Mothers' Perception Regarding their Children with Lactose Intolerance

Ola Mohamed Hassan[1], Hanaa Abd El Hakiem Ahmed[2], Shimaa Fathy Miky[3],
1-Demonstrator of Community Health Nursing, Faculty of Nursing, Ain Shams University
2- Professor of Community Health nursing. Faculty of Nursing. Ain Shams University
3- Assistant Professor of Community Health nursing. Faculty of Nursing. Ain Shams University

Abstract

Background: Lactose intolerance is a predominant indicator of under nutrition in children. They have abdominal discomfort, burping, and diarrhea whenever they consume dairy. **Aim of the study:** Assess mother's perception regarding their children with lactose intolerance. **Design:** A descriptive analytical design was used to conduct this study. **Setting:** The study was conducted at nutritional outpatient clinics at pediatric Ain Shams hospital affiliated to Ain Shams University, Cairo, Egypt. **Sample**: Purposive sample composed of 291 mothers, having children less than five years, confirmed diagnosis with lactose intolerance, attending to nutritional clinic for follow- up, free from any co-morbid diseases. **Tools of data collection:** three tools were used to collect the data **1st tool:** Interviewing questionnaire include socio demographic characteristics of mothers and their children, Mothers' and child health history, knowledge of mothers regarding lactose intolerance, and mothers' reported practices toward their children with lactose intolerance. **2nd tool:** Attitude scale of Mothers' toward their Children with lactose intolerance**. 3rd tool:** Anthropometric measurements of Children. **Results:** More than three quarters of the studied mothers were at unsatisfactory level of total knowledge, more than half of them were at poor level of total reported practice, and more than half of the studied mothers were negative attitude regarding their children with lactose intolerance. **Conclusion:** There were statistically significant positive correlation between total mothers' knowledge, total reported practice and total attitude toward their children with lactose intolerance. **Recommendations:** Developing and implementing of health education programs to increase their knowledge, practices and their attitudes toward their children with lactose intolerance.

Key wards: Lactose Intolerance, Perception, Children, and Mothers.

Introduction

Lactose intolerance is caused by a relative or entire absence of lactase during development, acute gastroenteritis, persistent diarrhea, small bowel overgrowth, and other causes of injury to the small intestinal mucosa. Secondary lactase deficiency can manifest at any age but is most common in infancy. In the past, when no lactose-free human milk substitute was easily accessible and nutritionally adequate, infants born with congenital lactase deficiency would not have been expected to live. Relative lactase deficit in infants born at less than 34 weeks of gestation is now considered diagnostic of developmental lactase deficiency ***(Neel., et al., 2019).***

Children who suffer from lactose intolerance have trouble digesting the milk sugar known as lactose. As a result, children have abdominal discomfort, burping, and diarrhea whenever they consume dairy. The disorder, commonly known as lactose malabsorption, is innocuous but can cause unpleasant symptoms. ***(Morelli et al., 2019).***

The main adverse health effects of LI occur as a result of milk avoidance and reduced calcium intakes. Avoidance of dairy products may lead to nutritional rickets in young children, as well as low bone mineral density and increased fracture risk later in life. Calcium intake is a marker for dietary adequacy and closely correlates with the intake of other micronutrients.
Calcium absorption in individuals with LI is normal, which means that calcium can be administered as an oral supplement in non-dairy formats. (***Giugliano, Musolino, et al, 2023***).

Several studies have shown that hypersensitivity to lactose has psychosocial impacts and negatively affect health status of children, adolescents, and their families. This is because the disease is treated with food restrictions. The parents of these intolerant

children share perceptions of similar treatments with children suffering from other chronic diseases, such as sickle cell disease. It is recommended that the experience of lactose intolerance should be seen within a wider family context, with special reference to coping with parents' anxiety ***(Jakobsen., et al., 2021).***

The US National Institute of Health reports that 65% of children and adolescents worldwide suffer from lactose malabsorption, with that number rising to 95% in Asia (***Ramsing, Santo, Kim, et al, 2023).***

Nurses can move beyond advocacy and take actionable steps to support the health status of children by hosting educational sessions on management of LI. Nurses can use their expertise to teach mothers in the community how to adapt with these dietary modifications, the signs and symptoms of LI, and how to manage LI, as well as the importance of nurses implementing these educational sessions in the community health care services (***Pajno, Fernandez-Rivas, Arasi, Roberts. 2018).***

Significance of the Study

Lactose intolerance is a predominant indicator of under nutrition. In children, nutritional status and development are traditionally considered some of the most essential health status indicator. Mostly symptoms are so vague and inconclusive that diagnosis remains a dilemma. lactose intolerance and mal-absorption in Children link with high under-nutrition that needs to be investigated and understood ***(Neel., et al., 2019).***

