

Coaching Program Regarding Enteric Fever for Patients and the Effect on their Health Status

Sahar Mahmoud S. El Awady¹, Enas Ebrahiem Elsayed Aboelfetoh² & Mervat Amin Sayed³

¹ Assistant Professor of Community Health Nursing, Faculty of Nursing, Helwan University, Egypt.

² Assistant Professor of Adult Health Nursing Department, Helwan University, Egypt.

³ Assistant Professor of Community Health Nursing, Faculty of Nursing, Fayoum University, Egypt.

Abstract

Background: Enteric fever means a bacterial infection caused by the bacteria *Salmonella enterica* serotype Typhi or Para typhi. It is usually acquired by consuming food or water contaminated with the bacteria. **Aim:** This study aimed to evaluate the coaching program regarding Enteric Fever for patients and the effect on their health status. **Research design:** A quasi-experimental research design was used to utilize this study. **Sample:** Purposive sample included 111 patients diagnosed with enteric fever. **Setting:** Outpatient clinics in Helwan hospital. **Tool for data collection:** one tool interviewing questionnaire composed of four parts, 1st part: socio-demographic characteristic of patients, **2nd part:** past and present history of enteric fever, **3rd part:** patient's knowledge about enteric fever, **4th part:** Patient's reported practices. **Results** revealed that 60.0% of the studied patients were male. 74.0% of them lived in rural residence. 10% of the studied patients had good total knowledge pre which developed 80% post program. 90% them had adequate total practices post program while it was 10% per program. **Conclusion:** The current study concludes that the coaching program improved patients' health status than preprogram. Also, patients' total knowledge and total reported practices regarding enteric fever enhanced post coaching program. **Recommendations:** Periodic preventions and reorientation seminars about enteric fever for patients in outpatient clinic through a well-organized follow-up.

Keywords: Coaching program, Enteric fever, Health status & Patients.

Introduction

Enteric fever is a fatal illness that is caused by *Salmonella Typhi* and, less frequently, *Salmonella Para-typhi*. In locations with poor sanitation and hygiene standards, this disease is usually acquired by ingesting food, drink, or water tainted with the bacteria. After move in the body through the digestive tract, the bacteria proceed to the intestines, lymph nodes, gallbladder, liver, spleen, and other organs (Browne et al., 2020; Diwaker et al., 2024).

The worldwide enteric load may rise as a result of urbanization and climate change. Additionally, in communities without access to clean drinking water or proper sanitation, rising antibiotic resistance is facilitating the development of enteric fever (Parry et al., 2023).

According to estimates, 110,000 people die from enteric each year and 9 million become ill in 2019. Adults up to 45 or 65 years old (depending on the vaccine) and children as early as 6 months are advised to have the enteric conjugate vaccine. Since December 2017, the World Health Organization (WHO) has prequalified two enteric conjugate vaccines, which are now being added to pediatric vaccination programs in enteric-endemic nations (Qamar et al., 2022). Enteric fever outbreak in Egypt linked to inadequate sanitation among densely

populated, impoverished people (Meiring et al., 2021).

Prolonged fever, exhaustion, headache, nausea, gastrointestinal pain, and diarrhea or constipation are all signs of enteric fever. Serious side effects like intestinal bleeding or perforation can result from severe cases. In order to manage the illness and lower the risk of consequences, it is essential to contact a healthcare provider for an early diagnosis and treatment with the right medicines. Typically, blood, stool, or urine tests are used to determine the presence of the bacteria. Improved sanitation, immunization, and public health education are examples of preventive measures that encourage the use of safe food and water (Nabarro et al., 2022; Lee et al., 2024).

Ten to fifteen percent of patients get complications from enteric fever, and those who have been sick for longer than two weeks are more prone to experience them. Numerous concerns include intestinal bleeding and damage, which can result in ulcers and inflammation. This may cause intestinal bleeding in extreme situations. Infections can result in the death of cells in the walls of the large or small intestine, which can cause gastrointestinal problems (Yousafzai et al., 2020).

