

Risk factors Associated with Recurrence of Diarrheal Episodes among Children under Two Years

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Abstract:

Background: Diarrhea is the leading cause of childhood morbidity and mortality. Failure of exclusive breast feeding, improper weaning practices, poor sanitation, lack of personal hygiene and inadequate water supply are among major risk factors of diarrheal disease in children. **Aim of the study** is to determine risk factors associated with recurrence of diarrheal episodes among children under two years **Settings:** This study was conducted at the Out Patient Clinic at Damanhur Medical National Institute (DMNI). **Subjects:** A convenient sample of 200 mothers having children under two years who are suffering from diarrhea constituted the subjects **Tool:** One tool was used for data collection: Risk Factors Associated with recurrence of Diarrheal Episodes among Children under Two Years Structured Interview Schedule. **Results:** that there is statistically significant relation between recurrence of diarrheal episodes of mothers` children and their breast-feeding practices, weaning practices, personal hygiene, vaccination status and seasonal pattern where $P=0.001$, $P<0.001$, $P=0.003$, $P=0.009$ and $P=0.029^*$ respectively. **Conclusion:** The findings of the present study concluded that mothers who have children with recurrence of diarrheal episodes are confronting multiple risk factors like younger age of mothers, low family income, family size (overcrowding), feeding type, residence, failure of exclusively breast-feeding, inappropriate weaning practices, poor personal hygiene, inadequate water sanitation, poor environmental sanitation, and seasonal pattern. **Recommendations:** Mothers` education class about diarrhea risk factors should be extensively encouraged by educational authorities in all health centers to help them gaining information about how to prevent diarrhea

Keywords: Risk factors, Diarrhea, Children

Introduction

Diarrhea disease is the second leading cause of death in children under 5 years and was responsible for deaths of 370.000 children in 2019 (Helmi et al., 2022; WHO, 2021). Internationally, there are almost 1.7 billion cases of childhood diarrheal disease every year (WHO 2017). In developing countries, children under three years of age have average of three episodes of diarrhea every year (Baye et al., 2021).

Diarrhea is defined as an increase in the fluidity, volume, and number of stools related to each individual usual habits. Infectious diarrhea is the most common type of diarrhea among children under 5 years. It is caused by infection agents like viruses such as rotavirus which is the most common agent can cause diarrhea, (Madkour 2016).

Risk factors associated with diarrhea such as early weaning, early introduction

of milk products, contaminated food, low nutritional status poor water storage, poor hygiene, lack of environmental sanitation as well as male gender, poor food cooking practices, low income and latrine utilization (Lanyero et al., 2021 ;Solomon et al, 2020)

Prevention of diarrhea is the significant action to reducing morbidity and mortality due to diarrhea. Prevention of diarrhea that are carried out by mothers includes washing hands by using soap and water, immunizing children giving breast milk, washing fruits and vegetables before cooking and eating, and maintain water and environmental sanitation (Karim & AL-Mosawi, 2021; Tate, 2016).

Treatment approach which approved by the world health organization (WHO) and the United Nations Children's Fund (UNICEF) is oral rehydration solution (ORS). It should be given to replace the fluids lost in stools and prevent dehydration. The WHO suggested the use of zinc as an additional therapy with ORS in the management of acute diarrhea. It should be given in all types of diarrhea and all degrees of dehydration for maximum 14 days only (**Rerksuppaphol, 2020**).

Finally the pediatric nurse's role is unique because of developmental immaturity and vulnerability of children. She should increase awareness of mothers about the disease prevention and health promotion which can progress the health status of a child, family and community. She has a crucial role in identifying risk factors of diarrhea which are vary in different population and educate the mothers about this risk factors (**James et al., 2014**). Pediatric nurse should educate mothers about the importance of hand hygiene practices and hand washing with soap and water which are more effective in prevention of childhood diarrhea. Pediatric nurse should foster the importance of initiate and provide exclusive breastfeeding, adequate sanitation and optimal personal and environmental hygiene, importance of rotavirus and

measles vaccine in addition to vitamin A capsule which limit the recurrence and the severity of diarrhea

Aim of the study:

The aim of the study is to determine risk factors associated with recurrence of diarrheal episodes among children under two years.