Another dimension of the problem could be lactose intolerance leading to under-nutrition that is why it is necessary to find the prevalence of the lactose intolerance. Mortality rates and deaths of under-five children from malnutrition was 6.9 million and are concentrated in Africa ***(United Nations Second report on the world nutrition situation, 2017).***

Mothers are the first caregiver of children to avoid nutritional problems in children and achieve optimal growth. Maternal knowledge, attitudes, and practices affect the change of the children's diet. Mothers with sufficient knowledge will implement a good nutrition practice; hence, their children will be healthy and free from malnutrition disease while they following better dietary practices. Subsequently, this will help the mothers in changing their family's eating behavior and practices ***(Mohamed, & Kamel, & Sayed,. 2021).***

Aim Of The Study

The aim of this study is to assess mother's perception regarding their children with lactose intolerance through:

1.Assessing mothers' and child health history.

2.Assessing mothers' knowledge regarding lactose intolerance and consequences health problems.

3. Assessing mothers' reported practices regarding their children with lactose intolerance.

4. Assessing mothers' attitudes toward their children with lactose intolerance.

5. Assessing anthropometric measurements of children.

Research Question:

1-Is there relation between mothers' knowledge and their reported practices regarding their children with lactose intolerance?

2-Is there relation between mothers' knowledge and their attitudes toward their children with lactose intolerance?

3-Is there relation between mothers' reported practices and their attitudes toward their children with lactose intolerance?

4-what is mothers' perception toward their children with lactose intolerance?

Materials and Method

Research design:

Descriptive analytical study was used to assess mothers' perception regarding their children with Lactose Intolerance.

Setting:

The study was conducted at specialized outpatient nutritional clinic at pediatric hospital affiliated to Ain shams university hospitals, Cairo, Egypt. this clinic considered the highest density, and works from 8 Am to 2 Pm, 2 days/ week except the public holidays.

Sampling:

Purposive sample included 291 mothers attending at the previous mentioned setting according to the following criteria: their children under 5 years, confirmed diagnosis with lactose intolerance, attending to nutritional clinic for follow- up, and free from any co -morbid diseases, as: diabetes mellitus and mental retardation.

Sample size calculation:

The estimated sample size is 291 out from 1200 mothers of children with Lactose Intolerance who are attending to the previous mentioned setting during 2021, at confidence level 95% (***Thompson, 2012).***

$$n = \frac{N \times p(1-p)}{\left[\left[N-1 \times \left(d^2 \div z^2\right)\right] + p(1-p)\right]}$$

Which:

n= 291

N= 1200

Z= 1.96

d= error level 5%

p= 0.5

Tools of data collection:

Three tools were used for data collection:

First tool: An interviewing questionnaire designed by the investigator and written in simple Arabic language to gather data which concern the aim of study and consists of the following parts**.**

Part I: A Socio demographic characteristic of mothers and their children include: Child's gender, age, birth order, going to a nursery, mother's age, educational level, job, place of residence, marital status, and family income. It includes 10 closed end questions from Q1 to Q10.

Part II: Mothers' and child health history includes:

A-Child's medical history: child entering premature unit after birth, age at time of diagnosis with lactose intolerance, type of LI that child has, weight and height at diagnosis, signs and symptoms at diagnosis, type of feeding used for child, previous hospitalization, complications of LI appeared on child. It includes 9 closed end questions from Q11 to Q19.

B-Maternal medical history: complications during pregnancy, type of child delivery, suffering from any chronic disease, kinship between husband, and other children suffered from LI. It includes 5 closed end questions from Q20 to Q24.

Part III : Mothers' knowledge regarding lactose intolerance includes meaning of lactose, meaning of lactose intolerance, Types, difference between milk allergy and LI, causes, high risk age for LI, signs and symptoms, diagnostic measures, treatment and care, complications, foods containing calcium, suitable and avoided foods. It included 13 closed ended questions Q 25 to Q 37.

Scoring system

For mothers 'knowledge, chosen the correct answer was scored (two) and incorrect answer or didn't know was scored (one). All items were summed up, total score=26, knowledge score was divided into (satisfactory) level (≥50%) if ranged from (14 to 26) and (unsatisfactory) level (<50%) ranged from (1 to < 13).

Part IV: Mothers' reported practices toward their children with lactose intolerance, adopted from (***Yüce,& Dalgıç, (2017)***, and

modified by investigator. it includes 7 items, as the following: practices toward signs and symptoms of LI, Practices during the breastfeeding period of child, Feeding of child, Activity and Movement of child, Sleep and Rest of child, Child hygiene, Follow-up plan. It includes 47 statements.

