

Effect of Educational Program on Improving Mothers' Performance towards Children with Typhoid Fever at Zagazig City

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Abstract: Typhoid fever remains a serious problem in developing countries including Egypt. An estimated 27 million cases of typhoid fever and 210,000 deaths occur worldwide. Aim of the study: To evaluate the effectiveness of educational program on improving mothers' performance towards children with typhoid fever at Zagazig City. Subjects and methods: Research Design: A quasi-experimental design was used. Setting: The study was conducted at Chiba Maternal and Child Health center, at Zagazig City. Subjects: Simple random sample of 103 mothers was recruited from the previous setting. Three tools were used: Tool I: A questionnaire sheet consisted of three parts: Demographic characteristics of the mothers under study, mother's knowledge about typhoid fever, and home environment risk factors. Tool II: Mother's practices related to food safety. Tool III: Mother's attitudes towards children with typhoid fever scale. Results: The overall pretest knowledge score was improved from 77.7% in pre-intervention to 97.1% immediately post intervention, and reduced to 96.1%, after 3 months. The total mean scores of their practices improved from 2.84±0.12 pre intervention to 2.88±.09 immediately post intervention and reduced to 2.87±0.1 after 3 months. Additionally, the total scores of their attitudes increased from 90.30% in pre-sessions; to 100% immediately post sessions, and reduced to 99%, at 3 months of post sessions. Only 13.6% of mothers' wash hands with soap, 25.2% of them eat from street food vendors. Moreover, 11.7% were boiling milk correctly. Furthermore, this result revealed highly statistically significant correlations between knowledge, practices and attitudes among studied sample throughout the phases of intervention. Conclusion: This study results provided evidence that after implementation of the educational intervention mothers' knowledge, attitudes, and practices regarding typhoid fever improved with highly statistically significant differences. Recommendations: Periodical educational programs for mothers regarding typhoid fever about preventive measures and its management with illustrated media.

Keywords: Children, Educational Program, Mothers Performance, Typhoid Fever.

1. INTRODUCTION

Typhoid fever is a major global public health problem, and it is an acute bacterial infectious disease that affects only humans. Typhoid fever is caused by "Salmonella typhi". Approximately 80% of cases and deaths occur in Asia and the rest mostly occur in Africa and Latin America. In Egypt, most of the typhoid deaths occur in school-age children or younger ⁽¹⁾.

Typhoid fever is transmitted through contaminated food, un-boiled milk, vegetables, or water. The house fly plays an important role by carrying the bacilli from the urine or stools of a person who is suffering or is an active food carrier ⁽²⁾.

The main symptoms of typhoid fever may involve fever, chills, and later abdominal pain. While, symptoms less common occur include; diarrhea or constipation, headache, cough, and intestinal bleeding. Symptoms usually start 8 to 14 days after infection with the bacteria ⁽³⁾.

The diagnosis of typhoid fever is based on isolation of *S. typhi* from the blood and bone marrow and by the Widal test. The presence of the characteristic clinical symptoms of typhoid fever or the detection of a specific antibody response indicates typhoid fever, but it is not definitive. Blood culture is the mainstay for diagnosing this disease. The Widal test is used to identify specific antibodies in the serum of people with typhoid using antigen and antibody reactions. In this test, serum is mixed with a dead bacterial suspension of salmonella that has specific antigens on it. More than 80% of children with typhoid fever have the pathogen in their blood ⁽⁴⁾.

Complications of salmonella infection may be non-typhoidal salmonellosis, such as: bacteremia, meningitis, pneumonia, endocarditis, pericarditis, osteomyelitis, and are more common in children with sickle cell anemia and liver and spleen abscess. But in typhoid fever (enteric fever) intestinal perforation and severe bleeding may occur in 1-10% of children, in addition to toxic encephalopathy, cerebral thrombosis, hepatitis, pancreatitis, arthritis, and myocarditis ⁽⁵⁾.

Without effective treatment, the case fatality rate is 10-30% ⁽⁶⁾. Interventions for disease prevention include health education, practicing safe food handling, and hand washing with soap and safe drinking water ⁽⁷⁾. Typhoid is treated with antibiotics successfully but even after treatment a small number of people who recover from typhoid continue to harbor the bacteria in their gut or gallbladder and become chronic carriers of the bacteria in their stools and are able to transmit the infection to others, even though they no longer have signs or symptoms of the disease. Up to 1 in 6 people have the potential to be a silent carrier. These individuals are considered to be particularly dangerous within the at-risk groups ⁽⁸⁾.

Mothers have an important responsibility in the care of their children with typhoid fever to recover faster. The role concerning offering a lot of fluids and food as will lose lots of fluid through fever, sweat, vomiting and diarrhea. So, the mothers should be taught the diet regimen of the sick child. Whatever, when the child gets stronger the mother can add thicker foods like mashed potatoes and soft bread. Care of the child with typhoid fever as he needs rest at least another week after the fever has subside and bathing the child every day which will also relieve fever. Moreover, the mother must tell that one of the key ways to stop the spread of typhoid fever is to promote and practice good hygiene ⁽⁹⁾.

The community health nurse plays crucial role in prevention and control of typhoid diseases through responding to public health problems; ensuring the utilization of available health services, providing health education and care management to vulnerable groups, elevating the public awareness toward personal hygiene; provision of a safe water supply and proper sanitation systems ⁽¹⁰⁾.

Significance of the study:

Typhoid fever is a serious public health challenge with socio-economic problems and an unaccounted financial burden. It needs joint efforts, promotion of inter-sectorial action, regional and international cooperation, as well as technical and financial support. Moreover, it is difficult to determine the true global incidence of typhoid fever, the incidence of the disease in 2011 was estimated at 12-33 million cases, resulting in 216,000--600,000 deaths annually ⁽¹¹⁾. In addition, in 2013, this resulted in approximately 161,000 deaths out of 181,000. The risk of death could be as high as 25% without treatment, while with treatment it ranged between 1 and 4% ⁽¹²⁾.

The present study aimed to evaluate the effectiveness of educational program on improving mothers' performance towards children with typhoid fever at Zagazig City. This was accomplished through the specific objectives:

1. To assess mother's knowledge, practices, and attitudes towards typhoid fever at Zagazig City.
2. To plan, implement, and evaluate the effectiveness of on educational intervention on improving typhoid fever mothers' performance towards children at Zagazig City.

• Research hypothesis:

- Educational intervention will improve mothers' knowledge, practices, and attitudes' scores regarding typhoid fever at Zagazig City.

2. SUBJECTS AND METHODS

Research design:

A quasi-experimental research design with pre–post assessment was used.

Setting:

At Chiba MCH center, at Zagzig City. There are four Maternal and Child Health Centers at Zagazig City; and then the researchers randomly selected one of them (Chiba MCH center) for the study.

Subjects:

Simple random sample was used it intended, mothers who attended the Maternal and Child Health center from 1 February 2020 to the end of May 2020 for any services, had children less than 6 years of age, regular attendance to the MCH center, and accept to participate in the study.

Sample size:

The sample size is calculated to detect an improvement in the scores of mothers' knowledge, attitude, or practice with a moderate effect size (0.50) based on *Hulley et al (2013)*⁽²³⁾ using a 1.5 standard deviation at 95% level of confidence and 80% power. Accordingly, the required sample size is 90 mothers. This will be increased to 100 to compensate for an expected dropout rate of around 10%.

