

Compliance of Rural Mothers with Preventive Behaviors of Respiratory Tract Infection to Their Children

Samar El-desokey Mohammed Ebeed¹, Amal Mohammed Ahmed El-Zeftawy², Lulah Abd EL-Wahaab Abd-Elaty Hassan³, and Nahed Karam Mohmoud El-Sehry⁴

¹ Nursing Specialist, Tanta Fever Hospital, Egypt.

^{2,3} Professor of Community Health Nursing. Faculty of Nursing. Tanta University. Egypt.

⁴ Lecture of Community Health Nursing. Faculty of Nursing. Tanta University. Egypt.

Abstract

Background: Respiratory tract infections are one of the most common causes of under-five morbidity and mortality. So, it is necessary for mothers to comply with preventive behaviors of respiratory tract infections. **The aim of the study:** was to assess the compliance of rural mothers with preventive behaviors of respiratory tract infection to their children. **Subjects and methods:** A descriptive research design was used in the study, and it was conducted in rural health unit at Nawag rural village – Tanta center - El Gharbia Governorate. **Subjects:** A convenience sample of 300 of rural mothers who are attending to the previous setting were included in the study. **Tool of the study:** One tool (a structured interview schedule) was used to obtain the necessary data for the study. It consisted of three parts as following: part (1): Socioeconomic status of rural mothers and health history of their under-five children. Part (2): Knowledge of rural mothers about respiratory tract infections (RTIs). Part (3): Assessment of compliance degree of rural mothers regarding preventive behaviors of respiratory tract infections (RTIs). **Results:** There was statistically significance positive correlation between total knowledge score, total compliance score of the studied rural mothers and family socio-economic status as ($p < 0.001$). **Conclusion and recommendations:** more than one-third of rural mothers had low level of knowledge, about one-third of them had moderate level of knowledge, and only one-quarter of them had high level of knowledge about RTIs. Furthermore, more than one-third of the studied rural mothers had moderate and higher compliance to preventive behaviors of RTIs while, only (17.3%) of them were having lower compliance with preventive behaviors of RTIs. So, we recommended continuous education and orientation programs for parents especially rural mothers of under-five children with RTIs to increase their knowledge and compliance with preventive behaviors regarding respiratory tract infections.

Key words: Compliance, knowledge, rural mothers, preventive behaviors, Respiratory tract infections.

Introduction

Respiratory tract infections among under-five children are a leading cause of illness, morbidity and mortality worldwide. The burden of respiratory tract infections has been estimated to be more than four million deaths per year internationally, with influenza infections accounting for an additional 250000 to 500000 deaths per year in 2019.^(1,2)

Acute respiratory infection is an inflammation of the respiratory tract anywhere from nose to alveoli with a wide range of combinations of signs and symptoms. The infection may interfere with the normal breathing of the individual.^(3,4) Respiratory infections are quite virulent and easily transmitted between populations. Due to the nature of respiratory disease, pathogens are easily aerosolized and are quite contagious. It is important to recognize signs and symptoms of respiratory illness early to prevent rapid spread of respiratory illness.^(5,6)

Respiratory infection constitutes upper respiratory infection (URI) and lower respiratory infection (LRI). Upper respiratory infection (URI) present mainly with rhinitis (common cold), tonsillitis, sinusitis and ear infections. While main presentation of LRI is pneumonia, asthma and bronchitis.^(7,8)

Infant and young children less than five years are more vulnerable to respiratory infections due to immaturity of their immune system. Also, the presence of allergy and family history of atrophy of lung increase in under- five children who are vulnerable to RTIs.^(9,10) Moreover, socio-economic conditions such as rural mothers' level of education, lack of health services, overcrowding, environmental factors, and

absence of ventilation are associated with increased risk of ARI among under-five children.^(11,12)

The most common signs and symptoms of respiratory infection among under-five children according to study published in 2016 were 40% of children had cough followed by 34% had fever, 9% had wheezing, 12% had sneezing and other symptoms like earache, lethargy, inability to play, and retraction of ribs.⁽¹¹⁾

Most of symptoms are quite and non-specific. Respiratory specific symptoms such as cough, sneezing, shortness of breathing and congestion are often indicative of a respiratory infection. Less specific symptoms as fever, malaise, body aches, headache, rashes, and gastrointestinal upset may also accompany respiratory infections.^(1,9)

The most common complications of respiratory infection among under-five children are pneumonia and chronic bronchitis. Annual incidence of pneumonia is reported to be 27%- 40% of community acquired pneumonia (CAPs) in children. Children under - five years are commonly affected making it the highest contributor of death due to LRTIs. According to WHO community acquired pneumonia (CAP) has annual incidence of 14% of all deaths of children under five years old in 2019. The mortality rate of CAP increases progressively with the severity of illness, killing 740180 children under -age of five in 2019 accounting for 22% of all deaths in children aged one to five years.⁽¹²⁾

Compliance of rural mothers with preventive behaviors regarding RTIs means that the process of adherence and following of rules, practices and behaviors that promotes health of their children and

protects them from RTIs. People have response differentially, some follow the rules of recommendations with great care, and others are laxer or simply refuse to comply. These differences occur as a result to number of factors including personal, social, mental, culture, and economic factors.⁽¹³⁻¹⁵⁾