Scoring system:

For mothers' reported practices consist of 3 scale score ranged from always = 3, sometimes =2, and never = 1. Full score of all statements = 141 grade. Total Scoring System of Reported practices: These scores were summed up and converted into a percent score: (≥ 60 %) for (85: 141) grade considered good practice and (< 60 %) for (1:84) grade considered poor practice.

Second tool: Attitude of mothers' toward their Children with lactose intolerance, adopted from **(*Spanish Society for Pediatric Gastroenterology, Hepatology and Nutrition, 2018)*** and modified by investigator. It included 26 statements.

Scoring system:

For mothers' attitude, score consist of 3 scale ranged from agree = (three), not sure = (two), and disagree = (one). Total score: ≥ 60% for (47:78) grade considered positive attitude and < 60% for (1:46) grade considered negative attitude.

Third tool: Anthropometric Measurements of Children, adopted from **(*Kirkilas, 2022*).**

Scoring system:

Included measurements of weight by digital scale, height, head and chest circumference by measuring tape. Measuring body mass index through using the formula (BMI = Kg/m2) is their height in meters squared.

BMI scores ranged into the following categories:

Percentile Range	Weight Status Category
Less than 5th percentile	Underweight
5th percentile to less than the 85th percentile	Healthy Weight
85th to less than the 95th percentile	Overweight
Equal to or greater than the 95th percentile	Obesity

In addition to measurement of Head and Chest circumference scoring done by Mean and Standard deviation (SD).

Content validity: The tools of data collection in this study. It was tested and evaluated for face and content validity by a jury group consisting of the three expertises in community nursing department of faculty of nursing, Ain-shams University.

Content reliability: the previous tools were tested by Cronbach alpha test of reliability, the tools proved to be strongly reliable tools.

Items	Cronbach' alpha test
Knowledge	**0.786**
Practice	**0.839**
Attitude	**0.808**

Ethical Considerations:

The study took approval scientific research from ethical committee at the faculty of nursing Ain shams university to carry out the study. Official permission including the title and purpose of the study was submitted from the dean and forward to the director to get approval for data collection. Written consent was taken from mothers who agreed to participate in the research process after explanation the aim of study. They were assured that anonymity and confidentiality would be guaranteed and they have the right to withdraw from the study at any time without giving any reason.

Administrative Design:

To carry out the study in the selected setting, official letters were issued from Dean of the faculty of nursing, Ain Shams University explaining the title and the aim of the study to obtain the permission for collecting of the data;

this letters were submitted to the pediatric outpatient clinic director.

Operational Design:

Preparatory phase: It included reviewing of past, current, national and international related literature and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals and magazines were done to develop tools for data collection and to get acquainted with the various aspects of the research problems.

Pilot study:

A pilot study was applied on (10%) of sample size represented 29 mother of child with LI to test the feasibility, objectivity, applicability, as well as estimating the time needed to fill the questions. Caring out the pilot study gave the investigator experience to deal with the included subjects, and the data collection tools. Data obtained from the pilot study was analyzed and no modifications were done. Study subjects included in the pilot were included in the main study sample as no modifications were needed.

Field Work

-Approvals were obtained from the research and ethical committee at faculty of nursing Ain-shams University, also an official permission was sent to director of outpatient clinics of pediatric Ain Shams hospital to conduct the study.

- The actual field work of the study was carried out by investigator was completed the tool by interview mothers during 2 days' week to complete tools of data collection, from the beginning of December 2022 to March 2023.

-The investigator was visited nutrition clinic on (Sunday, and Wednesday) of each week during the morning from the (8 AM to 2 PM), and was take time from 35 to 40 minutes for one questionnaire.

-It took about 4 months from the beginning of December 2022 to March 2023 at nutrition clinic of pediatric Ain Shams hospital.

-The investigator introduced herself firstly to each mother, and explained the purpose of the study was done before each interview.

-Each mother is interviewed individually after the oral approval for participant in the study according ethical issues.

-The investigator role in completing the questionnaire was to facilitate the understanding of any confusing or difficult question for mothers.

Statistical design:

The statistical analysis of data was done by using the computer software of Microsoft Excel Program and Statistical Package for Social Science (SPSS) version 22. Data were presented using descriptive statistics in the form of frequencies and percentage for categorical data, the arithmetic mean (X) and standard deviation (SD) for quantitative data. Qualitative variables were compared using chi square test (X) 2, P-value to test association between two variables and Pearson correlation test (R- test) to the correlation between the study variables.