Tools of data collection:

Three tools developed by the researchers, based on current related literature were used to collect the necessary data for achieving the study objectives:

Tool I: An interview questionnaire; it consisted of three parts;

- **Part A:** For collecting data pertaining to demographic characteristics of the mothers such as; age, number of telephone, sex, marital status, qualification, family size, number of rooms, past history of typhoid fever income and income.
- **Part B:** This involves questions regarding mother's knowledge about typhoid fever, to assess mother's knowledge about typhoid fever, guided by *Getachew et al.*⁽²⁾ as; meaning, causative organism, causes, its mode of transmission, signs and symptoms, complications, treatment, prevention, care of children with hyperthermia, child care during typhoid fever infection, and child nutrition.
- **Part C:** To determine mother's home environment risk factors such as; source of water at home, is there water filter at home, are there water store tanks, is there sanitary sewage disposal system for the home, eat from street food vendors, eat ice cream, is boiling milk correctly, washing eggs, is there housefly or cockroaches at home.
- **Scoring system:**

A complete correct answer was scored 2, an incomplete correct answer was scores 1, and an incorrect answer was scored zero. For each area of knowledge, the scored of items were summed up and the total of knowledge was (32) points. The mothers who scored greater than 50% were considered as having satisfactory knowledge. Cronbach's alpha coefficient of the instrument measured was 0.79.

Tool II: Mother's practices related to food safety, to identify mother's practices related to food safety, guided by *Abdelfattah et al.*⁽¹³⁾, it consisted of the following items:

1. **Personal hygiene:** It includes 9 questions regarding hand washing as wash hands before eating, wash hands in right manner, wash hands after toilet, wash hands after touching nose or body, wash hands after coming from outside etc.
2. **Food preparation and separation:** It includes 2 questions as: using separate instrument for food preparation, and cooked food during storage.
3. **Food cooking and reheating:** It includes 2 questions as: methods for cooking and reheating food well.

4. **Keep food at a safe temperature:** It includes one question as: storing food safely.

5. **Use safe water:** It includes 2 questions as: methods for choosing safe food and methods of washing fruits and vegetables properly.

Scoring system:

A complete correct answer was scored 2, an incomplete correct answer was scored 1, and an incorrect answer was scored zero. For each area of practice, the mean, standard deviation and weighted mean were used to determine the main areas of practices where never was from 1 to 1.66, sometimes from 1.67 to 2.33 and always from 2.34 to 3. Cronbach's alpha coefficient of the instrument measured was 0.87.

Tool III: Composed of two parts:

Part A: This tool was intended to assess mother's attitudes towards typhoid fever; it guided by **Mengistu et al.** ⁽¹⁴⁾, mothers were asked to respond by any of 3 options: complete "Agree," "Disagree," or "Not sure," for each statement. The Cronbach's alpha coefficient of the instrument measured was 0.65.

Scoring system:

A correct answer was scored 2, an incomplete correct answer was scored 1, and an incorrect answer was scored zero. For each area of attitudes, the mean, standard deviation and weighted mean were used to determine the main areas of practice where never was from 1 to 1.66, sometimes from 1.67 to 2.33 and always from 2.34 to 3. The Cronbach's alpha coefficient of the instrument measured was 0.76.

Part B: Nursing educational sessions about typhoid fever:

The researchers developed an intervention module in the form of an educational illustrated booklet for responding to the needs to mothers follow the educational sessions and to serve as a reference at home, based on current related literature, guided by (**Getachew et al.** ⁽²⁾; and **Bara et al.** ⁽¹³⁾). The duration of each session was 15-20 minutes at the previously mentioned settings.

Content validity and reliability:

The validity of data collection tools was tested by five experts from the Community Health Nursing and Community Health Medicine, Faculty of Nursing, Zagazig University and Faculty of Medicine, to assess clarity, relevance, application, comprehension, and understanding of the tools, all recommended modifications on the tools were done.

▪ **Operational Design:**

The current study was carried out as following:

▪ **Preparatory phase:**

A review of the past and current literatures using books, magazines, articles and periodicals to get acquainted with various aspects of research problem and develop the tools for data collection.

Pilot study:

A pilot study was carried out on 10% of predetermined sample which accounting as eleven mothers providing care to their children to test the validity, reliability, applicability and estimate their needs for filling the tools.

Field work:

Data collection took a period of 10 months; beginning of February 2020 to end of December 2020. The researchers started the data collection for 3 days per week from 10.00 a.m. to 12.00 noon. The execution of the study was through four phases: assessment, planning, implementation, and evaluation.

Assessment phase (Pre-intervention phase):

Once permission was granted to proceed with the study, the researcher started to prepare a schedule for collecting the data from the Maternal Health Unit. The researcher usually started by introducing herself to mothers, explaining the aim, nature of study, the magnitude of the topic in Egypt and reassured them that information obtained is strictly confidential

and would not be used for any purposes other than research. Followed by collecting data about baseline knowledge, attitudes and practices were pretested by interviewing every mother individually.

Planning phase:

Based on review of the literature, characteristics of the sample and the results obtained from the assessment phase, the researcher designed the intervention sessions' content. The learning booklet was prepared by the researcher and its content was validated and then distributed to mothers to be used as a guide for self-learning .

Implementation phase: (Intervention phase):

All mothers attended the health education intervention. The message was delivered using question and answer approach to ensure the involvement of all mothers. The sessions focused on the all categories of typhoid fever as well as the researchers focuses on how to wash the fruits and vegetables properly and how to boil milk correctly. Additionally, water storage needs a lot of precautions such as stored in clean and safe containers, stored for only days and replace it, stored away of any contamination specially bathrooms and separate between drinking water and other usage containers, supported by a PowerPoint presentation and educational short videos displayed for proper hand washing technique on a laptop, followed by group discussions with the mothers about the contents. As well, the researcher helped mothers gain feedback knowledge about typhoid fever. Additionally, pamphlets containing attractive images and clear simple texts were distributed to these mothers as a guideline after the intervention. The intervention was implemented in 3 sessions; the duration of each session was 20-25 minutes. The number of mothers in each session was 5 mothers; therefore the total sessions were 20 sessions.

Evaluation phase:

This phase was conducted after three months from health education intervention through the application of the same tools of the pretest.

Administrative and ethical considerations:

Official permission was obtained to conduct the study using the appropriate communication channel. Also, verbal consent was obtained from each mother who agreed to participate in the study. They were informed that participation is voluntary and that they have the right to withdraw from the study at any time without giving any reason.

Statistical analysis:

Data entry and analysis were done with the Statistical Package for Social Science Version 20; the statistical tests used are percentage, mean and standard deviation, Chi-square, paired t test and Spearman and Pearson correlation).

Significance of the results:

- Highly significant at p-value < 0.01.
- Significant at p-value < 0.05.
- Non-significant at p-value ≥ 0.05

3. RESULTS

Table 1: Number and Percentage Distribution of Studied Sample According to Their Demographic Characteristics (n=103).

Parameters	No	%
Age (in years)		
<20%	7	6.8
20-<25	28	27.2
25-<30	50	48.5
30+	18	17.5
Mean of age:	26.0194	±3.87799
Occupation:		
Housewife	81	78.6

Worker	22	21.4
<u>Educational level</u>		
Illiterate	15	14.6
Read And Write	10	9.7
Primary	8	7.8
Diploma 3 Years	42	40.8
University	28	27.2
<u>Marital status</u>		
Married	99	96.1
Widowed	4	3.9
<u>Family size</u>		
2-3	46	44.7
4-5	57	55.3
<u>Income</u>		
Insufficient	16	15.5
Sufficient	77	74.8
Sufficient And Saving	10	9.7

Table (1) indicates that, the mean age of the studied mothers was 26.0194±3.87799 years. In addition, 96.1% of them were married and 78.6% housewives. Considering, mothers' education, 40.8% were secondary education or diploma, followed by 27.2% had university education. Moreover, 74.8% of the studied mothers had sufficient income.

