

# Mother's Nutritional Knowledge and Practice towards Children under Two Years of Age and Its Impact on Their Health in Abuzaid Albuluk Pediatric Specialized Hospital in 2023

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**How to cite this paper:** Abd-Alrazig, M.H.A., Dakeen, M.A.-A.O., Ali, M.A.H.M. and Nasr, R.M.H. (2023) Mother's Nutritional Knowledge and Practice towards Children under Two Years of Age and Its Impact on Their Health in Abuzaid Albuluk Pediatric Specialized Hospital in 2023. *Food and Nutrition Sciences*, 14, 746-776. <https://doi.org/10.4236/fns.2023.148049>

**Received:** July 16, 2023

**Accepted:** August 20, 2023

**Published:** August 23, 2023

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## Abstract

**Background:** Nutritional knowledge and practise is an important measure to improve dietary habits and food choices. The daily food should contain balanced nutrition as needed to support optimal growth, avoid deficiency diseases and prevent the diseases which might interfere with the children health. **Materials & Methods:** A descriptive cross-sectional non-interventional hospital-based study was carried out among 122 mothers and 122 children by using a non-probability convenience sampling technique in the period of 15 March to 15 April 2023, and using interviews with structural questionnaires, the data was analyzed using SPSS version 26. **Results:** We found that most of the children had moderate health, while most of the mothers had moderate nutritional knowledge and practise towards their children, also we found that the relationship between mothers' knowledge and practise and child health was significant ( $P < 0.001$ ). **Conclusion:** Mothers' knowledge and practise among children was moderate and children had moderate health. Wrong beliefs and cultural taboos play major roles in decreasing knowledge and practise.

## Keywords

Mothers, Knowledge, Practise, Health, Children, Infant, Nutrition, Cultural Taboos

## 1. Introduction

Nutrition education and awareness is an important measure to improve dietary

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habits and food choices since poor dietary habits are the main reasons for poor nutritional status of children and health [1].

The daily food should contain balanced nutrition as needed to support optimal growth, to avoid deficiency diseases, to prevent poisoning, and also to prevent the diseases which might interfere with the children's health [2].

Infants or toddlers who are malnourished, will have a higher risk of death. Even though they survive, they often have weak physical and low mental development. Poor nutrition is the cause of high infant mortality with 60% deaths of under-five each year. Two-thirds of these deaths were related to improper eating habits that occur in the first year of age [3].

Malnutrition in every form presents significant threats to human health. Today the world faces a double burden of malnutrition that includes both under nutrition and overweight, especially in low- and middle-income countries. There are multiple forms of malnutrition, including under nutrition (wasting or stunting), inadequate vitamins or minerals, overweight, obesity and resulting diet-related non-communicable diseases [4].

The avoidance of specific types of food is a widespread phenomenon and applies more commonly to food of animal origin. Religious and other beliefs often call for this avoidance, but other cultural factors are involved as well; some foods are regarded as being of low prestige, for example, most people avoid the meat of animals that have died of natural causes, especially if they were diseased. This natural trait is strengthened by injunctions of the major religions. However, beliefs can differ sharply. One of the writers once saw migrant workers in the western Himalayas carrying away meat from a calf that had died of anthrax, a deadly disease, and was told that such meat had a special "sweetish" taste which they highly appreciated. The meat was later confiscated and incinerated by the authorities [5].

In most societies, cannibalism would be imaginable only in desperate circumstances. Yet in a number of cultural environments, it has been societies even to cut out fruit and vegetables. Scientifically, these are precisely the foods they need [5].

### **1.1. Problem Statement**

According to the United Nations International Children's Emergency Fund (UNICEF) Six million children are affected by life-threatening severe acute malnutrition (SAM) in West and Central Africa [6]. In Sudan, approximately 2.7 million children under five suffer from malnutrition annually, out of whom 522,000 suffer from SAM [7].

Malnutrition puts children's lives and futures at risk. Timely treatment can save children's lives; however, those who remain untreated are at risk of dying, delayed growth and impaired brain development – which impacts learning capacity and school performance, and labor force participation. Malnourished children also become more vulnerable to childhood diseases such as diarrhea and acute respiratory infections.

According to those, the level of mother's knowledge and practise plays an important role in child's health. So low knowledge and practise leads to a serious effect on child's health and the children who don't receive essential nutritive elements and are given cultural taboos can suffer from malnutrition or be overweight and will be exposed to serious health problems, which can hamper their healthy development. Also poor socioeconomic status, illiteracy and cultural beliefs lead to decreased the mother knowledge and practise, which has a greater effect on the children's health and development which lead to long-standing serious complication and can lead to the child's death.

## **1.2. Justification**

The ultimate reason was to assess well-being of children in Khartoum, Sudan—especially in Abuzaid Albuluk pediatric specialized hospital because it's the largest hospital in Omdruman and has different warts and a large population—also to orient the efforts toward the manipulation factors influencing children's nutritional health and determine the level of mothers knowledge and practise to increase it to prevent children from serious complication, so increasing the level of knowledge and practise is the most important factor to prevent malnutrition especially in children under two years old because it critical age and the brain and body rapidly developed at it, in addition to that filling the gap of decrease recent study about maternal knowledge and practise regarding children nutrition and health to give clue to doctors about level of the mothers' knowledge and practise to improve it and give good counseling to the mothers to promote children health.

## **1.3. Research Questions**

- What's the mothers knowledge regarding child under two years nutrition?
- What's the mothers' practise regarding child under two years nutrition?
- How were children under two years health?
- What's the association between the mother's nutritional knowledge and practise with children under two years health?

## **2. Objectives**

### **2.1. General Objective**

To assess the mother's nutritional knowledge and practice towards children under two years of age and its impact on their health in Abuzaid Albuluk pediatric specialized hospital in 2023.

### **2.2. Specific Objectives**

- 1) To assess mother's knowledge concerning child under two years nutrition.
- 2) To assess mother's practise concerning child under two years nutrition.
- 3) To assess children under two years health.
- 4) To determine the association between mother's knowledge and practise with children under two years health.

### **3. Materials & Methods**

#### **3.1. Study Design**

A descriptive cross-sectional non-interventional hospital-based study.

#### **3.2. Study Area**

This study was conducted at Abuzaid Albuluk pediatric specialized hospital established in 1980. It is located in Sudan, Khartoum state, Omdurman, Al-thawrah al-hara 4<sup>th</sup>. Approximately 250 patients are admitted every month and about 120 patients less than two years admitted every month, and it contains the following wards: malnutrition ward, respiratory ward, hematology ward, gastroenteritis ward, neonatal ward and general ward.

#### **3.3. Study Population**

The targeted populations were any mother that had child less than two years age and admitted to Abuzaid Albuluk pediatric specialized hospital at the period of the study.

#### **3.4. Inclusion Criteria**

The mothers of child's less than two years admitted to Abuzaid Albuluk Pediatric Specialized Hospital at the period of the study and showed willingness to participate at the study.

#### **3.5. Exclusion Criteria**

Any child who suffers from: metabolic disorders, developmental, congenital or eating disorders that can cause nutritional, development and growth problems were excluded from the study. Also mothers who were not given consent.