Degrees of significance of results were considered as follows:

- P-value > 0.05 Not significant (NS)
- P-value ≤ 0.05 Significant (S)
- P-value ≤ 0.01 Highly Significant (HS).

Results:

Table (1) shows that, 60.5% of the studied children their age were 1-<3 years, Mean SD of age was 1.41 ± 0.96 years. As regard to gender, 56.4% of the studied children were male. Regarding Order of the child among his siblings, 51.5% of them were the first. Also, 78.0% of them didn't go to the nursery.

Table (2) displays that, 62.6% of the studied mothers their age were 20-<30 years, with Mean SD of age 25.76±3.88 years. Regarding, 45.4% of their educational level were intermediate education. Moreover, 64.3% of them were housewife. Furthermore, 78.7% of them residing at urban areas. As regard marital status, 95.5% of them were married. Also, 75.6% of their family income were not enough.

Figure (1) Illustrates that, 75.9% of the studied mothers were unsatisfactory level of total knowledge regarding lactose intolerance. While, 24.1% of them were satisfactory level of total knowledge

Figure (2) shows that, 58.8% and 60.1% respectively of the studied mothers have poor level of total reported practice toward signs and symptoms of lactose intolerance and breastfeeding period of their children. Also, 52.9% and 61.9% respectively of them have poor level of total reported practices toward

feeding of their children and activity and movement. Moreover, 52.2% of them have poor level of total reported practices toward child hygiene. While, 51.5% and 54.3% respectively of them have good level of total reported practices toward sleep and rest and follow-up plan.

Figure (3) shows that, 51.9% of the studied mothers have negative attitude toward their children with lactose intolerance. While, 48.1% of them have positive attitude.

Table (3) displays that, 60.1% of the studied children their weight ranged from 10-<15 kg, the Mean SD of weight is 9.24±3.31 kg. Also, 50.5% of them their height ranged from 80-<90 cm, the Mean SD of height is 79.9±7.94 cm. Moreover, 65.6% of them their head circumference ranged from 46-50 cm, the Mean SD of head circumference is 46.37±1.91 cm. Furthermore, 64.9% of them their chest circumference ranged from 55-<60 cm, the Mean SD of chest circumference is 54.1±2.10 cm.

According to research Q1: Is there relation between total mothers' knowledge and their total reported practices toward their children with lactose intolerance?

Table (4) shows that, there is a highly statistically significant relation between total knowledge of the studied mothers and their reported practices toward their children with lactose intolerance at ($P < 0.01$).

Table (5) displays that; there is a highly statistically significant relation between total knowledge of the studied mothers and their attitude toward their children with lactose intolerance at ($P < 0.01$).

According to research Q3: Is there relation between total mothers' reported practices and their total attitude toward their children with lactose intolerance?

Table (6) shows that, there is a highly statistically significant relation between total reported practices of the studied mothers and their attitude toward their children with lactose intolerance at ($P < 0.01$).

Table (7) indicate that, there is highly significant positive correlation among total mothers' knowledge, total reported practice and total attitude toward their children with lactose intolerance at ($P= < 0.01$).

Table (1): Frequency Distribution of the Studied Children According to their Socio-Demographic Characteristics (n = 291).

Items	No.	%
Age (years)		
< 1	74	25.4
1-<3	**176**	**60.5**
3-<5	41	14.1
1.41 ± 0.96 **Mean SD**		
Gender		
Male	**164**	**56.4**
Female	127	43.6
Child order		
First	**150**	**51.5**
Second	94	32.3
Third	36	12.4
Fourth	11	3.8
Child going to a nursery		
Yes	64	22.0
No	**227**	**78.0**

Table (2): Frequency Distribution of the Studied Mothers According to their socio-Demographic Characteristics **(n = 291).**

Items	No.	%
Age (years)		
< 20	40	13.7
20-<30	**182**	**62.6**
≥ 30	69	23.7
Mean SD **25.76 ± 3.88**		
Education level		
Not read or write	10	3.4
Read and write	38	13.1
Primary education	80	27.5
Middle education	**132**	**45.4**
University education	28	9.6
Post-university education	3	1.0
Mother's job		
Governmental Sector	28	9.6
Private Sector	76	26.1
House Wife	**187**	**64.3**
Place of residence		
Rural	62	21.3
Urban	**229**	**78.7**
Marital status		
Married	**278**	**95.5**
Divorced	6	2.1
Widow	3	1.0
Separated	4	1.4
Sufficient of family income		
Enough	71	24.4
Not enough	**220**	**75.6**