Figure (1): Percentage Distribution of Studied Sample According to the Past History

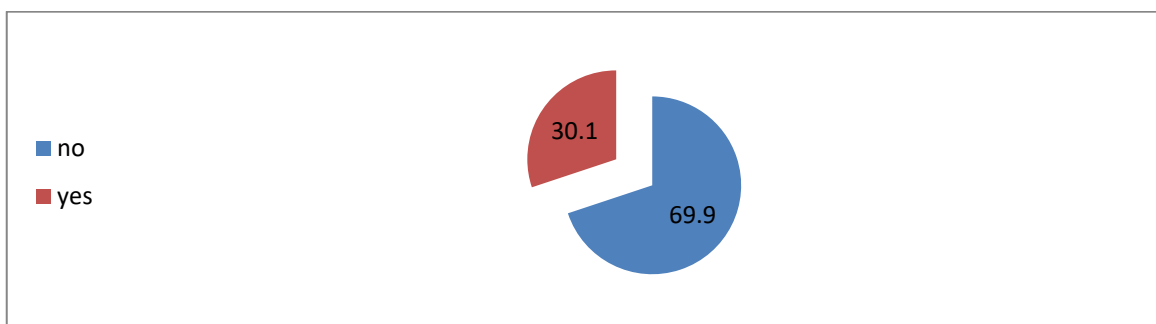


Figure 1 illustrates that 30.1% of mothers are having children with past history of typhoid fever.

Table 2: Numbers and Percentage Distribution of Studied Sample According to Their Home Environment

Parameters	No	%
Governmental Water Source	103	100
Water Filter	68	66.0
Water Storage Bathroom Or Kitchen	43	41.7
Sanitary Sewage Disposal System	103	100
Washing Hands With Water And Soap	89	86.4
Washing Hands With Water	14	13.6
Eat From Street Food Vendors	26	25.2
Eat Ice Cream	42	40.8
Boiling Milk Correctly	12	11.7
Washing Eggs	11	10.7
Housefly	59	57.3

House Cockroaches	50	48.5
Crowding Index		
Not Crowded	66	64.1
Crowded	19	18.4
Severely Crowded	18	17.5

Table (2) shows the distribution of studied sample according to their home environment. All (100%) mothers in their houses used governmental water source and sanitary sewage disposal system with water filter (66.0%). Moreover, the mothers mentioned that they use water storage bathroom/kitchen (41.7%), eat from street food vendors (25.2%), and eat ice cream (40.8%), boiling milk correctly (11.7%), and washing eggs before putting them in refrigerator (10.7%). Additionally, the mothers mentioned that they have housefly (57.3%) and cockroaches in their home environment (48.5%). Only, 18.4% of the participants reside crowded home.

Table (3): Typhoid Fever Correct Knowledge Difference of Studied Sample Pre, Post and Follow up Intervention

Parameters	Pre intervention		Post Intervention		Follow up		Pre-Post		Pre-Follow	
	N	%	N	%	N	%	X ²	Sig	X ²	Sig
Causative agent	0	0	84	81.6	78	75.7	141.836	0.000	125.531	0.000
Signs and symptoms	80	77.7	101	98.1	94	91.3	20.076	0.000	7.251	0.007
Causes	13	12.6	97	94.2	93	90.3	137.645	0.000	124.377	0.000
Incubation period	3	2.9	84	81.6	71	68.9	130.548	0.000	97.517	0.000
Mode of transmission	48	46.6	102	99	96	93.2	71.511	0.000	53.161	0.000
Diagnosis	4	3.9	97	94.2	95	92.2	168.005	0.000	161.039	0.000
Prevention	37	35.9	100	97.1	98	95.1	86.493	0.000	79.971	0.000
Complications	38	36.9	97	94.2	94	91.3	74.813	0.000	66.136	0.000
Treatment	15	14.6	101	98.1	99	96.1	145.936	0.000	138.590	0.000
Care of hyperthermia	66	64.1	103	100	95	92.2	45.101	0.000	23.912	0.000
Nutrition	24	23.3	92	89.3	90	87.4	91.240	0.000	85.558	0.000

Table (3) clarifies that no one of the studied three months of intervention. A considerable change was noticed between the studied mothers pre, and immediately post intervention related to mode of transmission ($X^2 = 71.511$, at $p = 0.001$). Additionally, majority of them identified methods of prevention that have arisen from 35.9%, to 97.1%, and decreased to 95.1% in pre-intervention, immediately post intervention and after three months respectively. All differences observed were statistically highly significant ($p = 0.001$).

Figure 2: Total Scores of Typhoid Fever Knowledge Difference of Studied Sample Pre, Post and Follow up Intervention.

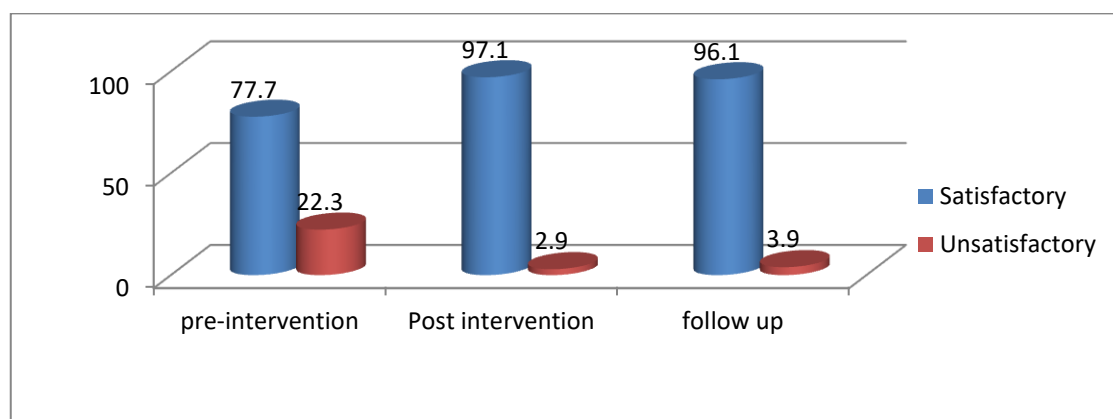


Figure 2 illustrates that, the total scores of typhoid fever knowledge increased from 77.7% in pre- intervention, to 97.1% immediately and reduced to 96.1% after three months.

Table (4): Typhoid Fever Practice Difference of Studied Sample Pre, and Immediately Post Intervention