Research question:

What are the risk factors associated with recurrence of diarrheal episodes among children under two years?

Materials and Method

Materials

Research design:

A descriptive research design was used to accomplish this study.

Setting:

This study was conducted at the Out Patient clinic of Damanhur Medical National Institute (DMNI).

Subject:

A convenient sample of 200 mothers having children under two years and suffering from diarrhea constituted the subject.

Tool:

Tool: Risk factors associated with Recurrence of diarrheal episodes among children under two years interview structured schedule:

The tool was developed by the researcher after thorough review of recent and relevant literature (Wasihun, 2018;UNICEF, 2018;WHO, 2017) to determine risk factors associated with recurrence of diarrheal episodes among children under two years.. It included three parts:

Part I: Socio-demographic characteristics of mothers and their children.

- Characteristics of mothers such as age, education, occupation, family income, residence, and crowding index.

- Characteristics of children such as age, sex, birth order, birth weight.

Part II: Diarrhea assessment sheet (habits, frequency, duration, amount, odor, color, consistency).

-Signs and symptoms such as (fever, nausea, vomiting, abdominal pain)

-Assessment of dehydration based on GEMS criteria which are (general condition, eyes, mouth and skin pinch).

Part III: Risk factors associated with Recurrence of diarrheal episodes among children under two years such as Breast-feeding practices, Bottle-feeding practices, Weaning, Personal hygiene of the child, sanitation factors, vaccination and seasonal pattern).

Scoring system:

The response to the items of the tool based on three points Likert scale:

- Always = 2
- Sometimes = 1
- Never = zero

The score of mother's practices is calculated as follow:

- Good = 65% and more
- Satisfactory =50% to less than 65%
- Unsatisfactory = less than 50%

Method:

- Official letter was directed to the responsible authority of chosen hospital in order to obtain their approval to collect the data after explaining the purpose of the study.
- The tool was developed by the researcher after reviewing the current and relevant literature.
- The developed tool was submitted to a jury of five experts in the pediatric nursing field to determine its applicability and content validity.
- The reliability of the tool was done by measuring the internal consistency of its items using Cronbach Coefficient Alpha Test where $r = 0.760$
- A pilot study was carried out on twenty mothers (10%) attending the previously

mentioned setting to ascertain the clarity and applicability of the tool. Accordingly, some modifications were done. Those mothers were excluded from the study subject.

- Every mother was interviewed in the previous selected setting individually after her child is being diagnosed to collect the necessary data to assess the risk factors.
- The duration of each interview lasted 15-20 minutes.

Statistical analysis:

The collected data was categorized, coded, computerized, tabulated and analyzed using Statistical Package for Social Sciences (SPSS) version 20 program.

Ethical considerations:

An informed written consent was obtained from each study subject after explanation of the study purpose. Anonymity and privacy of the study subjects, confidentiality of the collected data, and the subject's right to withdraw at any time were maintained.

Results:

Table (1) shows the characteristics of mothers having children with recurrence diarrheal episodes. The table clarified that more than half of mothers (55.5%) their age ranged from 18 to less than 25 years and majority of them (93.5%) are married. Regarding level of education, it is observed that 42% of mothers had secondary education. The table also highlighted that nearly three quarters of mothers (71%) were housewife.

It was also apparent that family income among 58.5% of the mothers was not enough for living and more than half of them (55.5%) lived in rural areas.. Crowding index of 46.5% of the mothers was moderate

Table (2) Characteristics of children with recurrence of diarrheal episodes. It is cleared from the table that the age of more than one third of children (35%) were 12 to

less than 18 months old. The same table clarified that more than half (58.5%) of children were males. Concerning child's birth order, it was found that second born child constituted nearly half of the studied mothers' children (47.5%) while the first born child constitute 15% .

Regarding gestational age, it is observed from the table that, 80% of children had gestational age ranged from 38 to 42 weeks of gestation. Moreover, nearly two thirds (63.5%) of children had birth weight ranged from 2500 to 4000 grams. Concerning type of feeding it was cleared that, more than one third of children (35.5%) received breast milk and 30.5% received mixed feeding. It was obvious that 34.5% of children go to nursery school, while 65.5% of them did not go.