Prevention of acute respiratory tract infection among under-five children is very important to reduce morbidity and mortality among them. So that, compliance of mothers especially rural mothers with preventive behaviors regarding respiratory tract infection is most effective and life saving for under -five children. Preventive behaviors for acute respiratory tract infection focus on hand washing, cough etiquette, and oral hygiene.⁽¹⁶⁾

Community health nurse can play an important role in primary level of prevention of ARTIs through helping and facilitating rural mothers to gain knowledge and adhere to preventive behaviors regarding acute respiratory tract infections among under-five children.⁽¹⁷⁾ The nurse needs to provide comprehensive health education on the etiology or causation, prevention, and management of ARTs. This will increase the capability of rural mothers of under- five children to identify the danger signs of acute respiratory infection in their children and to encourage appropriate and early compliance of them with respiratory tract infections preventive measures.⁽¹⁸⁾

Significance of the study

Respiratory tract infection affects large number of children and causes high morbidity and mortality rate. A study conducted in Egypt by Abd-El Mohsen et al., in 2020 revealed that 36.7% of under-five years fulfill the WHO criteria of ARI,

with higher incidence (48.8%) among infants below 6 months and (58.6%) among male children.⁽¹⁹⁾ A study conducted in Egypt by El-Koofy N et al, in 2022 revealed that 60.4% of under five children had RTIs and severe acute RTIs lead to hospitalization and mortality in 15% of them and half of infections in under five children with respiratory tract infections were lower RTIs.⁽²⁰⁾ Also, there is lack of rural mothers' knowledge about preventive behavior regarding respiratory tract infection. Therefore, the aim of the present study was to assess the degree of compliance of rural mothers with preventive behaviors regarding respiratory tract infections

The aim of the study was to:

Assess the levels of compliance of rural mothers with preventive behaviors of respiratory tract infections to their children.

Research question: -

What are the levels of compliance of rural mothers with preventive behaviors of respiratory tract infections to their children?

Subjects and Method

Study design:

Descriptive study design was used in this study.

Study setting:

This study was conducted at rural health unit at Nawag rural village- that affiliated to Tanta district – El Gharbia Governorate.

Study subjects:

A convenience sampling was utilized in this study. The total number of the studied subject was 300 of rural mothers who were attending to the previous setting for any reasons including (immunization, child checkup, treatment or follow up). The average number of rural mothers who were attending to the previous setting monthly was about 200 mothers.

Tools of data collection:

A structured interview schedule was used in this study in order to collect the necessary data. It was included the following parts:

Part (1): Socioeconomic status of rural mothers and health history of their under-five children:-

This part included data about

a- Family socioeconomic status was measured by using the scale for measuring family socioeconomic status (SES) for health research in Egypt which was developed by Fahmy and El-Shrbini ,1983 and updated by Fahmy et al., 2015 ⁽²¹⁾. The scale included ten variables such as (parent education and occupation, number of children, family income and mothers' age).

The total score of family socioeconomic status (SES) is 48, a higher score was indicating better SES.

The total score of family socioeconomic status (SES) was categorized as follows:

- High: $\geq 70\%$ (33.5-48) from the total score.
- Medium: 40 to $<70\%$ (19.2 to < 33.6) from the total score.
- Low: $< 40\%$ (< 19.2) from the total score.

b- Health history of under-five children included previous history of respiratory tract infections, types of RTIs, number of recurrence and previous hospitalization due to RTIs, previous compulsory immunization and history of annual influenza pneumococcal vaccination, type of feeding, weight and height of the child and father's smoking.

Part (2): Knowledge of rural mothers about respiratory tract infections (RTIs):-
(22,23)

This part was developed by the researcher after reviewing related literature review to assess rural mothers' knowledge about RTIs.

It included the following items: definition, causes, risk factors, signs and symptoms, mode of transmission, complications, treatment and methods of prevention of RTIs.

The scoring system: The items of the questionnaire was checked with a model key answer, which was prepared by the researcher. Each question of the knowledge was coded as "zero" for an incorrect answer or a "don't know", and "one" for the correct answer. The total score was obtained by summing the scores of all questions and the total score was converted into a percent score.

The scoring system for knowledge was classified as follows: -

- Low knowledge: a scoring of $< 50\%$ from the total score.
- Moderate knowledge: a scoring of 50 to 70 % from the total score.
- High knowledge: a scoring of $>70\%$ from the total score.

Part (3): Assessment of compliance degree of rural mothers regarding preventive behaviors of respiratory tract infections (RTIs):-

It was developed by the researcher to assess rural mothers' reported practices to assess rural mothers' reported practices to RTIs preventive behaviors which included the following items: hand washing, cough and sneezing etiquette, oral hygiene, ventilation and cleaning house, compliance of child vaccination, compliance to breast feeding and healthy nutrition, compliance to child weaning and monitoring to child weight.

- **Hand washing** which included: (techniques, time, frequency, indications and duration of hand washing).
- **Coughing and sneezing etiquette** which included: (cover mouse and nose with

tissue or with elbow during coughing or sneezing).