The mothers were asked first about any exclusion criteria and confounding variables, and any one had one of them were excluded.

#### **3.6. Variables**

##### **3.6.1. Dependent Variables**

Mother's nutritional knowledge and practice towards children under two years of age and its impact on their health in Abuzaid Albuluk Pediatric Specialized Hospital.

##### **3.6.2. Independent Variables**

Level of mother education and socioeconomic status, mothers cultural and religious beliefs, the knowledge about exclusive breastfeeding and children weaning.

##### **3.6.3. Background Variables**

Age, sex, marital and working status, number of children.

##### **3.6.4. Confounding Variables**

History of metabolic disorders that affected children nutrition, developmental

and congenital disorder that affected children nutrition, child with feeding or eating disorders.

## **4. Sampling**

### **4.1. Sample Frame**

All patients and their mother's whom present to Abuzaid Albuluk Paediatric specialized hospital.

### **4.2. Sample Size**

A convenient sampling was used in the period of 15 March to 15 April 2023 and the sample size was equal 112 mothers and 112 children.

### **4.3. Sample Technique**

A non-probability convenience sampling technique.

### **4.4. Data Collection Methods and Tool**

The Data collected by using interview with structural questionnaires, the questionnaire was designed by the researchers from the literature review and given to the experts and professors in the related field and its validity and reliability was confirmed. Finally, the questionnaire was asked to the mothers whom were willing to take part in the research. The questionnaire consists of:

- 8 questions of general characteristics of the participants (Q1-8).
- 14 questions of mothers' knowledge.
- 11 questions of the mothers practise.
- 13 questions of the child health. "**Appendix 1**"

The questionnaire scoring by given 2 for correct answer, 1 for incomplete answer or for "don't know" and 0 for wrong answer. We assessed mother knowledge by using Q1-13 in section B, mother practice by using Q1-11 in section C and child health by using Q 4, 6, 7, 8, 9, 10 in section D.

### **4.5. Data Analysis**

The program of analysis was: SPSS version 26 descriptive analysis, chi-square test of significance was conducted to determine the statistical significance. A  $P < 0.05$  level was considered statistically significant.

### **4.6. Definitions of Nutrition Indicators**

1) Wasting is acute malnutrition reflected by weight-for-height Z-score (WHZ) or mid upper arm circumference (MUAC). Global Acute Malnutrition (GAM) includes SAM and Moderate Acute Malnutrition (MAM).

Wasting global WHZ is the percentage of children 6 - 59 months  $< -2$  Z-scores weight for height and/or oedema.

Wasting severe WHZ is the percentage of children 6 - 59 months  $< -3$  Z-scores weight for height and/or oedema.

Wasting Moderate WHZ is the percentage of children 6 - 59 months between  $< -2$  Z-scores and  $-3$  Z-scores weight for height.

2) Stunting is chronic malnutrition reflected by height-for-age Z-score (HAZ).

Stunting global HAZ is the percentage of children 6 - 59 months  $< -2$  Z-scores height for age.

Stunting severe HAZ is the percentage of children 6 - 59 months  $< -3$  Z-scores height for age.

Stunting Moderate HAZ is the percentage of children 6 - 59 months between  $< -2$  Z-scores and  $-3$  Z-scores height for age.

3) Underweight WHZ is the percentage of children 6 - 59 months  $< -1.6$  and  $-2$  Z-scores weight for height.

4) Healthy weight WHZ is the percentage of children 6 - 59 months  $> -1.6$  and  $< 1.6$  Z-scores weight for height.

5) Overweight/Obesity is the percentage of children 6 - 59 months  $> 1.6$  Z-scores weight for height.

6) Exclusive breastfeeding is the percentage of children 0 - 6 months taking breast milk only.

7) Dietary diversity is the percentage of children consuming the appropriate number of food groups for their age during the 24 h before the survey

#### 4.7. Definitions of Health, Knowledge and Practise Score Indicators

1) High health, knowledge or practise  $> 70\%$  of total score.

2) Moderate health, knowledge or practise =  $70\% - 50\%$  of total score.

3) Low health, knowledge or practise  $< 50\%$  of total score.

## 5. Results

### 5.1. General Characteristics of the Study Participants

Out of 112 questionnaires were filled from 112 mothers and 112 children.

Most of children ages were ranging between 6 - 12 months (41.1%) followed by 13 - 18 months 26.8% after that 19 - 23 months (23.2%) then less than 6 months (8.9%). “Table 1”

About children sex we founded 50.9% of the children in the study were males and 49.1% were females. “Table 1”

About the mothers age we founded that the majority of the mothers were ranging in 26 - 30 years (34.8%) and 32 - 35 years (34.8%) followed by 21 - 25 years (14.3%) after that under 21 years (8.0%) and above 35 years (8.0%). “Table 1”

The majority of mothers marital status were married (91.1%), followed by widow (5.4%) then divorced (3.6%). “Table 1”

About mother working status that most of them were housewife (73.2%) followed by worker (26.8%). “Table 1”

The majority of the mothers participation socioeconomic status were moderate (59.8%), followed by low (39.3%) and then high (0.9%). “Table 1”

About mothers educational level that the majority of mothers were primary

**Table 1.** Shows distribution of sociodemographic characteristics of the children and their mothers in Abuzaid Albuluk pediatrics specialized hospital in 2023 (n = 122).

Characteristics	Value	Frequency	Percent
Child age in months	Less than 6	10	8.9
	6 - 12	46	41.1
	13 - 18	30	26.8
	19 - 23	26	23.2
Child sex	Male	57	50.9
	Female	55	49.1
Mother age in years	Under 21	8	8.0
	21 - 25	16	14.3
	26 - 30	39	34.8
	31 - 35	39	34.8
	Above 35	9	8.0
Mother marital status	Married	102	91.1
	Divorced	4	3.6
	Widow	6	5.4
Mother working status	Worker	30	26.8
	Housewife	82	73.2
Mother socioeconomic status	High	1	0.9
	Moderate	67	59.8
	Low	44	39.3
Mother educational level	University	28	25.0
	Secondary school	33	29.5
	Primary school	39	34.8
	Khalwa	7	6.3
	Illiterate	5	4.5
Mother's number of children	1 - 2	38	33.9
	3 - 4	53	47.3
	5 - 6	15	13.4
	More than 6	6	5.4

school (34.8%) followed by secondary school (29.5%) then university (25.0%) after that Khalwa-Islamic religion education(6.3%) then Illiterate (4.5%). “**Table 1**”

Most of the mothers in the study had number of children ranging from 3 - 4 children (47.3%) followed by 1 - 2 children (33.9%) after that 5 - 6 children (13.4%) then more than 6 children (5.4%). “**Table 1**”

## 5.2. Assessment of the Mothers Knowledge

About is breastfeeding should start immediately after birth, most of the mothers were said yes (96.4%) followed by no (1.8%) and don't know (1.8%). **"Table 2"**

About is breast milk alone sufficient in first 6 months, more than half of the mothers said yes (53.6%) followed by no (43.8%) then don't know (2.7%). **"Table 2"**

About is child had diarrhea should be breastfed, most of the mothers said yes (89.3%) followed by no (8.0%) then don't know (2.7%). **"Table 2"**