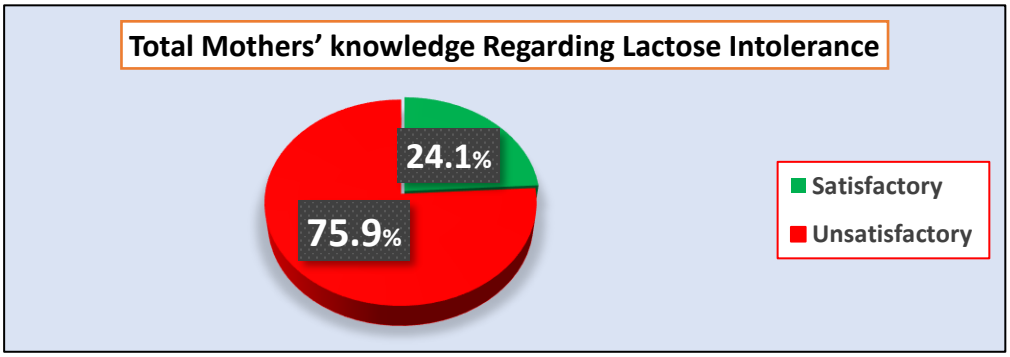

Figure (1): Percentage distribution of the studied mothers according to their total knowledge regarding lactose intolerance **(n = 291).**

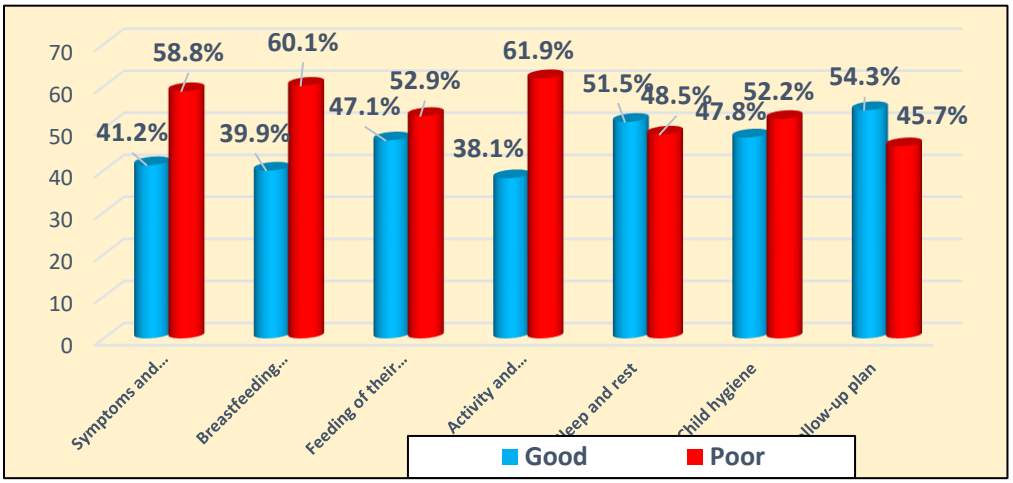

Figure (2): Percentage Distribution of the Studied Mothers According to their Total Subscales of Reported Practices toward their Children with Lactose Intolerance
(n = 291).

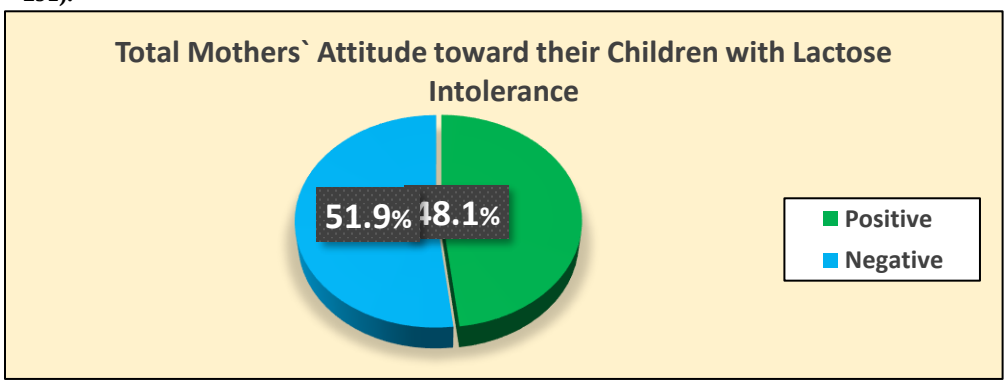

Figure (3): Percentage distribution of the studied mothers according to their total attitude toward their children with Lactose Intolerance **(n=291).**

Table (3): Frequency distribution of the studied children according to their anthropometric measurements **(n = 291).**