- **Oral hygiene** which included: (care of the mouth of under-five children and using tooth brush).
- **Compliance with home ventilation and hygiene** which included: (opening windows continuously, cleaning floors and exposed linen to sunlight).
- **Prevent kissing children from mouth.**
- **Compliance with immunization schedule** which included: (given kids obligatory immunization, taken care of symptoms after immunization and following up instructions after immunization).
- **Compliance with feeding (breast feeding and bottle feeding)** which included: (continuous breast feeding and ensure good nutrition to the child).
- **Compliance with growth monitoring (weight and height)** which included: (following up for weight and height during immunization and every 2 months). It is also included monitoring weight if there were changes in weight.
- **Compliance with healthy weaning practice and healthy nutrition** which included: (beginning weaning after 6 months, giving kids natural juices and giving the same food to kids for 2 months).

The scoring system for reported practices

The score for each reported practice was calculated as follows: always done was scored "two", sometimes done was scored "one" and never done was scored "zero". These scores were summed up and the total score was converted into a percent score. The higher score indicated a greater degree of rural mothers' compliance.

The scoring system was as follow:

- Low compliance: a scoring of <50 % from the total score.
- Moderate compliance: a scoring of 50% < 75% from the total score.
- High compliance: a scoring of 75 % to 100% from the total score.

Method

1- Obtaining approval

Before conducting the study, an official permission letter was obtained from the Dean of Faculty of Nursing to the manager of rural health unit of Nawag in order to obtain his permission to collect data from selected setting.

2- Ethical and legal considerations:

- a) Approval of ethical committee of Faculty of Nursing, Tanta University was obtained before conducting the study.
- b) The study was conducted with careful attention to ethical standards of research and rights of the participants.
- c) An informed consent was taken from all selected mothers after providing appropriate explanation about the purpose of the study.
- d) Each participant was informed that she has the right to withdraw from the study at any time she wanted.
- e) Anonymity was considered.
- f) The researcher ensured that the nature of the study didn't cause any harm or pain for the entire subjects.
- g) Every mother was ensured about the privacy and confidentiality of all information collected.

3- Developing the tool of data collection:-

Study tool was developed by the researcher based on literature review.

4-The study tool was tested for face and content validity by a jury of five experts in

the field of Community Health Nursing before conducting the study.

5- A pilot study

A pilot study was carried out by the researcher on 10% of the sample (30 rural mothers) for testing the tools for its clarity, applicability and to identify obstacles that may be encountered with the researcher during data collection. Accordingly, the necessary modification was done. This sample was excluded from the study sample.

6- Reliability of the study tool was done:

Cronbach's Alpha test was used and it was found to be (0.84) for a structured interview schedule.

7- Actual study:

- The data were collected by the researcher over a period of six months starting from October 2020 to the end of March 2021.
- The researcher met with the rural mothers only two days per week (Saturday and Monday) in the waiting areas at rural health unit at Nawag village – Tanta district - El Gharbia Governorate.
- Each rural mother was interviewed individually at rural health unit at Nawag village – Tanta district - El Gharbia Governorate.
- The questionnaire was filled by the researcher according to the answers of rural mothers.
- The average number of rural mothers interviewed per day ranged from 5-7 mothers.
- The average time spent for collecting data from each mother ranged from 30-45 minutes.

8- Statistical analysis

The collected data were organized, tabulated and statistically analyzed using SPSS software statistical computer package

version 26. For quantitative data, the range, mean and standard deviation were calculated. For qualitative data, comparison was done using Chi-square test (χ^2). For comparison between means for two variables in a sample, paired samples T-test was used. For comparison between means for more than two variables, the F-value of analysis of variance (ANOVA) was calculated. Correlation between variable was evaluated using Pearson and Spearman's correlation r. A significance was adopted at $P < 0.05$ for interpretation of results of tests of significance (*). Also, a highly significance was adopted at $P < 0.01$ for interpretation of results of tests of significance (**).

Results

Table (I) Represent the distribution of the studied rural mothers according to their family socio- economic status. This table shows that more than one- quarter (28.7%, 28.7%) of the studied rural mothers received secondary education and universal education respectively. Regarding fathers' educational level, more than one-third (37.3%) of them received universal education and less than one- quarter of them (21.3%) received secondary education.

Concerning the working status of the studied rural mothers, about two-thirds (61%) of them were working and more than one-third (39%) of them were housewives. Concerning the working status of the fathers, most (97.7%) of them were working. Regarding the family use of computer, more than one-third (38.7%) of them were never used it, while nearly half (48.7%) of them were sometimes used it.

Regarding family income, slightly less than one-third (31.7%) of the were had enough family income and 7.7% of them reported

that, their family income wasn't enough. Regarding the crowded index, about three-quarters (76.7%) of them were having crowded index of < 2 and the remaining 23.3% were having crowding index of > 2 . Regarding sewage and refuse disposal, the higher percentage (95.3, 93%) of them reported that, they had sewage and refuse disposal respectively.

Table (II) represents the distribution of the studied rural mothers according to their levels of socio-economic status, it illustrates that more than half (58.3%) of the studied rural mothers had high socio-economic status, while about more than one-third (36%) of them had medium level of socio-economic status and only 5.7% of them had low socio-economic status.

Table (III) represents the distribution of the studied rural mothers according to their correct answer regarding their knowledge about (RTI). It indicates that, about two-thirds (64%, 62.7%, 67.7%, 61.3% and 66%) of the studied mothers didn't know the meaning, causes, risk factors, symptoms, and complications of RTIs respectively. In the opposite, more than one-third (43% and 41.3%) of them known the correct answer for mode of transmission, drugs, and methods of prevention of RTIs respectively.