About is colostrum beneficial for a child, most of the mothers were said yes (72.3%) followed by don't know (24.1%) then no (3.6%). **"Table 2"**

About was child can given food at first 6 months, more than half of the mothers said no (50.9%) followed by yes (48.2%) then don't know (0.9%). **"Table 2"**

About was child can be given water or juices at first 6 months, most of the mothers were said yes (83.0%) followed by no (16.1%) then don't know (0.9%). **"Table 2"**

About is new born baby should be breastfed any time when he/she cries, most of the mothers said yes (84.0%) followed by don't know (10.7%) then no (8.9%). **"Table 2"**

About is an obese child is a healthy child, more of half of the mothers were said yes (58.9%) followed by no (25.9%) then don't know (15.2%). **"Table 2"**

About is Cow milk or goat milk is a complete nutrition food and can relapse breastfeeding, half of the mothers were said no (50.0%) followed by yes (39.3%) then don't know (10.7%). **"Table 2"**

About how to do weaning, the majority of the mothers were said gradual (67.0%) followed by sudden (17.0%) then don't know (16.1%). **"Table 2"**

About if a mother became pregnant she must stop breastfeeding her child, the majority of the mothers were said yes (65.2%) followed by no (24.1%) then don't know (10.7%). **"Table 2"**

About if mother become ill, she should stop breastfeeding their child, more than half of the mothers were said no (58.9%) followed by yes (31.3%) then don't know (9.8%). **"Table 2"**

About the child eating alone in his own plate in first years of his life is better than eating with his/her family, approximately half of the mothers were said yes (50.9%) followed by no (37.7%) then don't know (13.4%). **"Table 2"**

About from where the mother gain her knowledge about traditional treatment, most of them said from her mother or/and grandmother (87.5%) followed by culture (8.9%) then friends (3.6%). **"Table 2"**

## 5.3. Assessment of the Mothers Practise

About when did mothers start giving her child foods or drinks, the majority were said at age less than 6 months (74.1%) followed by 6 months (16.1%) then more than 6 months (9.8%). **"Table 3"**

About how many times did mothers feed her child yesterday, the majority



**Table 2.** Shows distribution of mother knowledge characteristics in Abuzaid Albuluk pediatrics specialized hospital in 2023 (n = 122).

Characteristic	Value	Frequency	Percent
Breastfeeding should start immediately after birth?	Yes	108	96.4
	No	2	1.8
	I don't know	2	1.8
Breast milk alone is sufficient in the first 6 months?	Yes	60	53.6
	No	49	43.8
	I don't know	3	2.7
Children with diarrhea should be breastfed?	Yes	100	89.3
	No	9	8.0
	I don't know	3	2.7
Colostrum (mother milk at first days of breastfeeding) is very beneficial for the child?	Yes	81	72.3
	No	4	3.6
	I don't know	27	24.1
Child can be given food at first 6 months?	Yes	54	48.2
	No	57	50.9
	I don't know	1	0.9
Child can be given water or drink at first 6 months?	Yes	93	83.0
	No	18	16.1
	I don't know	1	0.9
The new born baby should be breastfed any time he/she cries?	Yes	90	80.4
	No	10	8.9
	I don't know	12	10.7
A fat child is a healthy child?	Yes	66	58.9
	No	29	25.9
	I don't know	17	15.2
Cow milk or goat milk is a complete nutrition food and can relapse breastfeeding?	Yes	44	39.3
	No	56	50.0
	I don't know	12	10.7
Weaning should be done:	Gradual	75	67.0
	Sudden	19	16.9
	I don't know	18	16.1
If a mother became pregnant, she must stop breastfeeding her child?	Yes	73	65.2
	No	27	24.1
	I don't know	12	10.7

**Continued**

If a mother become ill, she should stop breastfeeding their child?	Yes	35	31.3
	No	66	58.9
	I don't know	11	9.8
Child eating alone with his own plate in first years of his life is better than eating with his/her family?	Yes	57	50.9
	No	40	35.7
	I don't know	15	13.4
From where did you gain your knowledge about traditional treatment?	Mother/grandmother	98	87.5
	Friends	4	3.6
	Culture	10	8.9

were said 3 times (37.5%) followed by 2 times (31.3%) then 1 times (11.6%) after that 4 times (10.7%) then none (8.0%) and the last is more than 4 times (0.9%).

**“Table 3”**

About it's necessary to wash hand when the mothers prepare food to her child, most of them were said yes (78.6%) followed by sometimes (20.5%) then no (0.9%). **“Table 3”**

About it's a good practice of mothers to give child local traditional treatment (like fenugreek, anise and Baobab), most of mothers said yes (74.1%) followed by no (22.3%) then don't know (3.6%). **“Table 3”**

About it's a good practice of mothers to treat child with jaundice (yellow discoloration of skin) by cauterization, more than half of mothers said no (54.5%) followed by don't know (23.2%) then no (22.3%). **“Table 3”**

About it's a good practice of mothers to treat her child at home by herbal medications when he/she is sick, most of them were said yes (67.9%) followed by no (27.7%) then don't know (4.5%). **“Table 3”**

About how many times during last month did mothers feed her child fruits, most of them were said less than once or once per week (56.3%) followed by 2 to 3 times per week (32.1%) then once per day (11.6%). **“Table 3”**

About how many times during last month did mothers feed her child beans or pea, most of them were said 2 to 3 times per week (40.2%) followed by once per day (32.1%) after that less than once or once per week (20.5%) then 2 to 3 times per day (7.1%). **“Table 3”**

About how many times during last month did mothers feed her child eggs, meat, fish or chicken, most of them were said less than once or once per week (70.5%) followed by 2 to 3 times per week (25.0%) after that once per day (2.7%) then 2 to 3 times per day (1.8%). **“Table 3”**

About how many times during last month did mothers feed her child bread, rice, pasta, potatoes, kesra or Aseeda, the majority of them were said once per day (31.3%) followed by 2 to 3 times per day (30.4%) after that 2 to 3 times per week (20.5%) then less than once or once per week (17.9%). **“Table 3”**

About how many times during last month did mothers feed her child vegetables

**Table 3.** Shows distribution of mother practise characteristics in Abuzaid Albuluk pediatric specialized hospital in 2023 (n = 122).