Anthropometric measurements of the studied children		No.	%
Weight (Kg)			
5-<10		96	33.0
10-<15		**175**	**60.1**
≥ 15		20	6.9
Mean SD	**9.24 ± 3.31**		
Height (Cm)			
60-<70		34	11.7
70-<80		50	17.2
80-<90		**147**	**50.5**
≥ 90		60	20.6
Mean SD	**79.9 ± 7.94**		
Body mass index			
Under weight		182	62.6
Normal weight		**97**	**33.3**
Over weight		10	3.4
Obese		2	0.7
Mean SD	**±**		
Head circumference (Cm)			
38-<42		28	9.6
42-<46		72	24.8
46-50		**191**	**65.6**
Mean SD	**46.37 ± 1.91**		
Chest circumference (Cm)			
50-<55		98	33.7
55-<60		**189**	**64.9**
≥ 60		4	1.4
Mean SD	**54.1 ± 2.10**		

Table (4): Statistical relation between total knowledge of the studied mothers and their reported practices toward their children with lactose intolerance **(n=291).**

Level of total reported practices	Level of total knowledge				X^2	P-Value
	Satisfactory (n=70)		Unsatisfactory (n=221)			
	No.	%	No.	%		
Good	70	100.0	52	23.5	51.77	0.000**
Poor	0	0.0	169	76.5		

X^2 =chi-square test. ****Highly statistically significant at p ‹ 0.01.**

According to research Q2: Is there relation between total mothers' knowledge and their total Attitude toward their Children with Lactose Intolerance?

Table (5): Statistical relation between total knowledge of the studied mothers and their attitude toward their children with lactose intolerance **(n=291).**

Level of total attitude	Level of total knowledge				X^2	P-Value
	Satisfactory (n=70)		Unsatisfactory (n=221)			
	No.	%	No.	%		
Positive	70	100.0	70	31.7	31.80	0.000**
Negative	0	0.0	151	68.3		

X^2 =chi-square test. ****Highly statistically significant at p ‹ 0.01.**

Table (6): Statistical relation between total reported practices of the studied mothers and their attitude toward their children with lactose intolerance **(n=291).**

Level of total attitude	Level of total reported practices				X^2	P-Value
	Good (n=122)		Poor (n=169)			
	No.	%	No.	%		
Positive	118	96.7	22	13.0		
Negative	4	3.3	147	87.0	48.00	0.000**

X^2 =chi-square test. ****Highly statistically significant at p ‹ 0.01.**

Table (7): Correlation between total mothers' knowledge, total reported practices and total attitude toward their children with lactose intolerance **(n=291).**

Items	Total knowledge		Total attitude	
	r	P-value	r	P-value
Total knowledge			0.510	0.000**
Total reported practice	0.521	0.000**	0.627	0.000**

r = correlation coefficient test. ****highly significant at p ‹ 0.01.**

Discussion

This study aimed to assess mothers' perception regarding their children with lactose intolerance.

Lactose intolerance is a common gastrointestinal condition caused by the inability to digest and absorb dietary lactose. Primary lactose intolerance is the most common type of lactose intolerance. It is one of the most common forms of food intolerance and occurs when lactase activity is reduced in the brush border of the small bowel mucosa. People may be lactose intolerant to varying degrees, depending on the severity of these symptoms **(Sekar et al., 2020).**

As regarding to socio-demographic characteristics of the studied sample, the current study revealed that, more than half of the studied sample their age was 1-<3 years, the Mean SD of age is 1.41 ± 0.96 years **Table (1**).

This result was similar to a study in Malaysia conducted by ***Vincent et al., (2022)*** entitled " Frequency of guideline-defined cow's milk allergy symptoms in infants: Secondary analysis of EAT trial data " and reported that more than half of children aged 12 month to three years. On the other hand, a study carried out *by* ***Kimani-Murage, et al., (2019)*** to assess "Perceptions on donated human milk and human milk banking in Nairobi, Kenya " found that most of the sample their age was between ages 3 month and 12 months. This discrepancy may be related to the difference between both study samples and demographic characteristics.

Concerning gender of the study sample, the present study displayed that more than half of the studied sample were male **Table (1).** This finding was in the same context of ***Bahbah, et al., 2022*** who conducted a study about " A Survey to Identify the Current Management of Cow's Milk Disorders and the Role of Goat Milk-Based Formulas in the Middle East and North Africa Region " and mentioned that nearly two thirds (62.15%) of the studied sample were male.