Parameters	Pre						Immediately Post						X ²	P value
	Never		Sometimes		Always		Never		Sometimes		Always			
	NO	%	NO	%	NO	%	NO	%	NO	%	NO	%		
Personal Hygiene														
Wash Hands Before Eating	0	0	0	0	103	100	0	0	0	0	103	100	--	--
Wash Hands In Right Manner	11	10.7	10	9.7	82	79.6	1	1	16	15.5	86	83.5	9.813	0.007
Wash Hands After Toilet	7	6.8	4	3.9	92	89.3	0	0	10	9.7	93	90.3	9.577	0.008
Wash Hands After Touching Nose Or Body	1	1	26	25.2	76	73.8	0	0	26	25.2	77	74.8	1.007	0.605
Wash Hands After Coming From Outside	34	33.1	10	9.7	59	57.2	0	0	20	19.4	83	80.6	14.339	0.001
Wash Hands After Treating Garbage	0	0	0	0	103	100	0	0	0	0	103	100	--	--
Touch Food When You Had A Wound	100	97.1	3	2.9	0	0	98.1	2	1.9	98.1	0	0	.205	.651
Dry The Hands	0	0	0	0	103	100	0	0	0	0	103	100	--	--
Wear Jewelry	80	77.70	3	2.90	20	19.4	80	77.7	6	5.80	17	16.5	1.243	.537
Food Preparation And Separation														
Using Separate Instrument For Food Preparation,	21	20.4	0	0	82	79.6	7	6.8	14	13.6	82	79.6	21.000	.000
Cooking Food During Storage.	17	16.5	0	0	86	83.5	10	9.7	4	3.9	89	86.4	5.866	.053
Food Cooking And Reheating														
Methods For Cooking	24	23.3	0	0	79	76.7	0	0	0	0	103	100	27.165	0.000
Reheating Food Well	17	16.5	6	5.8	80	77.7	0	0	10	9.7	93	90.3	5.000	.082
Keep Food At A Safe Temperature:	36	34.9	35	33.9	32	31.2	3	2.9	5	4.9	95	92.2	.254	.881
Storing Food Safely														
Use Safe Water														
Choosing Safe water	0	0	0	0	103	100	0	0	0	0	103	100	--	--
Washing Fruits And Vegetables Properly	5	4.9	98	95.1	5	4.9	4	3.9	99	96.1	4	3.9	.116	.733

Table (4) describes typhoid fever practice differences of the studied sample at pre, and immediately post intervention. Regarding participants' practices toward personal hygiene at the home environment, all of mothers (100%) mentioned that they always wash hands before eating, while 89.3% wash hands after toilet, which improved to 90.3% immediately post intervention, and 57.2% of participants mentioned that they wash hands after returning home while 33.1% were never doing it at pre intervention. which decrease to zero immediately after intervention. As regards food preparation and separation, 20.4% of participants mentioned that they don't use separate instrument for preparation food which decrease to 6.8% immediately after intervention. Concerning food cooking and reheating, 16.5% doesn't reheat food well reduced to 9.7%, doesn't reheating food well at post intervention. Concerning keep food at a safe temperature, 31.2% of participants' mentioned that pre intervention they always store food safely, which improved to 92.2% immediately post intervention, and only five mothers do not wash fruits and vegetables with safe water properly before eating which reduced to 4 mothers immediately intervention.

Table (5): Typhoid Fever Practice Difference of Studied Sample Pre, and Follow up Intervention

Parameters	Pre						Follow Up						X ²	P-value
	Never		Sometimes		Always		Never		Sometimes		Always			
	No	%	No	%	No	%	No	%	No	%	No	%		
Personal Hygiene														
Wash Hand S Before Eating	0	0	0	0	103	100	0	0	0	0	103	100	--	--
Wash Hands In Right Manner	11	10.7	10	9.7	82	79.6	0	0	20	19.4	83	80.6	14.339	.001
Wash Hands After Toilet	7	6.8	4	3.9	92	89.3	0	0	11	10.7	92	89.3	10.267	.006
Wash Hands After Touching Nose Or Body	1	1	26	25.2	76	73.8	0	0	27	26.2	76	73.8	1.019	.601
Wash Hands After Coming From Outside	34	33.1	10	9.7	59	57.2	0	0	21	20.4	82	79.6	14.903	.001
Wash Hands After Treating Garbage	0	0	0	0	103	100	0	0	0	0	103	100	--	--
Touch Food When You Had A Wound	100	97.1	3	2.9	0	0	100	97.1	3	2.9	0	0	--	--
Dry Your Hands	0	0	0	0	103	100	0	0	0	0	103	100	--	--
Wear Jewelry	80	77.7	3	2.90	20	19.4	79	76.7	6	5.8	18	17.5	1.112	.574
Food Preparation And Separation														
Using Separate Instrument For Food Preparation,	21	20.4	0	0	82	79.6	7	6.8	15	14.6	81	78.6	22.006	.000
Cooking Food During Storage.	17	16.5	0	0	86	83.5	10	9.7	5	4.9	88	85.4	6.838	.033
Food Cooking And Reheating														
Methods For Cooking	24	23.3	0	0	79	76.7	0	0	0	0	103	100	27.165	.000
Reheating Food Well	17	16.5	6	5.8	80	77.7	0	0	12	11.7	91	88.3	6.022	.049
Keep Food At A Safe Temperature														
Storing Food Safely	36	34.9	35	33.9	32	31.2	3	2.9	6	5.8	94	91.3	.548	.760
Use Safe Water														
Choosing Safe water	0	0	0	0	103	100	0	0	1	1	102	99	1.005	.316
Washing Fruits and Vegetables Properly	5	4.9	98	95.1	5	4.9	0	0	5	4.9	98	95.1	--	--

Table (5) demonstrates typhoid fever practice differences of the studied sample at pre, and follow-up interventions. Concerning personal hygiene at the home environment, 79.6% always wash hands in right manner which increased to 80.6% after follow-up intervention. Additionally, 89.3% always wash hands after toilet compared to 89.3% after three months of intervention. Moreover, 33.1% of participants mentioned that they never wash hands after coming from outside which decreased to zero after three months of intervention. As regards keeping food at a safe temperature, 31.2% of participants mentioned that they are always storing food safely which improve to 91.3% after 3 months. Considering the using safe water, only 4.9% never wash fruits and vegetables properly before eating which reduced to zero% after 3 months of intervention.

Table (6): Typhoid Fever Practice Difference of Studied Sample Pre, and Immediately Post Intervention

Parameters	pre Mean ±SD	post Mean ±SD	X ²	Sig
Personal hygiene				
Never	2.82±0.14	2.87±0.12	8.487	.004
Sometimes				
Always				
Separate raw food from cooked food				
Never	2.63±0.48	2.74±0.38	10.939	0.001
Sometimes				
Always				

cook food well				
Never	2.69±0.50	2.95±0.14	29.756	0.000
Sometimes				
Always				
Keep food at a safe temperature				
Never	2.88±0.42	2.89±0.39	---	---
Sometimes				
Always				
Use safe water				
Never	2.88±0.42	2.89±0.39	---	---
Sometimes				
Always				

Table (6) shows the total mean score of mothers’ personal hygiene. It increased from 2.82±0.14 in pre-intervention, to 2.87±0.12 immediately post intervention. As regards separate raw food from cooked food, it increased from 2.63±0.48 in pre-intervention, to 2.74±0.38 immediately post intervention. Concerning cook food well, it increased from 2.69±0.50 in pre-intervention, to 2.95±0.14 post intervention. All the differences observed were statistically significant (p= (0.001).

Figure 3: Total Means Scores of Typhoid Fever Practice Difference of Studied Sample Pre, and Immediately Post Intervention

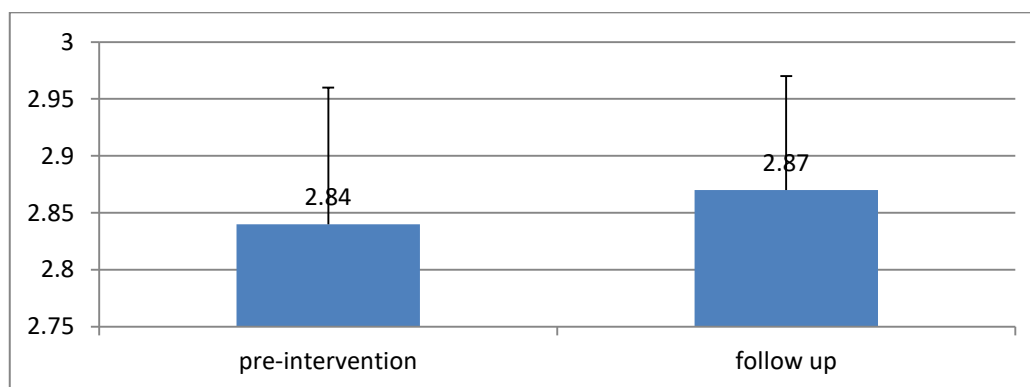


Figure 3 illustrates that, the total mean score of their practices improved from 2.84±0.12 in pre-intervention, to 2.88±.09 immediately post sessions.