Table (3) Distribution of the studied mothers according to their total percent score of their practices regarding recurrence of diarrheal The table portrays that 56.8% and 47.3% of mothers were obtain satisfactory regarding their breast and bottle feeding practices. On the other hand the table illustrates that, 55.2% and 45.5% of mothers were unsatisfactory regarding weaning and personal hygiene practices. The table also shows that, 49.5%, 67.0%, 43% of mothers` were obtained unsatisfactory regarding environmental sanitation, water sanitation and contact with animal respectively. Moreover, about three quarters 75% and 75.5% of mothers were good in their practice concerning seasonal pattern and vaccination of their children in that order .

The table show that slightly more than half of mothers (51%) obtained unsatisfactory in overall practices while only 13 % were good.

Figure (1): demonstrate the percent distribution of recurrence of diarrhea episodes among children under two years. It is revealed from the figure that, more than one third of children (36%) had

medium frequency of diarrhea, while less than one third of children (30.5%) had low frequency of diarrhea and one third of them (33.5%) had high frequency of diarrhea.

Table (4) presents relation between recurrence of diarrheal episodes and total percent score of mother's practices. It was obvious that there is statistically significant relation between recurrence of diarrheal episodes of mothers' children and breast-feeding practices, weaning practices, personal hygiene, vaccination status and seasonal pattern where $P=0.001$, $P<0.001$, $P=0.003$, $P=0.009$ and $P=0.029^*$ respectively. Moreover, there were statistical significant differences between recurrence of diarrheal episodes and total score of overall practice of mothers were $P<0.001$

At the opposite side, there is no statistically significant relation between recurrence of diarrheal episodes of mothers' children and formula feeding, environmental sanitation and seasonal pattern and contact with animals.

Discussion

Diarrhea is still appeared to be as one of the leading global killers and disability-adjusted life-years lost, particularly in the infant and children. (Mebrahtom et al., 2022).

Younger mothers were at risk of diarrheal recurrence. In the current study more than half of mothers whose age were between 18 to less than 25 years their children have high frequency of diarrhoea episodes (Table 1). It may be due to they have less experience in caring for their children's health as a result of their younger age. The result of present study is congruent with Musihb et al., (2020) who found that, younger mother aged from 20-29 having the highest percent of occurrence of diarrhea of their children than older mothers. This finding also in the same line with Claudine et al. (2021) who conducted study about "association

between sociodemographic factors and diarrhea in children under 5 years in Rwanda" he found that, there was a significant association between diarrhea and the mother's age.

Sex inequalities in diarrhea disease have been observed across many studies. So, regarding to socio-demographic characteristics of children it was revealed from the present study in that more than half of children were males (**table 2**) this may be justified that parents, especially in low socio-economic countries and rural areas, tend to prefer male children, therefore they care for them differently by giving them more privilege like play in street, contact with animals and give their children much more unhealthy and contaminated food. This results in the same line with study by **Goel et al (2021)** who found that more than half of children were male gender. On the other hand, this result disagreement with **Alghadeer et al., (2021)** who mentioned that, more than half of the studied children who had recurrence of diarrhea were female gender.

The mother is usually the main caregiver during early childhood and plays a fundamental role in her child's health through proper and healthy practices. The present study show that, slightly more than half of mothers obtained unsatisfactory in overall practices presented in table 3. This can be justified by more than half of mothers their age below 18 years, have low family income, and live in rural area as presented in table 1. This finding is in the same line with (**Workie et al., 2018**) who found that, practice of mothers were unsatisfactory about the prevention of under-five diarrheal diseases and they attributed that to their younger age, their low family income and the crowding index..

Good sanitation factors like healthy water source and healthy environment play dynamic role in reduction of infection and being health. The present study demonstrated in that, there is no

statistically significant relation between recurrence of diarrheal episodes of studied children and sanitation factors (water sanitation and contact with animals (**table 4**). These findings supported by **Aziz et al., (2018)** who showed that, there is no statistically significant relation between recurrence of diarrheal episodes of studied children and sanitation factors Water Supply.