Characteristic	Value	Frequency	Percent
When did you start giving your child food or drinks?	Less than 6 months	83	74.1
	6 months	18	16.1
	More than 6 months	11	9.8
How many times did you feed your child yesterday?	None	9	8.0
	1 time	13	11.6
	2 time	35	31.3
	3 time	42	37.5
	4 time	12	10.7
	More than 4 time	1	0.9
It's necessary to wash your hand every time you prepare food to your child?	Yes	88	78.6
	Sometimes	23	20.5
	No	1	0.9
It's good to give child less than 6 months local traditional treatment (like fenugreek, anise)?	Yes	83	74.1
	No	25	22.3
	I don't know	4	3.6
It's a good practise to treat child with jaundice (yellow discoloration of skin) by cauterization?	Yes	25	22.3
	No	61	54.5
	I don't know	26	23.2
It's good to treat your child at home by tablets or herbal medication when he/she is sick?	Yes	76	67.9
	No	31	27.7
	I don't know	5	4.5
How many times during last month did you feed your child fruits?	Once per day	13	11.6
	2 to 3 times per week	36	32.1
	Less than once or once per week	63	56.3
How many times during last month did you feed your child beans or peas?	2 to 3 times per day	8	7.1
	Once per day	36	32.1
	2 to 3 times per week	45	40.5
	Less than once or once per week	23	20.5
How many times during last month did you feed your child eggs, meat, fish or chicken?	2 to 3 times per day	2	1.8
	Once per day	3	2.7
	2 to 3 times per week	28	25.0
	Less than once or once per week	79	70.5

**Continued**

How many times during last month did you feed your child bread, rice, pasta, potatoes, Kesera or Aseeda?	2 to 3 times per day	34	30.4
	Once per day	35	31.3
	2 to 3 times per week	23	20.5
	Less than once or once per week	20	17.9
How many times during last month did you feed your child vegetables?	2 to 3 times per day	23	20.5
	Once per day	18	16.1
	2 to 3 times per week	19	17.0
	Less than once or once per week	52	46.4

the majority of them were said less than once or once per week (46.4%) followed by 2 to 3 times per day (20.5%) after that 2 to 3 times per week (17.9%) the once per day (16.1%). **“Table 3”**

#### 5.4. Assessment of the Child Health

About child term at birth, the majority of children were born full term (95.5%) followed by preterm (3.6%) then mother don't know (0.9%). **“Table 4”**

About child weight at birth that the most of the children were ranging from 2.5 - 4 Kilogram (kg) (48.2%) followed by mother don't knows (45.5%) after that more than 4 kg (4.5%) then less than 2.5 kg (1.8%). **“Table 4”**

About children type of feeding, the majority of children were breast fed only (70.5%) followed by breast and formula fed (26.8%) then formula fed only (2.7%). **“Table 4”**

About child diarrhoea frequency in the last two weeks, the majority of children has no diarrhoea (46.4%) followed by 1 - 3 times (28.6%) then more than 6 times (13.4%) and last 4 - 6 times (11.6%). **“Table 4”**

About children constipation in last month, most of children don't had constipation (75.9%) followed by children had constipation (23.2%) then mother's said don't know (0.9%). **“Table 4”**

About child vomiting frequency in the last two weeks, the majority of children has no vomiting (49.1%) followed by 1 - 3 vomits (25.0%) then more than 6 times (19.6%) and last 4 - 6 vomits (6.3%). **“Table 4”**

About children had been diagnosis as anaemic that the majority don't diagnosis anaemic before (63.4%) followed by diagnosed anaemic (36.6%). **“Table 4”**

About children eating non food items, the majority don't eat non food items (68.8%) followed by eating Clay (28.6%) then eating Ice (2.7%). **“Table 4”**

About children currently had dental problems, the majority don't had dental problems (87.5%) followed by had dental problems (10.7%) then mother's said don't knows (1.8%). **“Table 4”**

About children chronic illness, the majority don't had any chronic illness (83.9%) followed by lactose intolerance (12.5%) after that sickle cell anaemia (2.67%) then asthma (0.9%). **“Table 4”**

**Table 4.** Shows distribution of children health characteristics in Abuzaid Albuluk pediatrics specialized hospital in 2023 (n = 122).

Characteristic	Value	Frequency	Percent
Is your child born full term?	Yes	107	95.5
	No	4	3.6
	I don't know	1	0.9
What's your child weight at birth?	Less than 2.5 Kg	2	1.8
	2.5 - 4 Kg	54	48.2
	More than 4 Kg	5	4.5
	I don't know	51	45.5
What tape of feeding your child had?	Brest fed	79	70.5
	Formula fed	3	2.7
	Breast and formula fed	30	26.8
Did your child had a diarrhoea in the last two weeks?	No	52	46.4
	1 - 3 times	32	28.6
	4 - 6 times	13	11.6
	More than 6 times	15	13.4
Did your child had a constipation in the last month?	Yes	26	23.2
	No	85	75.9
	I don't know	1	0.9
Did your child had a vomiting in the last two weeks?	No	55	49.1
	1 - 3 times	28	25.0
	4 - 6 times	7	6.3
	More than 6 times	22	19.6
Was your child ever diagnosis as anemic?	Yes	41	36.6
	No	71	63.4
Does your child eat any non food items?	No	77	68.8
	Clay	32	28.6
	Ice	3	2.7
Does your child currently have dental problems?	Yes	12	10.7
	No	98	87.5
	I don't know	2	1.8
Does your child have any chronic illness?	No	94	83.9
	Lactose intolerance	14	12.5
	Asthma	1	0.9
	Sickle cell anemia	3	2.7
What's status of your child vaccination according to expanded programme on immunization?	Complete (up to date)	91	81.3
	Incomplete	20	17.9
	Not vaccinated	1	0.9

About children vaccination status, most of them had complete vaccination (81.3%) followed by incomplete vaccination (17.9%) then not vaccinated at all (0.9%). “**Table 4**”

#### 5.4.1. Assessment of the Child Linear Growth

About children assessment of linear growth, the majority had no stunting (65.2%) followed by children whom their data to assess it isn't available (15.2%) after that moderate stunting (14.3%) then severe stunting (5.4%). “**Table 5**”

#### 5.4.2. Assessment of the Child Weight for Height

About children assessment of weight for length, the majority were children whom their data to assess it isn't available (33.0%) followed by healthy weight (32.1%) after that severe wasting (11.6%) then moderate wasting (10.7%) then overweight (8.0%) then underweight (4.5%). “**Table 5**”

### 5.5. Overall Score of Assessment of the Mother Knowledge and Practise and Child Health

About assessment of the mother knowledge, the majority had moderate knowledge (43.8%) followed by high knowledge (41.1%) then low knowledge (15.2%). “**Table 6**”

About assessment of the mother practise, the majority had moderate practise (47.3%) followed by low practise (39.3%) then high practise (13.4%). “**Table 6**”

About assessment of the child health, the majority of them had moderate health (49.1%) follow by high health (41.1%) then low health (9.8%). “**Table 6**”

### 5.6. Cross Tabulation of the Participant's Characteristics

A bivariate analysis of child health and the mothers' knowledge and practice was done. In this analysis chi-square test of significance was conducted to determine

**Table 5.** Shows distribution of children weight for height and linear growth characteristics in Abuzaid Albuluk pediatrics specialized hospital in 2023 (n = 122).

Characteristic	Value	Frequency	Percent
Assessment of child linear growth	No stunting	73	65.2
	Moderate stunting	16	14.3
	Severe stunting	6	5.4
	Not available	17	15.2
Assessment of child weight for length	Overweight	9	8.0
	Healthy weight	36	32.1
	Underweight	5	4.5
	Moderate wasting	12	10.7
	Severe wasting	13	11.6
	Not available	37	33.0

the statistical significance between child health and the mothers knowledge and practice. The results in “**Table 7**” and “**Table 8**” indicate that mothers knowledge and practice had a statistically significant association with children health, with a p-value of <0.001, <0.001 respectively.