Systemic consequences include renal complications, hepatitis, meningitis, and pneumonia. Rarely,

intestinal perforation can result from enteric fever. Localized collections of pus, abscess development, can form in the liver, spleen, and other organs (Ndako et al., 2020).

Antibiotics are commonly used to treat enteric fever in order to eradicate the bacteria. Even if start feeling better, it's crucial to finish the entire course of treatment and take the antibiotics as advised. Recuperation depends on getting enough sleep, being hydrated, and eating a balanced diet. Good hygiene practices, such as frequent hand washing, particularly before meals, and eating properly prepared food, are recommended to prevent enteric fever. It is advised that people who are going to high-risk locations or working in settings where people may be exposed to the bacteria avoid drinking untreated water and get vaccinated against enteric fever (Carey et al., 2020).

Coaching builds patients awareness and empowers their health choice which leads to change behavior. A coaching program is a set of planned instructions and guidelines that teach individuals and groups how to modify their behavior or change it in a way that promotes and maintains their health. Also, it is any set of organized educational activities founded on reliable theories that give people, communities, and groups the chance to progress the knowledge and abilities necessary to make judicious health decisions. Thus, health systems base their most crucial initiatives on lowering the number of patients with enteric fever (Rahman et al., 2021).

In order to increase recovery and avoid complications, a coaching program for patients with enteric fever seeks to offer all-encompassing assistance and education. Personalized coaching sessions with medical experts that provide customized guidance on medication adherence, symptom management, and dietary adjustments are commonly included in this program. Coaches can monitor patients' progress, address issues, and modify care plans as necessary by conducting routine checks in person or online (Imran et al., 2024).

Moreover, the program clarifies patients how to spot the warning signs of problems and how significant it is to maintain good cleanliness in order to stop infections from spreading. The program helps patients feel more powerful and knowledgeable about their illness by creating a supportive relationship between them and coaches. This can result in better overall treatment of enteric fever, decreased hospital readmissions, and improved health outcomes (Irunde et al., 2023).

By assuming the roles of clinician, care provider, educator, advocate, manager, collaborator, leader, consultant, counselor, case manager, and researcher, community health nurses play a critical role in managing and preventing enteric fever. Nurses do this

by educating and motivating community members to take the following actions to control and stop the spread of enteric fever: In addition to maintaining strict standards of cleanliness in food preparation and handling, practice hand washing with soap and running water before preparing and eating food, after using the restroom, and after handling soiled diapers and bed linens. (McCann et al., 2022).

Significance of the study

There are significant regional variations in the yearly incidence of enteric fever (26/100,000 person per year in Vietnam, 172/100,000 person per year in Indonesia, and 502/100,000 patient per year in India). In Asia, untreated enteric fever causes about 552 000 fatalities per year (Sinha et al., 2021). Egypt was one of the top 20 nations with the greatest frequency of enteric fever in 2020, according to the Centers for Disease Control and Prevention (CDC). The International Enteric Fever Federation reports that in 2020, 5.202.328 Egyptians contracted salmonella enteric fever. (Saha et al., 2020).

The foundation of preventing enteric fever is the coaching program that the community health nurse offers patients. Nurses are urged to follow the procedures that assist stop the spread of enteric fever, as washing their hands with soap and running water after using the restroom and before preparing or eating food. It should be noted that preventing complications and lessening the severity of the sickness depend heavily on timely treatment with the right medications. It is advised to get medical help for an accurate diagnosis and treatment if suspect enteric fever or are exhibiting symptoms (Adesegun et al., 2020).

In order to prevent complications and expedite the healing process, community health nurses involve the family in the patient's care and explain the purpose behind bed rest. Encourage a rise in fluid consumption. Keep an eye on IV fluid administration and hydration levels as needed. Boost intake of nutrients. To meet nutritional demands, track calorie intake, track weight loss, and promote an increase in vitamin C intake (Iyer et al., 2021).