Table (7): Typhoid Fever Practice Mean Difference of Studied Sample Pre, And Follow up Intervention

Parameter	Pre Mean ±SD	Follow Up Mean ±SD	X ²	Sig
Personal hygiene				
Never	2.83±0.14	2.86±0.13	8.756	0.004
Sometimes				
Always				
Food preparation and separation				
Never	2.63±0.48	2.73±0.38	10.939	0.001
Sometimes				
Always				
Food cooking and reheating				
Never	2.69±0.50	2.94±0.16	29.756	0.000
Sometimes				
Always				
Keep food at a safe temperature				
Never	2.88±0.42	2.88±0.40	.548	.760

Sometimes				
Always				
Use safe water				
Never	2.88±0.42	2.97±0.13	1.005	.316
Sometimes				
Always				
Total practices				
Never	2.84±0.12	2.87±0.1	2.020	.155
Sometimes				
Always				

Table (7) reveals the mean score of mothers’ personal hygiene which increased from 2.83±0.14 in pre-intervention, to 2.86±0.13 at follow-up after three months. As regards food cooking and reheating, it increased from 2.69±0.50 in pre-intervention, to 2.94±0.16 at follow up with statistically significant differences ($X^2=29.756$, at $p=0.001$).

Figure 4: Total Means Scores of Typhoid Fever Practice Mean Difference of Studied Sample Pre, And Follow up Intervention.

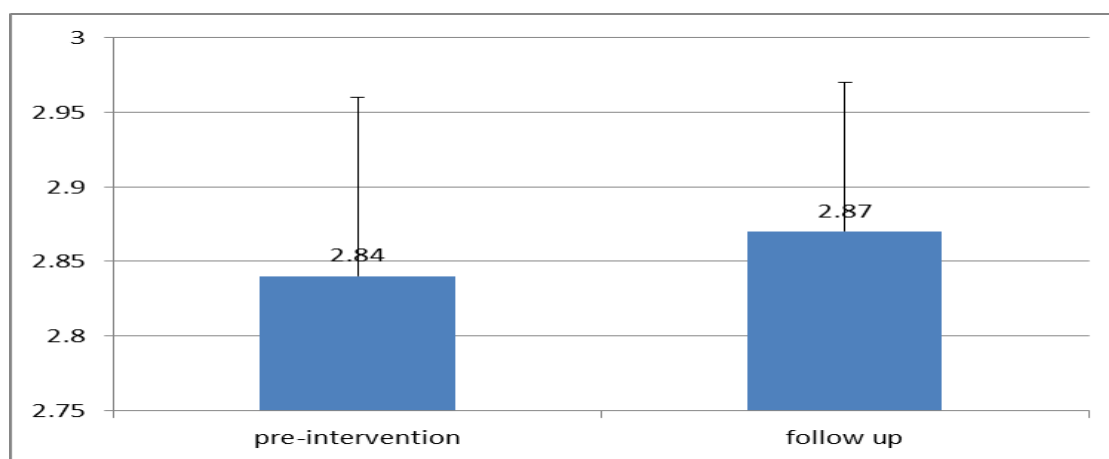


Figure 4 illustrates that the total means scores of their practices increased from 2.84±0.12 in pre- intervention, to 2.87±0.1 at follow up intervention

Table (8): Typhoid Fever Attitude Mean Difference of Studied Sample Pre and Immediately Post Intervention

Parameters	Pre Mean ± SD	Post Mean ±SD	T	Sig
I think typhoid is a serious disease	2.72±0.54	2.86±0.46	-1.930	.056
Disagree				
Not sure				
Agree				
I think cooking food thoroughly is very important for prevention of typhoid	3±0	2.99±0.09	1.000	.320
Disagree				
Not sure				
Agree				
I think washing hands after toilet is an essential method for prevention of typhoid	2.97±0.16	2.98±0.13	-.445	.657
Disagree				

Not sure				
Agree				
Hand washing before eating is essential for prevention of typhoid				
Disagree	3±0	2.99±0.09	1.000	.320
Not sure				
Agree				
I think appropriate water storage is critical step for prevention of typhoid				
	2.83±0.37	2.99±0.09	-4.042	.000

Table (8) describes that the total mean score of attitude differences of the studied sample concerning appropriate water storage is a critical step for prevention of typhoid fever pre and immediately post intervention increased from 2.83±0.37 in pre-intervention, to 2.99±0.09 at immediately after intervention with statistically significant differences (t= .004).

Table (9): Typhoid Fever Mean Attitude Difference of Studied Sample Pre and Follow up Intervention

Parameter	pre Mean ±SD	Follow Up Mean ±SD	T	Sig
I think typhoid is a serious disease				
Disagree	2.72±0.54	2.98±0.19	-4.346	.000
Not sure				
Agree				
I think cooking food thoroughly is very important for prevention of typhoid				
Disagree	3±0	3±0	---	---
Not sure				
Agree				
I think washing hands after toilet is an essential method for prevention of typhoid				
Disagree	2.97±0.16	2.98±0.19	-.376	.707
Not sure				
Agree				
Hand washing before eating is essential for prevention of typhoid				
Disagree	3±0	3±0	---	---
Not sure				
Agree				
I think Appropriate water storage is critical step for prevention of typhoid				
Disagree	2.82±0.37	2.83±0.37	2.441	.001
Not sure				
Agree				

Table (9) shows the total mean score of mothers' attitude differences regarding typhoid is a serious disease improved from pre (2.72±0.54) to 2.98±0.19 after 3 months follow up with statistically differences significant (t= .000.)

Figure 5 Typhoid Fever Mean Attitude Difference of Studied Sample Pre, post and Follow up Intervention

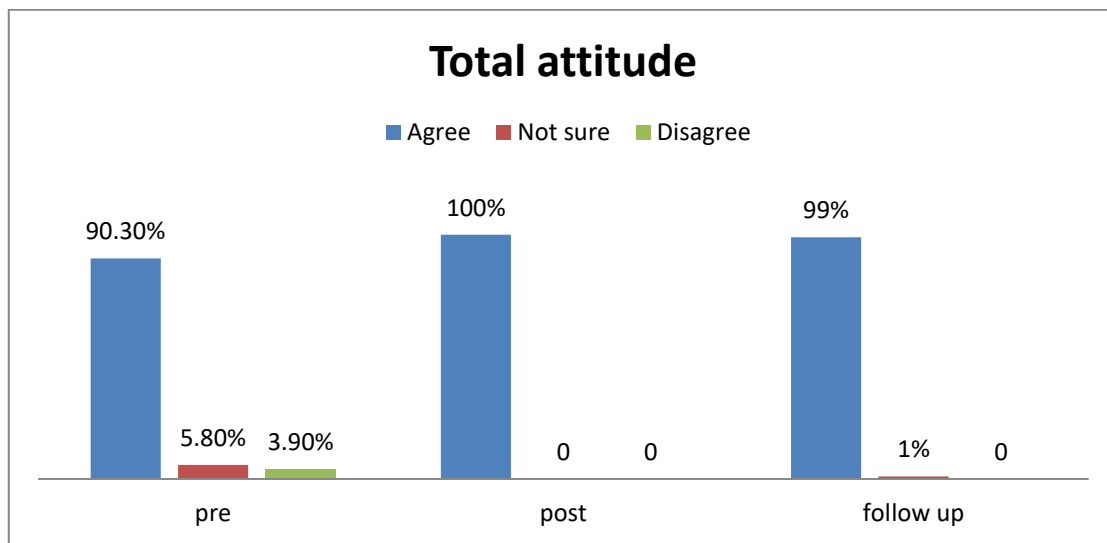


Figure 5 illustrates that the total mean score of the studied sample attitude differences improved from 90.30% in pre-intervention, to 100% immediately after intervention and reduced to 99% 3 months after intervention.