## 6. Discussion

Mother nutritional knowledge and practise is an important measure to improve dietary habits and food choices, since poor dietary habits are the main reasons for poor nutritional status of children and health.

**Table 6.** Shows distribution of overall score of assessment of the mother knowledge and practise and child health characteristics in Abuzaid Albuluk peditrics specialized hospital in 2023 (n = 122).

Characteristic	Value	Frequency	Percent
Overall score of assessment of the child health	High	46	41.1
	Moderate	55	49.1
	Low	11	9.8
Overall score of assessment of the mother knowledge	High	46	41.1
	Moderate	49	43.8
	Low	17	15.2
Overall score of assessment of the mother practise	High	15	13.4
	Moderate	53	47.3
	Low	44	39.3

**Table 7.** Shows mother knowledge \* child health tabulation.

		Knowledge			Total	P value
		High	Moderate	Low		
<b>Health</b>	High	46	0	0	46	<0.001
	Moderate	0	49	11	60	
	Low	0	0	6	2	
<b>Total</b>		46	49	17	112	

**Table 8.** Shows mother practise \* child health tabulation.

		Practise			Total	P value
		High	Moderate	Low		
<b>Health</b>	High	15	31	0	46	<0.001
	Moderate	0	22	33	55	
	Low	0	0	11	11	
<b>Total</b>		15	53	44	112	

This descriptive cross-sectional non-interventional hospital-based study was carried out to assess mother's nutritional knowledge and practice towards children under two years of age and its impact on their health in Abuzaid Albuluk paediatric specialized hospital, the mothers were asked questions by using interview with structural questionnaires about her child health (child birth history, child nutritional and growth assessment, communicable diseases, diet related diseases, child chronic diseases, child vaccination status), also the mothers were asked about her nutritional knowledge and practise (knowledge about exclusive breastfeeding, knowledge and practise about breastfeeding and child feeding, knowledge about diarrhoea management, knowledge about beneficial of colostrum, knowledge about obesity, knowledge and practice about weaning, practise about cultural taboos and it's source, practise about child fed nutrition requirement).

In general we founded that the mothers knowledge and practise had strong impacts on the children nutrition status and their general health, also in their growth and development..

### 6.1. General Characteristics of the Study Participants

The study showed about the children demographic that the majority of them their age ranging between 6 - 12 months (46 child, 41.1%) when the least age was less than 6 months (10 children, 8.9%) the study showed some similar with a study was preformed in September 2020 by Abd Elrahman, *et al.* [8] that showed the children less than on years age was 68.3% and from 1 - 2 years is 31.7%.

In our study about child sex we founded that male was about 57 child (50.9%) when female was about 55 child (49.1%), this was similar to study was preformed in September 2020 by Abd Elrahman, *et al.* [8] that showed male was 55.6% and female was 44.4%.

The study also shows about the mothers age that the majority of them were ranging in two equal category: 26 - 30 years and 31 - 35 years which each of them equal 39 mother (34.8%), followed by 21 - 25 years (14.3%) and the least number also ranging in two equal category: under 21 years and above 35 years which each of them equal 9 mothers (8.0%) which showed some similar with a study was conducted in 2019 by S. Shrestha, *et al.* [9] that showed most of them ranging between 25 - 34 years (48%) and the minimal was above 35 years (6%).

The study showed about mothers marital status that most of the mothers were married (102 mother, 91.1%) when some of them were widow (5.4%) or divorced (3.6%), which showed similar to a study was preformed in august 2021 by Sara G. Mohammed, *et al.* [10] that showed married was about 93.3% when divorced about 5.0% and widow was 1.7%, this similar due to both country their religion to born child after married.

In our study about mothers working status we founded that the majority of the mothers were housewife (82 mother, 73.2%) when the rest of them were worker (30 mother, 26.8%) which showed similar to a study was preformed in September 2020 by Abd Elrahman, *et al.* [8] showed that 90.5% of mothers



housewife and 9.5% was worker.

The study showed about the mothers socioeconomic status that the majority of them had moderate socioeconomic status (67 mother, 59.8%) when the rest of them almost had low socioeconomic status (44 mother, 39.3%) and only one mother had high socioeconomic status (0.9%), which showed difference with study was preformed in 2021 by Alex Yeshaneh, *et al.* [11] that showed high was 47.5%, moderate was 41.6% and low was 10.9% only.

In our study about the mothers educational level we founded that unfortunately only one quadrant of the mothers had complete university (28 mother, 25.0%) when the majority of them only had primary school (39 mother, 34.8%) and secondary school (33 mother, 29.5%) and the least number of them don't had any formal education even they educate Khalwa—Islamic religion education—(6.3%) or they were illiterate (4.5%), our finding comparing to study was preformed in September 2020 by Abd Elrahman, *et al.* [8] showed difference in that the majority was university (49.2%) when primary school was 23.0% only, and show similar at that secondary school was 31.9%, Khalwa was 0.8% and illiterate was 1.6%.

In the present study when we asked the mothers about how many children had, we founded that the majority of the mothers had 3 - 4 children (53 mother, 47.3%), which showed difference with a study was preformed in January 2019 by Kyaw S. Mya, *et al.* [12] that founded the majority had 1 - 2 child (63.4%).

## 6.2. Assessment of the Mothers Knowledge

### 6.2.1. Knowledge about Exclusive Breastfeeding

In our study we asked the mothers if breast milk alone is sufficient in the first 6 months and about half of the mothers said yes (53.6%) when minimal number said they don't know (2.7%) and the rest said is insufficient (43.8%), this was similar to a study was preformed in September 2020 by Shaza O. H. Kanan, *et al.* [13] which founded that 64.8% of the mothers said that baby must give breast milks only in first 6 months.

In this study when we asked the mothers is child can be given food at first 6 months, about half of the mothers said no (52%) when the rest of them were said they can give them food in first six months (48%), this was different to a study preformed in September 2022 by S. Gülümser, *et al.* [14] which founded 45% of them said yes and 55% said no.

In this study we asked the mothers is child can be given water or juices in the first 6 months and unfortunately most of them were said yes (83.0%), this was similar to a study was conducted in 2021 by C. Azandjeme, *et al.* [15] that founded most of them give water before six months, this similar because the two study sample from developing country and had insufficient education.

According to those 3 results we founded that most of the mothers in the study had poor knowledge about exclusive breastfeeding because only 43.8% of the mothers know that breast milk alone is sufficient and unfortunately only 16.1% of the mothers knows that water also shouldn't be given to the child.

### 6.2.2. Knowledge about Breastfeeding

In our study when we asked the mothers if cow or goat milk is a complete nutrition and can relapse breastfeeding, minimal number of them said it can replace it (39.3%), this was difference to a study was preformed in 2020 by Sahni B, *et al.* [16] that founded 55.0% said Cow's milk it can replace it this difference possible to be because the compared study done in India and people in it had religion bounded with cows.

In this study when we asked the mothers about was breastfeeding should start immediately after birth, most of them said yes (96.4%), this was similar to a study was preformed in 2021 by Alex Yeshaneh, *et al.* [11] that founded 85.2% of them said breastfeeding should started within less than one hour.