Table (IV) represents the distribution of the studied rural mothers according to their knowledge levels about respiratory tract infection (RTI). It illustrates that, slightly more than one-third (41.7%) of rural mothers had low level of knowledge, about one-third (32.3%) of them had moderate level of knowledge and only 26% of them had high level of knowledge about RTIs.

Table (V) represents the distribution of the studied rural mothers according to

their degree of compliance with each item of preventive behaviors of respiratory tract infection (RTI). It was noticed that, more than one-third (38.7%) of the studied rural mothers were had lower compliance with follow up to child weight. In the opposite, slightly and more than half (50.7%, 57.7%, 55%, 57.3%, and 63%) of them had moderate compliance to hand washing, coughing and sneezing etiquette, avoidance of kissing kids, breast feeding and healthy nutrition and child weaning respectively. Moreover, nearly three-quarters (73.7% and 74.3%) of them had higher compliance with ventilation, cleaning house and with vaccination respectively.

Table (VI) represents the relation between levels of knowledge of the studied rural mothers regarding RTI and their degree of compliance with preventive behaviors of RTI. It illustrates that, more than half (57.7%) of the studied mothers with low level of compliance showed low level of knowledge, while more than one-third (38.1%) of them showed moderate level of compliance and knowledge regarding preventive behaviors of RTIs with highly statistically significant relation between them p- value ($p < 0.001^{**}$)

Table (VII) represents the relation between levels of family socio-economic status of studied rural mothers and their levels of knowledge regarding RTI. It shows that, highest percentage (82.1%) of rural mothers with high level of knowledge had high level of socioeconomic status. Also, more than two-thirds (68.0%) of mothers with moderate level of knowledge showed high level of socioeconomic status. In addition, more than half (57.6%) of them with low level of knowledge had moderate socioeconomic status, with highly

statistically significant relation between them at ($p < 0.001^{**}$).

Table (VIII) represents the relation between levels of family socio-economic status of studied rural mothers and their degree of compliance with preventive behaviors of RTI. It shows that, about two-thirds (65.8%) of studied rural mothers with high level of compliance with preventive behaviors of RTIs had higher degree of socioeconomic status. Also, more than half (54.5% and 51.9%) of them with moderate and low degree of compliance with preventive behaviors of RTIs had high level

of socioeconomic status with highly statistically significant relation between them at ($p < 0.05^*$).

Table (IX) represents the correlation between total score of knowledge and total compliance score of the studied rural mothers regarding RTI and family socio-economic status score. It illustrates that, there was statistically significance positive correlation between total knowledge score, total compliance score of the studied rural mothers and family socio-economic status as ($p = < 0.001$).

Table (I) Distribution of the studied rural mothers according to their family socio-economic status

Family socio-economic status of the studied rural mothers	Studied rural mothers (300)	
	No.	%
Mother's educational level		
- Illiteracy /Reads and Writes	16	5.3
- literacy education	15	5.0
- Primary Education	15	5.0
- Preparatory education	30	10.0
- Secondary education or diploma	86	28.7
- University education	86	28.7
- Post-graduate studies	52	17.3
Father's educational level		
- Illiteracy /Reads and Writes	30	10.0
- Primary Education	21	7.0
- Preparatory education	37	12.3
- Secondary education or diploma	64	21.3
- University education	112	37.3
- Post-graduate studies	36	12.0
Mother's work		
- Working	183	61.0
- House wives	117	39.0
Father's work		
- Working	293	97.7
- Not working	7	2.3
Family use of computer		
- Never	116	38.7
- Sometimes	146	48.7
- Most of time	38	12.7
Family income		
- Not enough and not repaid	23	7.7
- Enough and big loan	80	26.7
- Enough and small loan	29	9.7
- Enough only	95	31.7
- Enough and saving	73	24.3
Number of family members		
▪ Consisting of 6 members	7	2.3

Table (I) Continue.

Family socio-economic status of the studied rural mothers	Studied rural mothers (300)	
	No.	%
Number of family members		
- Consisting of 5 members	81	27.0
- Less than 5 members	212	70.7
Number of house rooms		
- <3	100	33.4
- ≥3	200	66.7
Crowding index		
- <2	230	76.7
- >2	70	23.3
Sewage disposal		
- Yes	286	95.3
- No	14	4.7
Refuse disposal		
- Yes	279	93.0
- No	21	7.0

Table (II) Distribution of the studied rural mothers according to their levels of socio-economic status

Levels of family socio-economic status of the studied mothers	Studied rural women (300)	
	No.	%
- High	175	58.3
- Moderate	108	36
- Low	17	5.7

Table (III) Distribution of the studied rural mothers according to their correct answer regarding their knowledge about (RTI)

Mother's knowledge about RTI	Studied rural mothers (300)			
	Correct		Incorrect	
	No.	%	No.	%
- Meaning of respiratory tract infections	108	36.0	192	64.0
- Cause of respiratory tract infection	112	37.3	188	62.7
- Risk factors causing respiratory tract infection to children	97	32.3	203	67.7
- Mode of transmission of respiratory tract infections	129	43.0	171	57.0
- Symptoms of respiratory infection on children	116	38.7	184	61.3
- Complications of respiratory infection	102	34.0	198	66.0
- Drugs used for child suffering from respiratory tract infection	129	43.0	171	57.0
- Methods of prevention of respiratory tract infection among children	124	41.3	176	58.7