Table (10): Correlations between personal data Knowledge, Practice, and Attitude of Studied Sample

Parameters		Knowledge	Practice	Attitude
Age	R	-.035	.117	.274**
	Sig.	.725	.237	.005
Family Size	R	.217*	-.146	.238*
	Sig.	.028	.141	.015
Job	R	-.017	.108	.073
	Sig.	.867	.279	.466
Income	R	.123	.027	-.127
	Sig.	.214	.786	.201
Education	R	.078	-.023	-.215*
	Sig.	.436	.814	.029
Marital	R	.002	.040	.059
	Sig.	.985	.689	.553

Table (10) displays, correlations between personal data knowledge practices and attitudes of studied sample. There were statistically significant positive correlations between attitude and age (.274), family size (.238), while it was a negative correlation between attitude and education (-.215.). As well, there was a statistically significant positive correlation between knowledge and family size (.217).

Table 11: Correlation between Knowledge Practice and Attitudes among Studied Sample Pre Intervention

Parameters	Knowledge
Practice pre	r
	-.505
	Sig.
	.000
Attitude pre	r
	.015
	Sig.
	.883

Table (11) shows highly statistically significant correlations between knowledge, practices and attitudes among the studied sample pre intervention (P=0.001).

Table 12: Correlation between Knowledge Practice & Attitude among Studied Sample Immediately Post Intervention

Parameters		Knowledge Immediately post
Practice post	R	.167
	Sig.	.092
Attitude post	R	.083
	Sig.	.404

Table (12) portrays that highly statistically significant correlations between knowledge, practices and attitudes among the studied sample immediately post intervention ($P < 0.001$).

Table 13: Correlations Between Knowledge Practices and Attitudes Among the Studied Sample at Follow Up Intervention.

Parameters		Knowledge at follow up
Practice follow	r	.086
	Sig.	.389
Attitude follow	r	-.051
	Sig.	.607

Table (13) reveals highly statistically significant correlations between knowledge, practices and attitudes among the studied sample at follow up intervention ($P < 0.001$).

4. DISCUSSION

Typhoid fever is a global health and pervasive problem throughout the world, especially in developing countries; it has a great impact on human health. Egypt is one of the developing countries where there is an increasing trend to typhoid disease. Factors that contribute to the spread of these diseases in Egypt include unsanitary environmental risk factors, unhealthy lifestyle, human biology, close contact with infectious vectors and lack of access to health care services. The incidence of typhoid in Egypt is about 10-100/100 000 cases/year^[13].

The targeted population in the current study was mothers having children less than 6 years old. This target is selected because of the under developed immune system of children which makes them more prone to salmonella infection as few cells are required to initiate infection. Additionally, the children purchasing habits let them to be more exposed to the sale of products that have not been checked by health services. This finding is in agreement with that of the study by **Mengistu et al.**⁽¹⁴⁾ which done on **India**, which reported that the most cases of typhoid fever ages were 1-5 years.

Regarding the educational status, almost two fifth of the mothers had secondary education or diploma. This might be due to that the majority of females in rural areas marry early than in urban areas. The result of the current study is consistent that of with **Getachew et al.**⁽²⁾ in **Ethiopia**, who found that more than one third of mothers had moderate education, followed by more than one quarter had university education. This study finding is almost in line with that of the study carried out by **Abdelfattah et al.**⁽¹³⁾ in **Alqalioubiya Governorate, Egypt**; which revealed that 41.2% of participants had moderate education (diploma or institute). However this finding disagrees with that done in **Nigeria** by **Jo**⁽¹⁵⁾, which found that 61% of participants were diploma 3 years. This difference in percentages might be related to differences in socioeconomic characteristics factors.

Considering the mothers' age in the present study results revealed that the highest percentage of mothers representing mean half were in the age category of 25-<29 years. This might be due to that the proportion of females married before attaining the legal age of 18 years was higher among the rural community than in the urban one. This finding agrees with that of **Abdel-Sadik et al.**⁽⁵⁾ in **Egypt**, who found that 56.1% have age 25- < 30 years. This study result is in the line with that of **Abdelfattah et al.**⁽¹³⁾, the age of the mothers had direct effect on the level of care provided. They mentioned that

about half of study mothers their age were between 20 and less than 30 years with a mean age of 29.76 ± 7.36 . Such result was in agreement with that of a study done by **Naqqash et al.**⁽¹⁶⁾ on five hundred people of **Southern Punjab, Pakistan** and that found half of the mothers aged between 19 and 30 years.

The present study finding revealed that more than three quarter of the studied mothers were housewife. There are associations between early age of marriage and the socioeconomic variables as religion, consanguinity, marital distance, spousal age difference, education and occupation. This finding agrees with that of **Abdel-Sadik et al.**⁽⁵⁾ in **Egypt**, who mentioned that 74.5% were housewife. As well, this finding is supported by research conducted in **Menoufia Governorate, Egypt**, similar result was also found in **Ethiopia** by **Getachew et al.**⁽²⁾.

Regarding history of previous exposure of mothers' children to typhoid fever, from a total of 103 mothers under study, less than one third reported having got typhoid fever. So, effective prevention strategies include the promotion of hand washing. This finding was in agreement with that of **Getachew et al.**⁽²⁾ in **Ethiopia**, which mentioned that 151 (35.7%) reported having typhoid fever.

In the present study, pre intervention the results revealed that more than three quarters of mothers' had satisfactory knowledge, whereas after implementing the educational intervention a marked increase in knowledge level, was detected that most of the mothers had satisfactory knowledge. This might be due to that the health education program played a significant role on improving mothers' knowledge. The result of this study is incongruent with that of the study done in **Zimbabwe** by **Abdelfattah et al.**⁽¹³⁾, which mentioned 33% of mothers had satisfactory knowledge. As well as in **Ethiopia** by **Getachew et al.**⁽²⁾ found that 63.8% of the mothers have good knowledge related to typhoid fever. Contradicting with these study results percentages were reported in a study conducted by **Abdel-Sadik et al.**⁽⁵⁾ in **Egypt**, which demonstrated that, 70.4% of the studied mothers had inadequate knowledge before intervention, while the rest (29.6%) of them had adequate knowledge. The difference might be due to the effort of the researchers in implementation, sessions and success of the educational intervention.

Regarding the causative agent of typhoid fever in the present study, before intervention none of the mothers knew that typhoid fever is caused by germ compared to majorities of mothers in the post and follow up interventions. This might be due to that did not the mothers receive any health education regarding typhoid fever. This finding was in disagreement with that by **Getachew et al.**⁽²⁾ in **Ethiopia**, who found that 65.5 % of the respondents knew that typhoid fever is caused by salmonella typhi. Similarly, results of study done in **Ghana** by **Tutu**⁽¹⁷⁾, mentioned that 49.2% knew that typhoid fever is caused by germ. The difference might be due to the demographic characteristics of the previous study samples. Similarly, in line with these study results, another previous one⁽¹⁸⁾ in **Iraq** found that 80.1% of the mothers answered correctly the question about the causative agent of typhoid fever.