In our study we asked the mothers if colostrum was very beneficial for the child, most of them said that was true (72.3%), this was similar to a study was preformed in September 2020 by Shaza O. H. Kanan, *et al.* [13] which founded that 84.9% of the mothers know about colostrum beneficial.

### 6.2.3. Knowledge about Diarrhoea Management

In this study when we asked the mothers about was child with diarrhoea should be breastfed, most of them said yes (89.3%), this was difference to a study was preformed in 2022 by Bauleth MF, *et al.* [17] that founded only 43.0% said they don't stop breastfed, this possible to be because the compared study sample has low education and most of them from rural area.

### 6.2.4. Knowledge about Child Obesity

In this study we asked the mothers if they think that the obese child is a healthy child, unfortunately we founded that more than half of them said yes it's healthy (58.9%) when minimal number said they don't know (15.2%) and the rest said no isn't healthy (25.9%), this suggest to be due to traditional beliefs that obesity is indicate high prestige.

### 6.2.5. Knowledge about Child Feeding

In our study when we asked the mothers about were the new born babies should breastfed any time when they cries, we founded that most of them said that is true (80.4%), this difference from a study was preformed in September 2020 by Shaza O. H. Kanan, *et al.* [13] that founded only 20.6% of the mothers said new born baby breastfed when they cries, this possible to be due to another answers that mother can choose in the comparable study.

### 6.2.6. Knowledge about Weaning

In our study when we asked the mothers how weaning should be done, we founded that most of the mothers said gradually (67.0%), this was similar to a study preformed in September 2022 by Gassem A, *et al.* [18] that founded 84% of them were said gradually, this possible to be due to both mothers in study most of them had more than 3 children and overtime know how weaning done.

In this study we asked the mothers if they became pregnant, they must stop

breastfeeding or not, unfortunately we founded that most of them said must stop it (65.2%), this was difference to a study preformed in September 2016 by Alshe-bly M, *et al.* [19] that founded commonest cause of stop it insufficient milk then pregnancy (19.7%), this difference can be due to multiple answers in comparable study and the comparable study in developed country with high education sample.

In our study we asked the mothers if they became ill, they should stop breast-feeding or not, we founded that the majority of them said they shouldn't stop it (58.9%), this was similar to a study preformed in September 2022 by S. Gülüm-ser, *et al.* [14] that founded 65% of the mothers said shouldn't stop it, this dif-ference can be due to the comparable study in developed country with high education sample.

According to those 3 results we founded that even most of the mothers are know that weaning should be done gradually (67%) but most of them do it sud-denly if became pregnant (65%) and this was because of their wrong believes that milk became harmful to their children.

### **6.2.7. Source of Traditional Treatment Knowledge**

In our study when we asked the mother from where they gain their knowledge about traditional treatment we founded that most of them said from their moth-ers or/and grandmothers (87.5%), this was similar to a study was conducted in 2021 by C. Azandjeme, *et al.* [15] that founded most of them said they get it from the grandmothers.

### **6.2.8. Overall Score of the Mother Knowledge Assessment**

We assessed the mothers' knowledge score statistically by using 13 questions about: knowledge about exclusive breastfeeding, knowledge about breastfeeding, knowledge about diarrhoea management, knowledge about obesity, knowledge about child feeding and knowledge about weaning. After calculate the score in percentages we converted it to three indicators: high > 70%, moderate = 50% - 70% and low < 50%.

We founded that the majority of the mothers had moderate knowledge (49 child, 43.8%), followed by high knowledge (46 child, 41.1%) and fortunately the minimal number had low knowledge (17 child, 15.2%).

## **6.3. Assessment of the Mothers Practise**

### **6.3.1. Mother Practise about Child Feeding**

In this study when we asked the mothers about how many times they fed their children yesterday (dietary diversity) we founded only 49.1% of the mothers meet the minimal dietary diversity requirement according to child age, this was showed some similar to a study was preformed in January 2019 by Kyaw S. Mya, *et al.* [12] that founded only 24.8% received minimal dietary diversity, this simi-lar can be due to both sample in the two studies had low socioeconomic status.

In our study when we asked the mothers it's necessary to washed their hands every times they prepare food to their children, we founded that the majority of them said yes (78.6%), this was similar to a study was conducted in 2019 by Ed-

ward A, *et al.* [20] that founded 75% in Cambodia, 95% in Guatemala, 60% in Kenya and 45% in Zambia washed their hands.

### 6.3.2. Mother Practise about Cultural Taboos

In our study when we asked the mothers it's a good practise to give their children local traditional treatment like fenugreek, anise and baobab, most of them said yes (74.1%), this was difference to a study was conducted in 2016 by Satti SA, *et al.* [21] that founded only 37% use fenugreek, this can be due to the comparable study asked specifically about fenugreek only.

In this study we asked the mothers about it's a good practise to treat their children by cauterization when they had jaundice, we founded that 22.3% they said yes, this was similar to a study was conducted in 2016 by Satti SA, *et al.* [21] that founded 26% use cauterization for jaundice, this similar can be due to the both study in same state -Khartoum- and both in urban.

In our study when we asked the mothers about it's a good practise to treated their children at home by herbal medication when they sick, we founded that most of them said yes (67.9%), this was similar to a study was conducted in 2021 by C. Azandjeme, *et al.* [15] that founded most of them used tablets or herbal tea and go to hospital if condition worse, this similar can be due to both sample are in developing country with low income and high cost health services.

### 6.3.3. Mother Practise about Age of Start Weaning

In this study when we asked the mothers about when did they start to introduced complementary food to their children, we founded that unfortunately the majority of them said less than six months (74.1%), this difference to a study was preformed in 2020 by Ibrahim, S. *et al.* [22] that founded only 26.0% are introduced complementary feeding before six months, this can be due to high education of comparable study.

### 6.3.4. Mother Practise about Child Fed Nutrition Requirement

In this study when we asked the mothers about types of food they gives to their children and it's frequencies, we found:

- 1) Fruits: most of them fed it to their children less than once or once per week (56.3%).
- 2) Beans or Pea: the majority fed it to their children 2 to 3 times per week (40.2%).
- 3) Animal proteins: most of them fed it to their children less than once or once per week (70.5%).
- 4) Carbohydrates: the majority of them fed it to their children once per day (31.3%).
- 5) Vegetables: the majority of them fed it to their children less than once or once per week (46.4%).

So the mothers were gives adequate nutrition composition requirements to their children were: in fruits 11.6% mothers, beans or pea 39.2% mothers, animal proteins 4.5% mothers, carbohydrates 61.7% mothers and vegetables 36.6%

mothers, this was similar to a study was preformed in 2020 by Ibrahim, S. *et al.* [22] which founded that the children given adequate nutrition composition requirements were: in fruits 13.3%, in lean meats and beans 45.6%, in carbohydrates 77.0% and vegetables 6.7%.

### 6.3.5. Overall Score of the Mother Practise Assessment

We assessed mother practise score statistically by using 11 questions about: practise about child feeding, practise about cultural taboos, practise about age of start weaning and practise about child fed nutrition requirement. After calculated the score in percentages we converted it to three indicators: high > 70%, moderate = 50% - 70% and low < 50%.