Finally, the current study had been able to shed some light on the various risk factors associated with recurrence of diarrheal episodes among children under two years. In this respect, pediatric nurse can help those mothers to increase awareness regarding risk factors of diarrhea to promote the child health and well-being.

Conclusion

The findings of the present study concluded that mothers who have children with recurrence of diarrheal episodes are confronting multiple risk factors like younger age of mothers, low family income, family size (overcrowding), feeding type, residence, failure of exclusively breast-feeding, inappropriate weaning practices, poor personal hygiene, inadequate water sanitation, poor environmental sanitation, and seasonal pattern.

Recommendations

In line with the findings of the study, the following recommendations are made:

- Mothers' education class about diarrhea risk factors should be extensively encouraged by educational authorities in all health centers to help them gaining information about how to prevent diarrhea
- Foster the establishment of exclusive breast-feeding program in the first six months of the age of the child in all health care centers.

Table (1): Characteristics of Mothers Having Children with Recurrence Diarrheal Episodes.

Mothers ' Characteristics	No (n=200)	%
Age in years		
18-	111	55.5
25-	51	25.5
30- 35	38	19.0
Marital status		
Married	187	93.5
Divorced	9	4.5
Widow	4	2.0
Education		
Illiterate	11	5.5
Read and write	28	14.0
Primary	32	16.0
Preparatory	17	8.5
Secondary	84	42.0
Technical institution	20	10.0
University	8	4.0
Occupation		
House wife	142	71.0
Working	58	29
Family income		
Enough	83	41.5
Not enough	117	58.5
Residence		
Rural	111	55.5
Urban	89	44.5
Home		
Own	156	78.0
Rent	44	22.0
Family type		
Nuclear	119	59.5
Extended	81	40.5
Crowding index		
Low	44	22.0
Moderate	93	46.5
High	63	31.5
Having mother class about diarrhea		
Yes	181	90.5
No	19	9.5
Source of information about diarrhea		
Doctor	139	69.5
Nurse	70	35.0
Friends and relatives	58	29.0
Television	7	3.5

Table (2): Characteristics of Children with Recurrence Diarrheal Episodes (n=200)

Children ' Characteristics	No	%
Child age in months		
▪ < 6	27	13.5
▪ 6 -	52	26.0
▪ 12 -	70	35.0
▪ 18 <24	51	25.5
Gender		
▪ Male	117	58.5
▪ Female	83	41.5
Child order		
▪ The first	30	15.0
▪ The second	95	47.5
▪ The third	57	28.5
▪ The fourth and more	18	9.0
Gestational age		
▪ <38 weeks	3	1.5
▪ 38-42 weeks	160	80.0
▪ >42 weeks	37	18.5
Birth weight		
▪ < 2500 gm	73	36.5
▪ 2500-4000 gm	127	63.5
▪ > 4000 gm	0	0.0
Feeding type		
▪ Breast feeding	71	35.5
▪ Bottle feeding	68	34.0
▪ Mixed	61	30.5
Go to nursery school		
▪ Yes	69	34.5
▪ No	131	65.5

Table (3): Distribution of the Studied Mothers According to total Percent Score of their Practices (n = 200)

Mother's practices	Unsatisfactory <50%		Satisfactory 50 - <65%		Good ≥ 65%	
	No.	%	No.	%	No.	%
Breast feeding practices	21	15.9	75	56.8	36	27.3
Formula-feeding practices	35	27.1	61	47.3	33	25.6
Weaning	107	55.2	54	27.8	33	17.0
Personal hygiene	91	45.5	69	34.5	40	20.0
Environmental sanitation	99	49.5	58	29.0	43	21.5
Contact with animals	86	43.0	60	30.0	54	27.0
Water sanitations	134	67.0	51	25.5	15	7.5
Vaccination status	30	15.0	19	9.5	151	75.5
Seasonal pattern	50	25.0	0	0	150	75.0
Overall practice	102	51.0	72	36.0	26	13.0

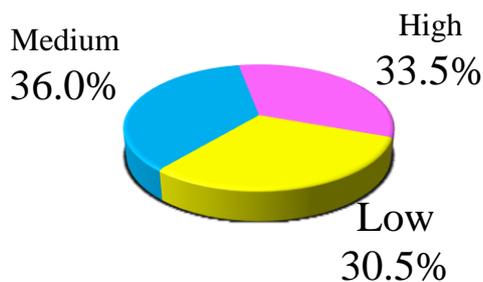


Figure (1): Recurrence of Diarrheal Episodes Among Children.