Table (IV) Distribution of the studied rural mothers according to their knowledge levels about respiratory tract infection (RTI)

Levels of mother's knowledge	Studied rural mothers (300)	
	No.	%
- High	78	26
- Moderate	97	32.3
- Low	125	41.7

Table (V) Distribution of the studied rural mothers according to their degree of compliance with each item of preventive behaviors of respiratory tract infection (RTI)

Preventive behaviors of RTI	Studied rural women (300)					
	High		Moderate		Low	
	No.	%	No.	%	No.	%
- Hand washing	84	28.0	152	50.7	64	21.3
- Cough and sneeze etiquette	69	23.0	173	57.7	58	19.3
- Mouth clean	114	38.0	135	45.0	51	17.0
- Ventilation and cleaning house	221	73.7	66	22.0	13	4.3
- kissing kids	51	17.0	165	55.0	84	28.0
- Vaccination compliance	223	74.3	61	20.3	16	5.3
- Compliance to breast feeding and healthy nutrition	95	31.7	172	57.3	33	11.0
- Complain to child weaning	82	27.3	189	63.0	29	9.7
- Follow up child's weight	73	24.3	111	37.0	116	38.7

Table (VI) Relation between levels of knowledge of the studied rural mothers regarding RTI and their degree of compliance of preventive behaviors of RTI

Levels knowledge	Studied rural mothers (300)						Chi-square	
	Levels compliance						χ^2	P-value
	High (n=114)		Moderate (n=134)		Low (n=52)			
	No.	%	No.	%	No.	%		
High	57	50.0	11	8.2	10	19.2	65.967	<0.001**
Moderate	34	29.8	51	38.1	12	23.1		
Low	23	20.2	72	53.7	30	57.7		

<0.001* High significant

*Significant at $p \leq 0.05$

Table (VII) Relation between levels of family socio-economic status of studied rural mothers and their levels of knowledge regarding RTI

Levels of family socioeconomic status	Studied rural mothers (300)						Chi-square	
	Levels of knowledge						χ^2	P-value
	High (n=78)		Moderate (n=97)		Low (n=125)			
	No.	%	No.	%	No.	%		
High	64	82.1	66	68.0	45	36.0	54.589	<0.001**
Moderate	14	17.9	22	22.7	72	57.6		
Low	0	0.0	9	9.3	8	6.4		

<0.001* High significant

Table (VIII) Relation between levels of family socio-economic status of studied rural mothers and their levels compliance with preventive behaviors of RTI

Levels of family socioeconomic status	Studied rural mothers (300)						Chi-square	
	Total compliance						χ^2	P-value
	High (n=114)		Moderate (n=134)		Low (n=52)			
	No.	%	No.	%	No.	%		
High	75	65.8	73	54.5	27	51.9	11.308	0.023*
Moderate	30	26.3	53	39.6	25	48.1		
Low	9	7.9	8	6.0	0	0.0		

<0.05* Significant

Table (IX) Correlation between total score of knowledge and compliance of the studied rural mothers regarding RTI and family socio-economic status score

	Family socioeconomic status score		Total compliance score	
	r	P-value	r	P-value
Total compliance score	0.799	<0.001**	-	-
Total knowledge score	0.659	<0.001**	0.749	<0.001**

<0.001* High significant

Discussion

Acute respiratory tract infection among under-five children is a major health problem in developing countries as it is responsible for majority of morbidity and mortality of children under-five years of age. Up to 13% of children deaths in pediatric wards are due to acute respiratory tract infection. The proportion of mild to severe disease varies between high- and low-income countries and because of difference of etiology and risk factors. Also, the proportion of death due to acute respiratory infections in the community is high as many children die at home. ⁽²⁴⁾

Globally, ARTIs are responsible for 12 million morbidities and 1.3 million fatalities in children under-five with three-fourths occurring in sub-Saharan Africa. The incidence of ARTIs in children aged less than five years is estimated to be 0.29 and 0.05 episodes per child-year in developing and industrialized countries respectively. Although respiratory tract infection among under-five children is responsible for forty-two percent of childhood deaths in Africa, however it can be prevented. ^(23,25) So, the aim of the current study was to assess the compliance of rural mothers with preventive behavior of respiratory tract infection to their children.

Knowledge of the studied rural mothers played vital role in prevention of respiratory tract infections (RTIs) as mothers are the main caregiver for their children. The knowledge, attitude and practices of rural mothers directly effect on health status and survival of their under-five children. Comprehensive health education about RTIs will help mothers to identify the dangerous signs, facilitate early management, and prevention of ARTIs in their children. ⁽²⁵⁾

With regards to the distribution of the studied rural mothers according to their correct answer about (RTI). It indicated that about two-thirds of

the studied mothers didn't know the meaning, causes, risk factors, symptoms, and complication of RTIs respectively (**Table III**). This may be because they didn't attend educational program about RTIs with specialized person and their information about RTIs was from the public.