We founded that the majority of the mothers had moderate practise (53 children, 47.3%), followed by low practise (44 children, 39.3%) and unfortunately the minimal number had high practise (15 children, 13.4%).

### 6.4. Assessment of the Child Health

The study was showed that most of the children were born full term (95.5%) and a lit number of them were born preterm (3.6%) when one mother said she don't know (0.9%) that showed difference with a study was preformed by Gilliam J. *et al.* [23] that founded 33.3% of children was born preterm, this difference because the comparable study conducted in children with special health.

Regarding this study the majority of the children born within the normal weight 2.5 - 4 Kg (48.2%) when near half of the mothers said they don't know (45.5%) and a minimal number were more than 4 Kg (4.5%) or less than 2.5 Kg (1.8%), this showed similar with a study was preformed in January 2019 by Kyaw S. Mya, *et al.* [12] that was founded most of the children with normal average weight or above it (87.7%) and the rest were below the average weight (12.3%).

Regarding our study most of the children were breast fed only (70.5%) and a minimal number were formula fed only (2.7%) when the rest were both breast and formula fed (26.8%), this showed difference with a study was conducted March in 2023 by Ali Ranjha A. *et al.* [24] that showed: formula fed were 55.9%, breast fed were 25.8% and both were 18.3%.

In this study when we asked the mothers about her child diarrhoea frequency in last two weeks we founded that more than half of the children had diarrhoea (55.6%), this shows difference with a study was preformed in January 2019 by Kyaw S. Mya, *et al.* [12] that founded the majority of them don't have diarrhoea (83.9%), this can be due to our study is a hospital based study.

Regarding constipation frequency in last month we founded 23.2% of children had constipation, this result matched with a study was preformed by Gilliam J. *et al.* [23] which founded 22% of children were had constipation.

Regarding vomiting frequency in last two weeks we founded that half of the mothers said that her children had vomiting (50.9%), this result don't matched with a study was preformed by Gilliam J. *et al.* [23] which founded only 18% of

children had vomiting, this can be due to our study is a hospital based study.

In our study when we asked the mothers about if even her child had diagnosis anaemic before we founded that the majority of them diagnosis anaemic (63.4%), this showed difference with a study was preformed in January 2019 by Kyaw S. Mya, *et al.* [12] that founded 43% of child had anaemia, this can be due to our study in a hospital with specialized wart in haematology.

Regarding eating any non food items or substances that have no nutritional value (pica) which is sometimes is a characteristic sign of iron deficiency anaemia, when we asked the mothers we founded that most of them their children don't had it (68.8%) and minimal number eat ice (2.7%) when the rest eat clay (28.6%), this showed similar with a study was preformed by Gilliam J. *et al.* [23] that founded 18% of children eat non food item (clay, dirt and ice).

In this study when we asked the mothers if her child currently had dental problems we founded that 10.7% of them said yes, this showed similar with a study was preformed by Gilliam J. *et al.* [23] that founded 6% of children had dental problems.

Regarding children vaccination according to Sudan Expanded Programme of Immunization (EPI), we founded that most of the children were complete vaccinated up to date, unfortunately the rest had incomplete vaccination (17.9%) except one child not vaccinated at all (0.9%), this showed similar with a study was conducted in March 2023 by Ali Ranjha A. *et al.* [24] that founded: children vaccinated were 84.4%, incomplete were 8.4% and not vaccinated were 7.2%.

#### **6.4.1. Assessment of the Child Linear Growth**

In this study we collect child data about his/her age, sex and length to assessed child linear growth by growth standards according to WHO classification [25], we founded that the majority of the assessed children (95 child, 84.8%) had no stunting (73 child, 65.2%) followed by children had moderate stunting (16 child, 14.3%) and the minimal number had severe stunting (6 children, 5.4%) when the rest of the children (17 child, 15.2%) unfortunately their data were not complete to assessed their linear growth, this was similar to a study was preformed in 2020 by Ibrahim, S. *et al.* [22] that founded 85% of children had no stunting when the rest 15% had stunting.

#### **6.4.2. Assessment of the Child Weight for Length**

In our study we collect child data about his/her age, sex, weight and length to assessed child weight for length by the growth standards according to WHO classification [25], we founded that the majority of the assessed children (75 child, 67.0%) had healthy weight (36 child, 32.1%) followed by wasting (25 child, 23.3%) with his two category: moderate wasting (12 child, 10.7%) or severe wasting (13 child, 11.6%) and the minimal number was the children that overweight (9 child, 8.0%) or underweight (5 child, 4.5%) and the rest of the children (37 child, 33.0%) unfortunately their data weren't complete to assessed their weight for length, the study showed some similar and some difference with a

study was performed in 2020 by Ibrahim, S. *et al.* [22] that founded: 67% child healthy weight, 18% at risk of overweight, 8% wasted and 7% overweight or obese.

#### **6.4.3. Overall Score of the Child Health Assessment**

We assessed child health score statistically by using 5 questions and 2 indicators about: child linear growth, child weight for length, diarrhoea frequency, vomiting frequency, constipation frequency, dental problems and anaemic history, after calculate the score in percentages we convert it to three indicators: high > 70%, moderate = 50% - 70% and low < 50%.

We founded that most of children had moderate health (55 child, 49.1%) followed by high health (46 child, 41.1%) and fortunately a minimal number had low health (11 child, 9.8%).

### **7. Limitations**

There was a problem with the mothers' availability and to given us their attention because they were focusing with their sick children, so a lot of times required in waiting mothers available times for data collection.

Also we took children health data from her mother only without any interventions in them because of the difficulty of approved to do any intervention.

### **8. Recommendation**

Firstly we recommended ministry of health and government to adopt appropriate strategies of antenatal nutritional counselling to the mothers and to adopt eradication programme towards wrong beliefs and cultural taboos about children treatment, also further research is required with involving a large study sample of mothers and interventions on their children at different paediatric health care settings.

Secondly we recommended hospital to eradicate wrong beliefs about children nutrition in general and about weaning specifically and increase knowledge about food nutrition composition especially proteins because only very little of the mothers given it probably.

### **9. Conclusions**

The majority of participant -mothers and children- ages ranging between 26 - 35 years and 6 - 12 months receptively, most of the children were male when most of the mothers were married, housewife, had 3 - 4 children, educate to primary school and had moderate socioeconomic status.

Most of the children were born full term, with normal average birth weight, also most of them were breast fed.

Most of the children founded to be anaemic once at any times of their life and fortunately the majority of them don't had diarrhoea or vomiting in last two weeks and most of them don't had constipation in the last month, also most of

children don't had dental problems or eating non food items and fortunately most of them is fully vaccinated up to date.

Most of the mothers know that breast milk was sufficient in the first six months but also most of them think that they can give water to their children in the first six months and half of them think they can give food. So most of the mothers had poor knowledge and practise about exclusive breastfeeding.

Half of the mothers said cow or goat milk don't replace breast milk and most of them said breastfeeding start immediately after birth, also most of them said that child with diarrhoea should breastfed.

