice and etc. Most of mothers prefer to give juices mostly gongolaze and guava

Practice of the respondents toward frequency of breast feeding during diarrheal diseases. About 44% of mothers increase frequency of breast feeding, 42.9% feed the usual amount, 8.7%decrease frequency and 4.3% stop breast feeding (table 18).

Practice of the respondents toward management of diarrheal diseases. Most of mothers around 47.7% when home treatment fail, 45.4% seek medical advice when the diarrhea is continuous during the day, 19% when the diarrhea last more than three days, only 8.7% seek medical unit immediately(table 19).

Type of fluid	Frequency	Percent
Yoghurt	53	28.8
Rice water with salt	48	26.1
Tea and coffee	12	6.5
Soups	36	19.6
Boiled cooled water	27	14.7
Juices	66	35.9
Nothing	29	15.8
Total	184	100

Table 17: Practice of the respondents toward management of diarrheal diseases regarding the type of fluid was given during diarrheal attacks, Emergency Pediatrics Hospital in Khartoum State, 2017:

breast feeding during diarrheal	Frequency	Valid Percent
Discontinued	8	4.3
Increased in frequency	81	44.0
Decreased in frequency	16	8.7
Usual amounts	79	42.9
Total	184	100.0

Table 18: Practice of the respondents toward management of diarrheal diseases regarding breast feeding during diarrheal attacks, Emergency Pediatrics Hospital in Khartoum State, 2017:

child requirement for medical aid	Frequency	Percent
Presence of several loose stools in 1 or 2 hours	84	45.4
Diarrhea lasting at least more than 3 days	35	19
Failure of home treatment	51	47.7
Immediately	16	8.7
Do not know	5	2.7
Total	184	100

Table 19: Practice of the respondents toward management of diarrheal diseases regarding the child requirement for medical aid, Emergency Pediatrics Hospital in Khartoum State, 2017:

Regarding WASH practice, 61.4% of responders use tap water as source for drinking water, 32.6 using karo, only 6% use bottle or filter water (table 20). 74.5 of mothers wash their hands before they prepare food or eating feeding the child, 41.3% after defecation or cleaning the baby and 28% sometimes (table 21). 94% of responders use sanitary latrines and the remaining 6% doesn't have latrines (table 22).

Practice of the respondents toward management of diarrheal diseases around 35.9% of mothers use tradition method for diarrheal management (table 23).

Associations between Socio-demographic data(age of mothers and children, education level of mothers, residence, occupation of mothers, family monthly income, number of sibling and gender of child and knowledge, attitude and practice of mothers were tested and no significant association were found with P value more than 0.05.

Sources of drinking water	Frequency	Percent
tap water	113	61.4
karo water	60	32.6
Other	11	6
Total	184	100.0

Table 20: the sources of drinking water in responders, Emergency Pediatrics Hospital in Khartoum State, 2017:

Frequency of hand washing with soap and water is	Frequency	Percent
Sometimes	28	15.2
After defecation or cleaning the baby	76	41.3
Before preparing/eating food/feeding the child	137	74.5
Total	183	99.5

Table 21: Practice of the respondents toward management of diarrheal diseases regarding frequency of hand washing with soap and water, Emergency Pediatrics Hospital in Khartoum State, 2017:

Sewage disposal	Frequency	Percent
Open field defecation or covering human excreta with earth or mud	11	5.9
Use of sanitary latrines	173	94.0
Total	184	100.0

Table 22: distribution of respondents regarding use of sanitary latrines , Emergency Pediatrics Hospital in Khartoum State, 2017:

Traditional methods	Frequency	Percent
Yes	129	70.1
No	55	29.9
Total	184	100.0

Table 23: Practice of the respondents toward traditional methods in the management of diarrheal diseases, Emergency Pediatrics Hospital in Khartoum State, 2017:

Disscusion

Diarrheal diseases remain a major threatening to children less than five year old in developing countries. Awareness of mothers about diarrheal diseases and its management play an important role in decreasing morbidity and mortality (3). So in our study we assess the mother knowledge, attitude and practice toward diarrheal disease in children under five years old and we found that 51.6 % of mothers didn't know the correct definition of diarrhea according to WHO definition (17) and 76.6% of women agree that the cause of diarrhea is due to microorganism. Some of mothers believe that wrong ideas like devil's eye weaning and teething could cause diarrhea which is similar to study conducted in Pakistan (27). We shouldn't expect from mothers to know the specific causes of diarrhea because their information may by influence by their cultural and social beliefs. 81.5% of mothers think that diarrhea can be transmitted through contaminated food and water. Most of mothers they think that only fluid can be lost during diarrheal attack without electrolytes which influence their attitude toward diarrheal management. 80.4% of mothers think that weight loss is a major sequence of diarrheal disease and only 65.8% of 184 respondents think it can lead to death. According to The Environmental Health Project (Environmental Health Project, 1999) (supported by USAID) and T. Vesikari and B. Torun (Vesikari et al, 1994), strategies for comprehensive prevention and control of diarrhea include: good personal and domestic hygiene; use of safe water; improved nutrition; immunization; and effective case management. The study showed that the most of respondents had good knowledge about methods of prevention. 93.7 % consider personal hygiene as impotent method of prevention. This result consistent with study in Pakistan (27)