According to the ranking of the studied child among his siblings, the present study portrayed that more than half of them were the first child and didn't go to a nursery (**Table 1).** This study agreed with ***Moimaz et al., 2019*** who conducted a study in India about " Parent's perception of allergic or food-intolerant children in relation to disease" and found that, less than one fifth of the studied children were the first son.

As regard the age of the studied mothers, the current study represented that less than two

thirds of them their age is in **Table (2).** This finding was supported by ***Abrams et al.,(2020)*** who conducted a study in Canada about " Milk allergy most burdensome in multi-food allergic children " and found that, the more than half of the studied caregivers were in the age group from 25-35 year.

As regard educational level of the studied mothers, the present study finding showed that more than one third of them had intermediate education (**Table 2**). On the same line, ***Dubrovsky et al., 2023*** who carried out a study in USA, entitled " Cow's milk allergy in children impacts parental or caregiver calcium intake " and found near to half the studied caregivers had secondary education. This agreement between the studies' results may be related to lack of interest at some societies to continue education levels.

This result may be related to cultures, marriage age and demographic characteristics at some societies.

Concerning occupation of the studied mothers, the study sample indicated that less than two thirds of the studied sample were housewives (**Table 2).** This finding matched with a study carried out by ***Diwakar, et al., 2021*** in the West Midlands, entitled " Parent experiences with pediatric allergy pathways in the West Midlands: A qualitative study " and mentioned that more than half of the studied mothers were housewives and the fathers were workers.

This result may be related to level of education and cultures of them at some societies.

Regarding residence of the studied mothers, the present study clarified that more than three quarters of the studied mothers were residing at urban areas. This result is in agreement with a study conducted by ***Peters et al., 2019*** in Australia entitled " Early exposure to cow's milk protein is associated with a reduced risk of cow's milk allergic outcomes " and indicated that more than half of the subjects were living at urban places.

As regarding to marital status and family income of the studied mothers, the current study showed the majority of the studied mothers were married and more than three quarters of them reported that the income of family per month were not enough. The present study is consistent with ***Shafi & Husain, 2021*** who studied " Intolerance to milk lactose, diagnostic tests and dietary management: A recent update " and reported that the high percent of the studied subjects were married but had enough family income. This discrepancy may be related to the difference between socioeconomic status at both study samples.

As regard total knowledge of the studied mothers regarding lactose intolerance, the current study illustrated that more than three quarters of the studied mothers had unsatisfactory level of total knowledge regarding lactose intolerance. While, less than one quarter of them had satisfactory level of total knowledge **Figure (1).**

This finding was congruent with ***Mumena, 2021*** who studied "Maternal knowledge, attitude and practices toward free sugar and the associations with free sugar intake in children" in Saudi Arabia and showed that more than three quarters of the mothers of children had limited in total knowledge observed in relation to lactose intolerance in their children, these mothers were making efforts to limit their children's consumption.

On the other hand, a study conducted by ***Prasad & Shivay, 2020*** in EIndia about "Awareness of cow milk protein allergy and lactose intolerance " in India and reported that the level of good knowledge towards lactose intolerance is found to be almost more than two thirds in this study.

This result may be related to level of education and sociodemographic characteristics of them.

According to total subscales of reported practice regarding their children with lactose intolerance, the findings of the current study illustrated that more than half and more than half of the studied mothers had poor level of total reported practices toward symptoms and signs of lactose intolerance and breastfeeding period of their children, respectively. Also, more than half and less than two thirds of them had poor level of total reported practices toward

feeding of their children and activity and movement, respectively. Moreover, more than half of them had poor level of total reported practices toward child hygiene, had good level of total reported practices toward sleep and rest and follow-up plane **(Figure 2)**.

These results were in difference with the study done by ***Lapides & Savaiano, 2018*** which entitled "Gender, age, race and lactose intolerance: is there evidence to support a differential symptom response? A scoping review" and stated that three quarters of caregivers of children with lactose intolerance were able to manage most of their children symptoms with adaptive strategies.

This discrepancy may be related to the difference between both study subjects regards their socio-demographic characteristics (income, residence, and education level), lack of health services provide and educational programs.

According to total attitude regarding their children with lactose intolerance, the present study revealed that more than half of the studied mothers had negative attitude regarding their children with lactose intolerance. While, less than half of them had positive attitude **Figure (3).**

This result was congruent with the study achieved by ***Facioni et al., (2019)*** who found that, more than two thirds (68.2%) of the mothers of children had negative attitude regarding health aspects of their children with lactose intolerance. On the other hand, this result is was in disagreement with the study achieved by ***Rizzo, Harwood & Drake, 2020*** entitled "Consumer desires and perceptions of lactose-free milk" and showed that more than half of caregivers (53.5%) had positive perception and attitude toward lactose intolerance.