On the other hand, this result is in the opposite to **Bham et al., (2016)** who conducted a study about knowledge, attitude and practice of mothers on acute respiratory infection in children under-five years in the department of pediatrics, Darual Sehat hospital in Ghana and revealed that, good knowledge of mothers about ARI symptoms as more than one-third of them reported that, cough and fever were the most common symptoms of RTIs respectively. Also, most of the studied mothers know that pneumonia is the most common complication of RTIs and had good knowledge about risk factors. ⁽²⁶⁾

In addition, slightly more than one-third of rural mothers had low level of knowledge, about one-third of them had moderate level of knowledge and only one-quarter of them had high level of knowledge about RTIs (**Table IV**). This may be because they didn't attend educational programs about RTIs with specialized person and their information about RTIs was from the public. Also, about one-third of them had primary, preparatory education or were illiterate. This result is in the same line with **Saeed et al., (2020)** who conducted study about knowledge, attitudes, and practice among mothers of under-five children about acute lower respiratory tract infections in Al-Haj Yousuf administrative, Sharg-Alneel locality, Khartoum state, and found that, more than one-quarter of mothers had good knowledge and the rest of them had poor knowledge. Furthermore, this result is in the contrast with **Suganya et al., (2018)** who carried out a study about knowledge on

management of respiratory tract infection among mothers of under-five children in Kakatur village at Nellore District and showed that, one-fifth of mothers of under-five children had inadequate knowledge, about three-quarters of them had moderate knowledge and few of them had adequate knowledge about RTIs. ^(26,27)

Also, this result agrees with **Malla (2020)** who conducted a study of knowledge regarding acute respiratory infection and its management among mothers of under-five children attending pediatric OPD of teaching hospital, Birgunj and demonstrated that, more than half of the studied mothers had inadequate knowledge and more than one-third had adequate knowledge. In the contrary, **Abozed et al., (2020)** who conducted a study on the effectiveness of learning package application on the use of antibiotics for mothers of children with upper respiratory tract infection carried out at Mansoura University Children's Hospital and stated that, most of the studied mothers had poor knowledge, few of them had fair and good knowledge about RTIs. ^(23,28)

Concerning rural mothers' degree of compliance with each item of preventive behaviors of respiratory tract infection (RTI). It was noticed that more than one-third of the studied rural mothers had lower compliance with follow up to child weight. In the opposite, slightly and more than half of them had moderate compliance to hand washing, coughing and sneezing etiquette, avoidance of kissing kids, breast feeding and healthy nutrition and child weaning respectively. Moreover, nearly three-quarters of them had higher compliance with ventilation, cleaning house and with vaccination (**Table V**). This may be due to the higher level of awareness of mothers about the importance of some actions in prevention of infectious diseases among their children and more than half of studied mothers had knowledge about respiratory tract infections (table VII).

This result agrees with **Alhazmi et al., (2019)** who conducted a study about community's compliance with measures for the prevention of respiratory infections in Riyadh, Saudi Arabia and reported that, more than half of studied subject were always washing their hands with soap and water and about two-thirds of them were following coughing and sneezing etiquette. Furthermore, this result is in contrast with **Akteruzzaman et al., (2021)** which found that, less than one-third of the studied subject were following regular hand washing with soap, following cough etiquette, and a few keeping their houses clean, and more than half of mothers followed exclusive breast feeding, but this study was in the same line of our result in the part of children vaccination as the majority of them vaccinated their children. ^(29,30)

Concerning, the relation between levels of knowledge of the studied rural mothers regarding RTI and their degree of compliance with preventive behaviors of RTI, the results of the present study showed that, more than half of mothers with low level of compliance showed low level of knowledge, while more than one-third of mothers showed moderate degree of compliance and knowledge regarding preventive behaviors of RTIs with highly statistically significant relation between them as p-value ($p < 0.001^{**}$) (**Table VI**). This may be due to the direct impact of knowledge on practices as when the person knows, they will do. Also, more than one-quarter of mothers had secondary and universal education (table I). This result agrees with **Abdelatty et al., (2022)** who found that there was statistically significant correlation between mothers' total knowledge score about RTIs and their total preventive practices while, this result is in the contrast with **Kim & Oh (2021)** who found that, the correlation between mothers' knowledge and practice level was not statistically significant. ^(31,32)

Regarding the relation between levels of family socio-economic status of studied rural mothers and their levels of knowledge regarding RTI. The findings of the present study showed that, highest percentage of rural mothers with a high level of knowledge had high socioeconomic status. Also, more than two-thirds of mothers with moderate level of knowledge showed high level of socioeconomic status. More than half of them with low level of knowledge had moderate socioeconomic status, with highly statistically significant relation between them at ($p < 0.001^{**}$) (**Table VII**). From the researcher's point of view, this may be due to direct impact of socioeconomic status on the knowledge of the mothers as it easy for them to seek the information through different ways. This result is in the line with a study conducted by **Mutalik, (2018)** about association of maternal education and socioeconomic status with knowledge, attitudes, and practices of the studied mothers regarding acute respiratory infections and found that there was a significant association of socioeconomic status with maternal knowledge, attitudes, and practices ($p < 0.05$).⁽³³⁾

Regarding the correlation between total score of knowledge and total compliance score of the studied rural mothers regarding RTI and family socio-economic status score. The results illustrated that, there was statistically significance positive correlation between total knowledge score, total compliance score of the studied rural mothers and family socio-economic status as ($p = < 0.001$) (**Table IX**). This may be due to the socioeconomic factors affecting directly on the health as it facilitates easy access to health care information and services. Higher socioeconomic status led to higher health literacy and sought more web-based information. Both were associated with high adherence to guidelines for preventive

behaviors. Also, educational levels and income were considered as indicators for socioeconomic status (SES) as more than half of rural mothers had high socioeconomic status and one-quarter of them had high level of knowledge and more than one-third of them had high level of compliance with preventive behaviors.