About 30% of mothers think that vaccination don't prevent child from diarrhea and may cause it.

Regarding attitude of mothers 47.3% of mothers think that exclusive breast feeding don't prevent child from diarrheal attack in early age.94% agree that good hygiene practice and safe drinking water protect child from diarrhea. 57.9% think that only antibiotic can treat diarrhea.

Regarding practice of mothers most of mothers start initial management at home around 39.3% prepare home fluids including sugar and salt solution and juices. 29.6% seek medical advice, 16.8% give antibiotic for treatment. Unfortunately, these medications aren't prescribed by the medical staff. About ORS administration during diarrheal episodes only 14.3% use it and 57.1% of them prepare it correctly. Similar to study in shendi that35% prepare home fluid only18% using ORS

About 88% of mothers give fluid during diarrheal attacks, only 41.2% increase frequency of fluid intake. They use fluids like juices, rice water and other mentioned fluids. This practice of giving fluids is quite important since it replace the losses during diarrhea.

Breast feeding during attack of diarrhea was recognized by most of mothers to be effective to the child. 95.7% of mothers didn't stop breast feeding while only 44% increase frequency during diarrhea. 35.9% of mothers have cultural and social misbelieve that affect management by using traditional methods which contradict with study in shendi(26).

47.7 % of mothers seek medical advices when the home management of diarrhea was fall

Regarding WASH methods, 61.4% of respondents use tap water as safe drinking water methods while 32.6% karo water is used. 74.5% of mothers washes their hands before eating or giving food to their children. Regarding sanitation 94% of respondents have sanitary latrines. This finding coincides with that reported in study in Ethiopia 91.5% had sanitary latrines and 62.3% safe water sources other study in Sudan found 95.4% had sanitary latrines (25)

Regarding Socio-demographic data of respondents most of mothers were at age of 23-39 years old as that found in study conducted in AL-Gezeria(25), 83.2% of them were housewife as a study in Egypt found that 93.2% are house wife most of mothers were educational level is primary school followed by illiterate. 66.9% of them live in urban areas and 59.4% of them their monthly income was <2000SDG.

In our study most of children affected below the age of 1 year and most of the children were male, in contradict with other study in Pakistan (27)

There is no significant association between Socio-demographic data and knowledge, attitude and practice of mothers.

More detailed questions about knowledge, attitude and practices of mothers towards diarrhea and its management could give better results. Community based study with health educational messages could even be better if it is feasible.

Conclusions

- The study concludes that the knowledge, attitude and practice of mothers about diarrheal diseases were relatively good which may influence by hospitals setting.
- Children age less than one year were more vulnerable to diarrhea
- The knowledge of mothers about the correct definition of diarrhea was low and the knowledge about possible causes of diarrhea were also low which influenced by cultural and social misbelieve.
- Large number of mothers believe that teething is a major cause of diarrhea in children under five years old
- About more than one third of mothers think that vaccination isn't a prevented method.
- Increasing the amount of oral intake or breast feeding were low in mothers practice and there's increase of mothers administration of antibiotic without health staff advices.
- Most mothers believe in seeking treatment for diarrhea when home management was fail. Also the management was influenced by cultural and social misbelieve.
- Very small percentage of mothers uses ORS in the management.
- One third of mothers practice traditional method in diarrheal management like erq, dokhan and teeth extraction.
- Almost all participants has good water supply, hygienic practice and sanitation.

Recommendation

The study recommended the following:

1. Local health authority should increase knowledge of mothers about diarrhea and its management through health education sessions.

a. Educate mothers about the three roles of management of diarrhea at the home (give extra fluid, continue breast feeding and when they seek medical advices) (18).

b. Emphasis mother to increase oral intake and breast feeding.

c..To promote awareness of mothers about ORS benefit and correct method for preparation and avoid giving medication without medical prescription

2. Introduce WASH principles in education curriculum.

3. Furthers studies toward traditional method and misconception in diarrheal disease.

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