Most of the mothers know about beneficial of colostrum and times of new born fed, also most of them said children eating alone at first years of their life is better than eat alone but unfortunately the majority of them think obese child is a healthy child and most of the mothers think if they become pregnant must stop breastfeeding their children, when most of them fortunately said weaning done gradually and they should not stop the breastfeeding if they become ill. Also most of them said they gain their knowledge about sources of traditional treatments from their mothers or/and grandmothers.

The majority of the mothers fed their children above the minimal dietary diversity and washed their hand before prepare food, also most of them don't think it's a good practise to treat children with cauterization but unfortunately most of them think it was a good practise to given their children local traditional treatment or given them herbal medication at home when they became sick.

Unfortunately most of them introduce complementary food at age less than six months and don't give sufficient food frequencies of animals' proteins, fruits, vegetables or pea and beans and only give sufficient food frequencies of carbohydrates.

When we calculate mothers knowledge and practise score and children health score we founded that most of the mothers had moderate knowledge and practise and most of the children had moderate health. Also we found significant relationship ( $p$  value  $< 0.001$ ) between the mothers' knowledge and the child health, and we founded significant relationship ( $p$  value  $< 0.001$ ) between mothers practise and child health.

## **Acknowledgements**

Benjamin Franklin once said:

“An investment in knowledge pays the best interest.”

We want to thank everyone who supported us in delivering this research, we sincerely think that we couldn't accomplish this paper without the complete support & help from our loved ones, specially our families, the ones who stood by us all along the way, cheering, complimenting and advising us on how we need to complete this work, telling us “not to quit when we're tired but to quit when we're done”.



And last but not least I want to thank us, I want to thank us for never quitting, for doing all this hard work and for believing in our selves.

We hope that you see our efforts worth your full and non-dividing attention.

Thank you a lot.

### **Ethical Consideration**

The permission was obtained from the Khartoum ministry of health, from Abuzaid Albuluk Pediatrics Specialized Hospital and from the mothers by informed written consent.

### **Funding**

This study was funded independently by the authors.

### **Conflicts of Interest**

The authors declare no conflicts of interest regarding the publication of this paper.

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## Appendix 1: Questionnaire

### Questionnaire

Mother's nutritional knowledge and practice towards children under two years of age and its impact on their health in Abuzaid Albuluk pediatric specialized Hospital

All answers written in this questionnaire will be treated with confidentiality and only used for research purposes. Please answer the following questions regarding your nutritional knowledge and practice. Also keep in mind that this is not mandatory but your contribution is warmly appreciated.

### A. General Characteristics

1. Child age (months): -----
2. Child sex:  
Male  Female
3. Mother marital status  
Married  Divorced  widow
4. Mother working status:  
Worker  Housewife
5. Socioeconomic status:  
Low  Moderate  High
6. Number of children:  
1 - 2  3 - 4  5 - 6  More than 6
7. Mother educational level:  
University  Secondary school  Primary school  Khalwa  Illiterate
8. Mother age (years):  
Under 21  21 - 25  26 - 30  31 - 35  Over 35

### B. Assess Mother's Knowledge

1. Breast milk alone is sufficient in the first 6 months?  
Yes  I don't know  No
2. Children with diarrhea should be breastfed?  
Yes  I don't know  No
3. Colostrum (mother milk at first days of breastfeeding) is very beneficial for the child?  
Yes  I don't know  No
4. Child can be given food at first 6 months?  
Yes  I don't know  No
5. Child can be given water or drink at first 6 months?  
Yes  I don't know  No
6. The new born baby should be breastfed any time when he/she cries?

- Yes  I don't know  No
7. An obese child is a healthy child?  
 Yes  I don't know  No
8. Cow milk or goat milk is a complete nutrition food and can relapse breastfeeding?  
 Yes  I don't know  No
9. Breastfeeding should start immediately after birth?  
 Yes  I don't know  No
10. Weaning should be done:  
 Gradual  I don't know  Sudden
11. If a mother became pregnant , she must stop breastfeeding her child?  
 Yes  I don't know  No
12. If a mother become ill , she should stop breastfeeding her child?  
 Yes  I don't know  No
13. The child eating alone in his own plate in first years of his life is better than eating with his/her family?  
 Yes  I don't know  No
14. From where did you gain your knowledge about traditional treatment?  
 Mother or/and grandmother  Religion  Culture  Friends

### C. Assess Mother's Practise

1. At which time you started give your child foods or drinks?  
 Less than 6 months  6 months  more than 6 months
2. How many time did you feed your child yesterday?  
 None  1  2  3  4  More than 4
3. It's necessary to wash your hands when you prepare food to your child?  
 Yes  sometimes  No
4. Is it a good practise to give child with diarrhoea local traditional treatment ( like Fenugreek, Anise, Baobab)?  
 Yes  I don't know  No
5. Is it a good practise to treat child with jaundice (yellow discoloration of skin) by cauterization?  
 Yes  I don't know  No
6. Is it a good practise to treat your child at home by herbal medications when he sick?  
 Yes  I don't know  No
7. How many times during last month do you feed your child Fruits?  
 Less than once or once per week  2 to 3 times per week   
 Once per day  2 to 3 times per day
8. How many times during last month do you feed your child beans or peas?

Less than once or once per week  2 to 3 times per week

Once per day  2 to 3 times per day

9. How many times during last month do you feed your child eggs , meat, fish or chicken?

Less than once or once per week  2 to 3 times per week

Once per day  2 to 3 times per day

10. How many times during last month do you feed your child Bread, rice, pasta, potatoes, Kesera or Aseeda?

Less than once or once per week  2 to 3 times per week

Once per day  2 to 3 times per day

11. How many times during last month do you feed your child vegetables?

Less than once or once per week  2 to 3 times per week

Once per day  2 to 3 times per day

#### D. Assess Child's Health

1. Was your child born full term and what's his/her weight at birth?

Yes  I don't know  No

2. Weight at birth:

Less than 2.5 Kg  2.5 - 4 Kg  More than 4 Kg  I don't know

3. What type of feeding your child had?

Breast fed  Formula fed  Breast and formula  Cow or/and Goat milk

4. If available, what is your child's most recent:

-Weight in Kg: \_\_\_\_\_

-Height in Cm: \_\_\_\_\_

- Date of measurement \_\_\_\_\_

5. Is your child allergic or intolerant to any food?

Yes  I don't know  No

6. If yes, what type of foods?

Milk  Eggs  Bea nuts  Others: \_\_\_\_\_

7. Did your child had a diarrhea in the last two weeks?

0  1 - 3  4 - 6  more than 6

8. Did your child had a constipation in the last month?

Yes  I don't know  No

9. Did your child had vomit in the last two weeks?

0  1 - 3  4 - 6  more than 6

10. Was your child ever diagnosis anemic?

Yes  I don't know  No

11. Does your child currently have dental problem?

Yes  I don't know  No

12. Dose your child eat any non-food items?

No  Clay  Ice  Others: \_\_\_\_\_

13. Does your child have any chronic illness?

No  DM  Celiac disease  cardiac problem  Others: \_\_\_\_\_

14. What's status of your child vaccination according to EPI(Expanded Programme on Immunization in Sudan)?

Complete  Incomplete  Not vaccinated  I don't know