Concerning the mode of transmission in the present study, after intervention, almost all of mothers knew that typhoid fever is transmitted by eating contaminated food and drinking contaminated water as well as most of them at follow up carried to less half of them before intervention with that of **Getachew et al.**⁽²⁾ in **Ethiopia**, which mentioned that 92.7% of the mothers know that correctly.

Considering the ways of prevention of typhoid fever in the current study more than one third in the pretest intervention knew them compared to most of them whatever immediately post intervention or after three months. This finding is consistent with that of **Abdelfattah et al.**⁽¹³⁾ in **Alqalioubiya Governorate, Egypt** which cited the ways of preventing typhoid as washing hands with soap and water (54%), drinking water from safe sources (54%), washing fruits before eating them (30%), proper disposal of waste (30%), avoiding eating cooked food from vendors (9%). Moreover, **Nguri et al.**⁽²¹⁾ in **Kenya** found that 86.5% answered drinking boiling water, proper waste disposal were 83.7%, and 77.3%, hand washing, 96.5% washed their hand by soap and water after using toilet facility. The results of this study are almost in the same line with those of the study done in **Nigeria** by **Nahimana et al.**⁽⁷⁾ who mentioned the ways of preventing typhoid satisfactorily (94.0%).

Concerning the risk factors of typhoid fever in environmental practices about one quarter of mothers reported that they eat from street food vendors, about one tenth of mothers are washing eggs before putting them in their refrigerator, as well minority of them are boiling milk correctly, additionally slightly more than two fifth of mothers eat ice cream from vendors. This might be due to poor food hygiene as risk factors for typhoid fever. These findings were in agreement with

those of **Taha et al.** ⁽¹⁸⁾ in **Iraq**, who found that 27.3% of the mothers did eat from street food vendors. The **Pakistani** study showed that 60.5% were routinely eating foods sold on carts by vendors which are unprotected from flies and dust ⁽¹⁹⁾.

All mothers in their houses are using governmental water source, and sanitary sewage disposal system. As well, the majority of mothers are using soap for hand washing. As well, slightly less than two thirds use filter to treat their water in their houses. Hand washing with soap is the single most effective and inexpensive way to prevent diarrhoeal diseases including typhoid. These findings were in agreement with those of a study carried out by **Getachew et al.** ⁽²⁾ in **Ethiopia**; they mentioned that 90.5% of the mothers obtained drinking water from pipe line. However, **Nahimana et al.** ⁽⁷⁾ in **Mahama Refugee Camp of Kirehe District, Rwanda**, found that 87.0% of mothers reported using soap when they wash their hands which 13% are using water only.

Concerning the pests (flies and cockroaches) in mothers' homes environment under study results revealed that around are having of mothers are having flies and cockroaches. From the researchers point of view, insects are the great risk for the spread of typhoid. Additionally, cockroaches are among the most common pests in many homes and other buildings. At night they search for food in kitchens, food storage places, rubbish bins, drains and sewages. They are pests because of their faulty habits and bad smell. Some people may become allergic to cockroaches after frequent exposure. Cockroaches can sometimes play a role as carriers of intestinal diseases, such as diarrhoea, dysentery, and typhoid fever. This study finding is in agreement with that of **Abdelfattah et al.** ⁽¹³⁾, who found that sixty point four percent had pests at home while only half of them control them by having intact silk at the home outlets.

Concerning water storage almost all of the study subjects have water tanks placed inside the house. Two fifths of mothers put water tanks in the bathrooms. From the researchers point of view, water storage needs a lot of precautions. Therefore, targeted educational campaigns should be focusing on household water treatment and safe storage, hand washing with soap, safe food preparation, and proper sanitation. Additionally, storing drinking water in a clean container with a small opening or a cover, and using it within 4 hours is essential as a method for prevention of typhoid. These results are in disagreement with those of **Abdelfattah et al.** ⁽¹³⁾, in **Alqalioubiya Governorate, Egypt**, which mentioned that majority of their studied sample put water tanks in the kitchens, while one quarter put them in the bathrooms. More than one third store water for one week while one quarter store it more than two weeks and till water turned off.

Regarding the mothers' personal hygiene practices in the present study, the result revealed that almost one third of mothers never washed their hands after returning home i.e., coming from outside. Additionally, the results also revealed that minority of mothers never washed hands after toilet. Moreover, regarding the use of safe water, only five mothers never washed fruits and vegetables properly with safe water before eating which reduced to four mothers immediately post intervention and zero after three months at follow up.

Concerning food cooking and reheating, the results of the current study revealed that pre-intervention less than fifth were not reheating food well. The researchers point of views this as a main risk factor that directly affects on food and water manipulation either for self or others especially in such fecal-oral infections. The germs that cause typhoid are invisible. They can be carried on the hands without knowing it. Media plays important role in hand washing. Expanded hand washing could save thousands of lives from typhoid and other diseases- especially in low-income countries. This point of view is supported by **Wali et al.** ⁽²⁰⁾ in rural **Sharkia Governorate**, who mentioned that typhoid is a serious public health problem. This finding is in agreement with that of **Abdelfattah et al.** ⁽¹³⁾ found that more than one third of mothers didn't wash their hands after returning home. The previous results are in accordance with the result reported by **Nguri et al.** ⁽²¹⁾ whose study on risk factors influence typhoid fever occurrence among the adults in **Maina Slum, Nyahururu Municipality, Kenya** found that, majority of his study subjects didn't wash hands after returning home. Moreover, 97.1% of participants' mentioned that they wash their hands before food preparation while 2.9% doesn't do this, wash hands before eating only, 7.3% of participants regularly wash their hands before eating while 90.7% of them don't do this. Similarly, a study done by **Alam et al.** ⁽¹⁹⁾, found that 98.5% of mothers washed fruit and vegetables with water before eating. This is in agreement with the **Pakistani** study which has also shown that 95% of the sample washes fruits before eating. This finding is also on the line with that of **Taha** ⁽¹⁸⁾ in **Iraq**, they mentioned that (1.5%) of the mothers were not always washing fruits and vegetables with water before eating, and 6.7% of the mothers did not usually heat cold food before consumption.

As for attitude, the present study finding showed that there were improvements between pretest and immediately posttest intervention, and after three months, where the mothers perceived that typhoid fever is a serious disease. This might be due to that results provided evidence that the health education played a significant role on improving attitude scores among mothers. A similar positive attitude was reported by a study done in **Ethiopia** by **Getachew et al.** ⁽²⁾, which found that 88.4% perceived that typhoid fever is a serious disease. This finding was also in agreement that of a study carried out by **Abdelfattah et al.** ⁽¹³⁾, in **Ghana**, which mentioned good attitudes on preventive measures as cooking food thoroughly (99%) washing hands after toilet (99%), use hand washing before eating (100%), washing hands before handling food (99%) washing fruits and vegetables (99%), and appropriate water storage (100%). Additionally, **Taha et al.** ⁽¹⁸⁾, in **Iraq**, mentioned that 98.1% have positive attitude regarding typhoid fever.

According to correlations in the current study, there were highly statistically significant differences before and after intervention as regards mothers' practices, total knowledge scores, and attitudes ($p > 000$). This finding might be due to that if there is adequate knowledge already there will be satisfactory practice and attitudes. This finding was approved by **Abdel-Sadik** ⁽⁵⁾ in **Egypt**, which documented that there were positive correlations among total knowledge, practices and total attitudes' scores ($p > 000$).