Therefore, researcher recommended that continuous education and orientation programs about RTIs and its preventive measures for rural mothers of under-five children with RTIs to increase their knowledge and compliance with preventive behaviors regarding RTIs.

Conclusion and recommendations

Conclusion:

Based on the findings of the present study slightly more than one-third of rural mothers had low level of knowledge, about one-third of them had moderate level of knowledge, and only one-quarter of them had high level of knowledge about RTIs. Furthermore, more than one-third of the studied rural mothers had moderate and higher compliance to preventive behaviors of RTIs while, only (17.3%) of them were having lower compliance with preventive behaviors of RTIs.

In addition, there was a higher statistically significant relation between all elements of family socio-economic status and level of knowledge and degree of compliance with preventive behaviors of RTI ($p = < 0.001$) except for father's work, number of family members and sewage disposal. Finally, there was a statistically significance positive correlation between total knowledge score, total compliance score of the studied rural mothers and family socio-economic status as ($p = < 0.001$).

Recommendation

Based on the findings of the present study, the following recommendations were suggested:

1. Continuous education and orientation programs for parents' especially rural mothers of under-five children with RTIs to increase their knowledge and compliance with preventive behaviors regarding respiratory tract infections.

2. Development of a concise and feasible online information booklet for mothers about respiratory tract infections and its prevention as a tool for prevention of disease.

3. Health instructional guidelines about respiratory tract infections should be applied on a wide range through different social media to help disseminating information to large sector of the community about RTIs.

4. Further researches are required to investigate all factors associated with increased incidence of respiratory tract infections, especially among under-five children.

References

1. Depaolo L, Grant L, Chavis S, Ganesh N. Respiratory hygiene and cough etiquette, Infection control in dental office. National library of medicine. 2019 Nov; 18: 91-103
Dol: 10.1007/978-3-030-30085-2_7. PMC 7120096.
2. Andualem Z, Nigussie Z, Bagnaw B, Dessie A, Dagne H. Acute respiratory infections among under-five children from households using biomass fuel in Ethiopia: systematic review and meta analysis. Multidisciplinary respiratory medicine journal. 2020 Dec 23; 15(1): 710.
3. Modjadji P. Engaging mothers on the growth of school-age children in a rural South African health and demographic site: a qualitative insight. Journal of healthcare (Basel). 2021 Feb; 9(2):225.
4. Shibre G, Mekonnen W. Socio-economic inequalities in ANC attendance among mothers who gave birth in the past 12 months in Debre Brehan town and surrounding rural areas, a community-based survey. Journal of reproductive health, 2019 July; 16(99): 2-14. Available from: <http://creativecommons.org/licenses/by/4.0/>
5. Nho JH, Kim EJ. Health promoting behaviors in low-income overweight and obese women in Korea: an exploratory qualitative study. Korean journal of women health nurse, 2021 Dec; 31; 27(4): 348-357.
6. Tesema G, Worku M, Teshale A, Yeshaw Y, Alamneh T, Getaneh H, et al. Understanding the rural-urban disparity in acute respiratory infection symptoms among under-five children in sub-Saharan Africa: a multivariate decomposition analysis. BMC public health journal, 2022 November 3; 22 (2): 767.
7. Saeed E, Awadalla H. Knowledge, attitude and practice among mothers of under-five children about respiratory tract infections and a locality in Khartoum Urban Area, Sudan. Journal of environmental science and public health. 2020 Dec 22; 4 (2020): 455-468.
8. Dagne H, Bogale L, Dagne B, Borcha M, Tesfaye A. Hand washing practice at critical times and its associated factors among mothers of under-five children in Debar town, northwest Ethiopia; Italian journal of pediatrics. 2019 Sep 13; 45:(120).
9. Subha J, Shrim G, Charumathi B, Jian T. Knowledge, attitude and practices about acute respiratory infection among mothers of under-five children in an urban area of Tamil Nadu. International journal of research in pharmaceutical sciences. April 2020; 11(2): 16-20. Dol: 10.26452/ijrps.v11iispl2.2054.
10. Qassim S, Saeed F, Alam M. Knowledge, attitude and practice of mothers on acute respiratory infection in children under-five years. Pakistan journal of medical sciences. 2016 Dec; 32 (6): 1557-1561.