Table (4): Relation between Recurrence of Diarrheal Episodes and Total Percent Score of Mother’s Practices.

Mother’s practices	Recurrence of diarrheal episodes						χ^2	p
	No.	%	No.	%	No.	%		
Breast feeding	Low (n = 49)		Medium (n = 47)		High (n = 36)		χ^2	p
	No.	%	No.	%	No.	%		
Unsatisfactory <50%	5	10.2	5	10.6	11	30.6	18.021*	0.001*
Satisfactory 50 - <65%	23	46.9	35	74.5	17	47.2		
Good \geq 65%	21	42.9	7	14.9	8	22.2		
Bottle-feeding practices	Low (n = 26)		Medium (n = 49)		High (n = 54)		χ^2	p
	No.	%	No.	%	No.	%		
Unsatisfactory <50%	6	23.1	10	20.4	19	35.2	6.721	0.151
Satisfactory 50 - <65%	11	42.3	23	46.9	27	50.0		
Good \geq 65%	9	34.6	16	32.7	8	14.8		
Weaning practices	Low (n = 55)		Medium (n = 72)		High (n = 67)		χ^2	p
	No.	%	No.	%	No.	%		
Unsatisfactory <50%	17	30.9	48	66.7	42	62.7	37.685*	<0.001*
Satisfactory 50 - <65%	15	27.3	17	23.6	22	32.8		
Good \geq 65%	23	41.8	7	9.7	3	4.5		
Continuous Mother’s practices	Low (n = 61)		Medium (n = 72)		High (n = 67)		χ^2	p
	No.	%	No.	%	No.	%		
Personal hygiene	Low (n = 61)		Medium (n = 72)		High (n = 67)		χ^2	p
	No.	%	No.	%	No.	%		
Unsatisfactory <50%	20	32.8	32	44.4	26	38.8	16.253*	0.003*
Satisfactory 50 - <65%	19	31.1	33	45.8	31	46.3		
Good \geq 65%	22	36.1	7	9.7	10	14.9		
Environmental sanitation	Low (n = 61)		Medium (n = 72)		High (n = 67)		χ^2	p
	No.	%	No.	%	No.	%		
Unsatisfactory <50%	23	37.7	36	50.0	40	59.7	8.13	0.091
Satisfactory 50 - <65%	19	31.1	21	29.2	18	26.9		

Good ≥ 65%	19	31.1	15	20.8	9	13.4		
Water sanitation								
Unsatisfactory <50%	38	62.3	49	68.1	47	70.1		
Satisfactory 50 - <65%	17	27.9	18	25.0	16	23.9	1.205	0.877
Good ≥ 65%	6	9.8	5	6.9	4	6.0		
Contact with animals and insects								
Unsatisfactory <50%	24	39.3	30	41.7	32	47.8		
Satisfactory 50 - <65%	15	24.6	24	33.3	21	31.3	4.363	0.359
Good ≥ 65%	22	36.1	18	25.0	14	20.9		
Vaccination status								
Unsatisfactory <50%	17	27.9	7	9.7	6	9.0		
Satisfactory 50 - <65%	3	4.9	10	13.9	6	9.0	13.480*	0.009*
Good ≥ 65%	41	67.2	55	76.4	55	82.0		
Seasonal pattern								
Unsatisfactory <50%	9	14.8	25	34.7	16	23.9		
Satisfactory 50 - <65%	0	0.0	0	0.0	0	0.0	7.090*	0.029*
Good ≥ 65%	52	85.2	47	65.3	51	67.1		
Overall practice								
Unsatisfactory <50%	23	37.7	36	50.0	43	64.2		
Satisfactory 50 - <65%	22	36.1	29	40.3	21	31.3	17.731*	0.001*
Good ≥ 65%	16	26.2	7	9.7	3	4.5		

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