This study result revealed that mothers' educational levels and age were significantly associated with their attitudes. This finding was consistent with that of a study carried out by **Nguri et al.** ⁽²¹⁾, in **Kenya** which had shown that low educational level was a risk factor for typhoid fever infection. As well, this finding was in agreement with that of **Getachew et al.** ⁽²⁾, in **Ethiopia**, which mentioned similar results.

5. CONCLUSION AND RECOMMENDATIONS

In light of the results of the current study, it can be concluded that the application of the educational intervention among mothers improved their knowledge, practices, and attitudes about typhoid fever. Additionally, the result showed that the posttest and follow up scores were higher than the pretest score in knowledge, practices and attitudes of mothers with ($p = 0.001$) for all changes. Therefore, the following recommendations are suggested.

- Periodical educational programs for mothers regarding typhoid fever, preventive measures and its management with illustrated media.
- Development of guiding leaflets for mothers of children with typhoid fever is essential to upgrade their knowledge about care of children with typhoid fever.
- Educational programs regarding protocol of care of infectious communicable diseases should be prepared, and implemented.

REFERENCES

- [1] **Kimberlin, D.W. (2018):** Red Book: 2018-2021 Report of the Committee on Infectious Diseases. American Academy of Pediatrics.
- [2] **Getachew, D., Walel, B., Eshete, W., Getahun, B., Demise, W., Shewasinad, S., & Deres, T. (2018):** "Assessment of Knowledge and Risk Perception towards Typhoid Fever among Communities in Mendida Town, Ethiopia 2018. *EC Paediatrics*;7 (12):1141-1157.
- [3] **Djemgou, P.C., Gatsing, D., Hegazy, M.E., El-Hamd, A.H., Ngandeu, F., & Tane, P. (2010):** Tueanone Rrealabdane, Turraanone and an Antisalmonellal Agent from Turraeanthus Africanus; *76(2):165-71*.
- [4] **Feasey, N.A., & Gordon, M.A. (2014):** "Salmonella Infections". In Farrar J, Hotez P, Junghanss T, Kang G, Lalloo D, White NJ (Eds.). *Manson's Tropical Infectious Diseases (23rd ed.)*. Saunders: Ltd. Doi:4.
- [5] **Abdel-Sadik, B.R., Khalaf, S.M., & Farid, W.Z. (2017):** Maternal Awareness Regarding Care of Their Children with Typhoid Fever. *Egyptian Journal of Health Care, EJHC*; 8 (4):180.
- [6] **Buckle, G.C., Walker, C.L., Black, R.E. (2010):** Typhoid Fever and Paratyphoid Fever: Systematic Review To Estimate Global Morbidity and Mortality for *J Glob Health*. Jun; 2(1): 010401.

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- [7] **Nahimana, M.R., Ngoc, C.T., Olu, O., Nyamusore, J., Isiaka, A.I., Ndahindwa, V., Dassanayake, L., & Rusanganwa, A. (2017)**; Knowledge, Attitude and Practice of Hygiene And Sanitation In A Burundian Refugee Camp: Implications For Control Of A Salmonella Typhi Outbreak". Pan African Medical Journal; 28 (1): 54
- [8] **Mayo Clinic Staff. (2012)**: Typhoid Risk Factors. Available at: [Http://Www.Mayoclinic.Com/Health/Typhoid-Fever/DS00538/DSSECTION=Risk-Factors](http://www.mayoclinic.com/health/typhoid-fever/DS00538/DSSECTION=Risk-Factors).
- [9] **Mali, S. (2012)**: Effectiveness of Structured Teaching Program on Knowledge of Mothers of Under Five Children on Domiciliary Management and Prevention of Infectious Disease, Sinhged College Of Nursing, PP:44,45.
- [10] **American Public Health Association. (2012)**: The Role of Public Health Nurses. Available at [Http://Www.Apha.Org/ Memb Ergroup S/Sections/-Aphas Ections/-Phn/About/Ph Nroles.Htm](http://www.apha.org/membership/sections/apha-sections/apha/about/apha-roles.htm), 2013.
- [11] **American Journal of Public Health Research. (2015)**: Typhoid fever. 3 (4): 162-166 Available at [http://Pubs.Sciepub.Com/Ajphr/3/4/6](http://pubs.sciepub.com/ajphr/3/4/6).
- [12] **Anna E. (2014)**: Infectious Diseases Related to Travel CDC Health Information for International Travel The Yellow Book Polymerase Chain Reaction Technology. Scandinavian Journal of Clinical and Laboratory Investigation. 134: 396.
- [13] **Abdelfattah, R.H., Elshair, E.H., & Elsayed, E.M. (2019)**: The Correlation between The Environmental Risk Factors and Typhoid Disease Among Children and Their Care Givers, Alqalioubiya Governorate. Med. J. Cairo Univ; 87 (5):3117-3125. [Www.Medicaljournalofcairouniversity.Net](http://www.medicaljournalofcairouniversity.net).
- [14] **Bara, H.T.1., Makoni, A.C.1., Masunda, K.P.E.1., Vere M.1, Makwara, I.P.1., Manyara, J.1., Mukeredzi, I.1., Moetsabi, T., Chonzi, P. (2016)**: Knowledge, Attitudes and Practices Related To Typhoid - The Case of Glen View Suburb, City of Harare. 1;34 Available at [Https://Www.Coalitionagainststypoid.Org/Wp-Content/Uploads/2016/07/20-](https://www.coalitionagainststypoid.org/wp-content/uploads/2016/07/20-)
- [15] **Mengistu, E., Anthonia, O., & Olum I. (2014)**: Typhoid Fever India Plante Parts Used in Folklore Remedy for Management of Typhoid Fever: An Open-Labe Randomized Controlled Trial. Lancet Infect. Dis., PP: 11,445- 454.
- [16] **Jo O., (2015)**; "Prevalence Of Salmonellosis Among Food Handlers And The Health Implications On The Food Consumers In Lagos State Nigeria". Journal of Medical Microbiology And Diagnosis 4.2 (2015): 187.
- [17] **Naqqash, S.S., Jaleel, Z., Faheem, B., & Rehman. (2016)**: A Cross Sectional Survey of Community Awareness about Typhoid and Its Major Vector Cockroach in Southern Punjab, Pakistan. In Middle-East Journal of Scientific Research; 21 (4): 602-608.
- [18] **Tutu, E.O. (2011)**: A Study on Typhoid Fever in Elmina in the Central Region of Ghana 2011".
- [19] **Taha, N., Sadeq, R.K., & Jabar. (2017)**: Knowledge, Attitude and Practice of Mothers Towards Typhoid Fever Disease. Iraqi JMS.; 15(1): 71-77. Doi: 10.22578/IJMS.15.1.9.
- [20] **Alam, A.Y., Adil, M.M., Qureshi, A.A. (2008)**: Knowledge, Attitude and Practices Survey on Hygiene and Their Impact on Health. Rawal Med J; 33(1): 68-71.
- [21] **Wali, H., Almoslmani, S., & Abbas (2011)**: Personal Hygiene and Household Habits Relation to Typhoid Outbreak in Rural Sharkia Governorate. In The Egyptian Journal of Community Medicine; 29(2):67-75.
- [22] **Nguri, K.A.B., Keraka, M., & Ng'ang'a, Z (2011)**: Typhoid Risk Factors and History to Study Risk Factors Influence Typhoid Fever Occurrence among the Adults in Maina Slum, Nyahururu Municipality. A thesis submitted for master degree of public health in the school of health science of Kenyatta University.
- [23] Hulley SB, Cummings SR, Browner WS, Grady D, Newman Typhoid fever. Designing clinical research: an epidemiologic approach. 4th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2013. Appendix 6A, page 73.