The difference between the studies may relate to the ability of each family to cope with their children health condition. Additionally, the level of awareness among mothers about all aspects of children health helps to improve the level of practice and attitude.

This result may be related to cultures, beliefs and their level of knowledge.

For anthropometric measurements of the studied children, the current study found that more than half of the studied children their weight ranged from 10-<15 kg, the Mean SD of weight is 9.24±3.31 kg. Also, more than half of them their height ranged from 80-<90 cm, the Mean SD of height is 79.9±7.94 cm. Moreover, less than two thirds of them their head circumference ranged from 46-50 cm, the Mean SD of head circumference is 46.37±1.91 cm and their chest circumference ranged from 55-<60 cm, the Mean SD of chest circumference is 54.1±2.10 cm (**Table 3**).

These results were in difference with the study achieved by ***Kanth et al., 2019*** entitled "Prevalence of lactose intolerance and its association with malnutrition in children" who mentioned that more than half of children (58.6%) had abnormal weight and other developmental indicators.

Regarding relationship between total mothers' knowledge and total reported practices regarding their children with lactose intolerance, the present study revealed that there was a highly statistically significant relation between total knowledge of the studied mothers and their reported practices toward their children with lactose intolerance (**Table 4**).

In the same line, ***Madrazo et al., 2022*** who conducted a study in Mexico to assess "International cross-sectional survey among healthcare professionals on the management of cow's milk protein allergy and lactose intolerance in infants and children" showed that there was statistically significant relation between the knowledge and practice regarding lactose intolerance among the participants. This finding may be due to the fact that the level of knowledge determine the level of practice as with improving level of knowledge can enhance level of practice.

Regarding relationship between total mothers' knowledge and total attitude toward their children with lactose intolerance, the current study showed that there was a highly statistically significant relation between total knowledge of the studied mothers and their attitude toward their children with lactose intolerance (**Table 5**).

This result was approved with ***Kaufman-Shriqui et al., 2020*** at a study conducted in Israel and entitled "Knowledge and Attitudes Towards Nutrigenetics: Findings from the 2019 Unified Forces Preventive Nutrition Conference (UFPN)" which stated that there was a relation between knowledge and attitude in children with lactose intolerance.

Concerning relationship between total mothers' reported practice and total attitude regarding their children with lactose intolerance, the present study illustrated that there was a highly statistically significant relation between total reported practices of the studied mothers and their attitude regarding their children with lactose intolerance (**Table 6).**

This result was supported by with ***Tang et al., 2020*** at a study in China entitled "Knowledge, attitude, and practice of adolescent parents on free sugar and influencing factors about recognition" who reported that there was positive relation between practice of the studied participants and their attitude regarding children with lactose intolerance. The similarity between the studies may be related to that practice of person is influenced by level of attitude.

Concerning correlation between total mothers' knowledge, total reported practices and total attitude regarding their children with lactose intolerance, the current study showed that there was highly significant positive correlation between total mothers' knowledge, total reported practices and total attitude toward their children with lactose intolerance **(Table 7)**.

This result was in the same line with ***Facioni et al., 2020*** who mentioned that there was positive correlation between respondents' attitude knowledge and practices toward lactose intolerance. This can be explained as individuals who have knowledge and positive attitude are more likely to have high scores of practices.

Conclusion:

Based on the finding of the research questions and the study findings it is concluded that:

More than three quarters of the studied mothers were unsatisfactory level of total knowledge regarding lactose intolerance. More than two fifth of them have good level of total reported practices toward their children with LI. More than half of the studied mothers have negative attitude toward their children with lactose intolerance. Moreover, there was a highly statistically significant relation between total knowledge of the studied mothers and their reported practices toward their children with lactose intolerance. There was a highly statistically significant relation between total knowledge of the studied mothers and their attitude toward their children with lactose intolerance. There was a highly statistically significant relation between total reported practices of the studied mothers and their attitude toward their children with lactose intolerance. There was highly significant positive correlation between total mothers' knowledge, total reported practices and total attitude toward their children with lactose intolerance.

Recommendations:

Based on the results of the present study and research questions the following recommendations are suggested:

1- Developing and implementing of health education programs to develop mothers' knowledge, practices and their attitudes regarding lactose intolerance.

2- Raising mothers' awareness toward differences between lactose intolerance and cow milk allergy through mass media, mothers' classes, brochures, and booklets at family health centers.

3- Activating the role of pediatric nurses in outpatient clinics to apply health education sessions for mothers.

4- Conducting further researches to assess mothers' perception toward their children with lactose intolerance at different setting or governorate.

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