11. Schaad B, Esposito S, Razi C. Diagnosis and management of recurrent respiratory tract infections in children: A practical guide. *Official journal of pediatric infectious diseases*. 2016; 4 (1). Doi: 10.5812/pedinfect.31039.
12. Mahashur A. Management of lower respiratory tract infection in outpatient setting. *Journal of lung India*, April 2018; 35(2): 143-149.
13. Demirtas-Madran HA. Accepting restrictions and compliance with recommended preventive behaviors for covid-19: A Discussion Based on the Key Approaches and Current Research on Fear Appeals. *Front Psychol*, 2021 June; 7; 12 (1):6-48. Available from: <http://doi.org/10.3389/fpsyg.2021.558437>
14. Chen X, Chen H. Differences in preventive behaviors of covid 19 between urban and rural residents: lessons learned from cross sectional study in China. *International journal of environmental Research and Public health*. 2020 June; 17 (12): 4437-4450. Available from: <https://doi.org/10.3390/ijerph17124437>.
15. Shahbaznejad L, Navaeifar M, Rezai M, Shirazi Z, Fahimzad S, Hosseinzadeh F, et al. Knowledge, attitude and practice of Sari birth cohort members during early weeks of covid-19 outbreak in Iran. *BMC public health*. 2021 May; 28(11): 21: 982. Doi 10.1186/s12889-021-11039-6. Available from: <http://creativecommons.org/licenses/by/4.0/>.
16. Rahardja M, Puspitasari M. Family health behavior: preventive measures against acute respiratory infections in under-five children. *International journal of preventive medicine*. 2021 Jul 29; 12: 99. Doi: 10.4103/I jpvm. Ijpvm 580-20
17. Wheatherspoon D. Acute respiratory infection. Health line Media a Red Ventures Company: Health Line Editorial Team; 2005-2020. Update March 4, 2019. Available from: <https://www.healthline.com/health/acute-respiratory-disease>.
18. Mutalik AV, Raje VV. Study to assess the knowledge, attitude and practice about acute respiratory infections among school going children and their parents in rural Maharashtra. *International journal of medical science and public health*. 2017; 6(11) 1584-1587. Available from: <https://www.researchgate.net/publication/320017400>
Doi: 10.5455/ijmsph.2017.0721414092017.
19. Abdel Mohsen A, Amin M, Yousef R. Acute respiratory tract infection in children under-five year; study of prevalence, risk factors and outcome in Minia university children's hospital, Egypt. *International journal of pediatric*. 2020; 8 (4)1149-57. Available from: <Http://ijp.mums.ac.ir>
20. El- Koofy N, El shabrawi M, Badawi N, Abd El-alim B, Zein M. Pattern of respiratory tract infections in children under-five years of age in low- middle income country. *Journal of Egyptian public health association*; 2022 Nov 7; 97 (1): 22.
21. Fahmy S, El-Sherbini AF . Determining simple parameters for social classifications for health research. *Bulletin of the high institute of public Health journal*. 2015 Aug; 7 (8): 95-108.
22. Bhalla K, Gupta A, Nanda S, Mehra S, Verma S. Parental knowledge and common practices regarding acute respiratory infections in children admitted in a hospital in rural setting. *Journal of family medicine and primary care*; 2019 Sep; 8 (9): 2908-2911. Available from: <Http://www.jfmpc.com>. Doi: 10.4103/jfmpc. Jfmpc_510_19

23. Malla C. Knowledge regarding acute respiratory infection and its management among mothers of under-five children attending pediatric OPD of teaching hospital, Birguni. *International journal of health sciences and research*. 2020; 10 (7): 112-115. Available from: www.ijhsr.org
24. Ghimire P, Gachhadar R, Piya N, Shrestha K. Prevalence and factors associated with acute respiratory infection among under-five children in selected tertiary hospitals of Kathmandu valley. *Plos One*. 2022 Apr 7; 17 (4): 170-174. Available from: <http://doi.org/10.1371/journal.pone.0265933>
25. Al-Kareem M, Abed M, Obaid H. Mother's practice of knowledge concerning their children under five years with upper respiratory tract infections. *Annals of the Romanian society for cell biology*; 2021 Jan; 25 (3): 7295-7304.
26. Bham S, Saeed F, Shah M. Knowledge, attitude and practice of mothers on acute respiratory infection in children under-five years in the department of pediatrics, Darul Sehat hospital in Ghana. *Pakistan journal of medical sciences*. 2016 Nov; 32 (6): 1557-1561.
27. Suganya V, Sunny N, Kummar N. Knowledge on management of respiratory tract infection among mothers of under-five children. *Narayana nursing journal*. 2018; 7(1): 37-41.
28. Abozed H, Abusaad F, Abd El Aziz M. The effectiveness of learning package application on the use of antibiotics for mothers of children with upper respiratory tract infection. *International journal of novel research in health care and nursing*. April 2020; 7 (1): 878-889.
29. Alhazmi A, Alshammari S, Alenazi H, A.Shaik S, Alzaid H, Almahmoud N, et al. Community's compliance with measures for the prevention of respiratory infections in Riyadh, Saudi Arabia. *Journal of family and community medicine*. 2019 Sep; 26 (3): 173-180.
30. Akteruzzaman M, Habib R, Praveen S, Ahmed S, Khalil I, khatun A, et al. Knowledge, attitude and practice of mothers about acute respiratory tract infections in under-five children. *Research gate*. 2021 Jun 9; 1 (01): 2-9.
31. Kim J, Oh S. The relationship between mothers' knowledge and practice level of cough etiquette and their children's practice level in South Korea. *Child health nurse research journal*. 2021 Oct; 27 (4): 385-394.
32. Attia T, Mesbah K, Arafa M. Compliance of Egyptian mothers to asthma controllers at pediatric outpatient clinic at Zagazig university hospitals. *Zagazing university medical journal*. 2020 May; 26 (3): 364-374.
33. Mutalik A , Raje V. Association of maternal education and socioeconomic status with knowledge, attitude and practice of her child regarding acute respiratory infections. *International journal of medical science and public health*. 2018 Nov; 7 (1): 29- 33.