Aim of the study

This study aimed to evaluate the coaching program regarding Enteric fever for patients and the effect on their health status through:

- Assessing patients' knowledge and reported practices about enteric fever.
- Designing coaching program in the light of the actual need and assessment of the patients.
- Implementing coaching program about enteric fever.
- Evaluate the effect of coaching program regarding the enteric fever.

Research Hypothesis

H1: The coaching program will enhance patients' knowledge and reported practices about enteric fever.

H2: After applying a coaching program for enteric fever, patients' health status will improve.

Operational Definition:

Coaching program define as health program helping patients gain the knowledge, skills, and confidence to become active participants in their care so that patients improve health status.

Subjects & Methods**Research design:**

A quasi-experimental research design was done to complete the study.

Setting:

This study was performed in outpatient clinic at Helwan fever hospital. Outpatient clinics in Helwan fever hospital including five clinics, three for adult patients and two for child. In each clinic there had one bed, office for the physician. One window and sink for hand washing & one nurse and one physician. One head nurse to all clinics. About 15 patients suffer from enteric fever visit the clinics daily. All clinics were opened in the same direction and fulfilled with personnel protective equipment. One room for lab investigation beside the clinics. Two bathrooms are available for all clinics. Clinics are located in the first floor.

Sample:

Purposive sample used in this study. Total number of patients in one year from the beginning of January to the end of December is 182 patients according to sample size calculation at 95% and error 5%, it was 111 patients (100 actual sample size + 11 for pilot study) in outpatient clinic at Helwan fever hospital according to the following inclusion criteria; patients with enteric fever and agree to be participate in the study.

Tool of data collection:

Data for this study collected by applying the following one tool: A Structure interview questionnaire: Developed by researchers after reviewing the national and international related literatures (Carey et al., 2020; Neupane et al., 2021). It was written in simple Arabic language, it comprised **four parts:**

Part I: Socio-demographic characteristics of patients consisted of 10 items such as: sex, age, marital status, residence, number of family member, room's numbers, crowding index, level of education, occupation and income.

Part II: Past Medical history and current complain of patients contained of 13 closed end questions such as: suffer from chronic disease,

earlier history of gastrointestinal disease, suffer from a constant high-grade fever, treatment regimen presence of high-grade fever, had enteric fever before, previous time of hospitalization **and current complain as** duration of fever, onset of disease, currently suffering from high grade fever, intestinal pain and diarrhea or vomiting.

Part III: Patient's knowledge about enteric fever (pre – post format) (Diwaker et al., 2024). It involved 15 closed end questions as Concept, mode of transmission, causes, signs and symptoms, risk factors, what done in appear signs and symptoms, diagnosis, medical and non-medical treatment, effect of high-grade fever, complication and prevention of enteric fever.

Scoring system, it comprised 15 questions; the answer score 2 point for comprehensive correct answer, 1 point for an partial correct answer and zero point to wrong answer.

The total score of patient's knowledge about enteric fever =30 score which be divided as the following:

- **Poor knowledge <50 % (<15 score)**
- **Fair knowledge 50 -75 % (15: 23 score)**
- **Good knowledge > 75% (> 23 score).**

Part IV: Patient's reported practices (pre – post format): The scale is constituted of questions and divided into 7 sub- elements as:

1. **Practices relayed to eating habits contained 10 closed end questions as:** Eat well cooked food, cover cooked foods to keep them from insects, eat fruits and, vegetables without washing them, wash hands well before peeling fruits or vegetables, eat food from street vendors, check the validity of the food before using it, mix cooked and uncooked foods, drink water straight from the tap, add ice cubes to drinks outside the home and use clean water for cooking.
2. **Hand washing steps and personal hygiene practices included 14 closed end questions as:** Remove jewelry (rings, bracelets) and watches before washing hands, cut nails (don't wear false nails), soap (plain, antimicrobial) and wash thoroughly, use circular motions in one direction to wash hands and arms up to the wrists, hand massage for at least 10-15 seconds, clean under the nails, rinse hands well, keeping hands lower than forearms and dry hands well with a disposable paper towel, or air dry them. wash hands well with soap and water before eating, wash your hands well with soap and water after using the toilet, rinse hands using running water, shortening the nails continuously, biting nails with your teeth, maintain the toilet clean after use and share your personal instruments such as "towel - toothbrush" with others.

3. **Cold compresses to reduce the temperature included 9 closed end questions as:** make cold compresses, use ice cubes, use lukewarm water to make compresses, put cold compresses on the head, put cold compresses on places where blood vessels collect, vinegar and Spero in compression, put large amounts of water on the sick person without squeezing the towel, put water on the patient's chest, the pads used in compresses washed before and after using them and do compresses under the air conditioner or the fan.
4. **Clean vegetables and fruits included 9 closed end questions as:** use clean running water to wash vegetables and fruits, remove the labels on the fruit before washing it to ensure that the water reaches all parts, remove the damaged parts of vegetables and fruits, use a suitable size strainer to wash vegetables and fruits, use a suitable brush to remove dirt from vegetables as potatoes and potatoes, for example, soak green leafy vegetables in water before washing them, soak some vegetables in water before washing them, grapes and strawberries, to dissolve dirt and chemicals and use vinegar and salt to clean surfaces.
5. **Kitchen and refrigerator hygiene contained 7 closed end questions as:** the refrigerator rinsed and cleaned regularly, slaughtered meat and birds placed in the refrigerator immediately after purchasing them, the refrigerator cleaned of leftover foods, hot food eaten within two hours after heating, melt water from meat safely disposed of, should kitchen surfaces be rinsed with hot water and a cleaning solution, kitchen towels and towels cleaned regularly and towels be washed in a washing machine at 60°C.
6. **The sanitation of the bathroom consist of 9 closed end questions as:** the bathroom cleaned daily, chemicals used in cleaning such as Dettol and Fennec, clean paper towels used in the bathroom, the municipal bathroom used permanently inside the house of worship or public places, bathroom ceramics and the gaps between them well cleaned, sinks, taps and bathtubs cleaned using disinfectants, there a clean running water source inside the bathroom and use a stagnant water source when the water is cut off for cleaning.
7. **Preserving the home environment comprised 6 closed end questions as:** Ventilate the house well, safe disposal of waste, use a running water source for drinking, wash clothes separately from other people's garments, using Abyssinian pumps to drink water, the water tanks disinfected on a continuous and regular basis, as diluted chlorine and the Abyssinian pumps periodically disinfected with chlorine.

Scoring system, it included 64 questions; the answer score 2 point for don answer, 1 point for sometimes done answer and zero point to not done answer.

The total score of patient's reported practices about enteric fever = 128 point which be divided as the following:

- **Adequate practices $\geq 60\%$ (≥ 76.8 point).**
- **Inadequate practices $< 60\%$ (< 76.8 point).**

Pilot study:

In order to assess the research tool clarity and completion time, a pilot study was conducted on 10% of the sample, or 11 patients. Changes were made in light of the findings. Therefore, due to the changes made, patients from the pilot trial were not included in the study.

Validity content:

The revision of the tool for clarity, relevance, comprehensiveness, understanding and applicability was done by a panel of three experts from the Community Health nursing and two from Adult Health Nursing Department, Helwan universities to measure the content validity of the tool and the necessary modification done accordingly through add some question to evaluate the patient's knowledge about enteric fever. All recommended modifications were applied.

Tool Reliability:

Reliability was applied for examination the internal consistency of the tool, by administration of the same tool to the same subjects under similar conditions two times. Answers from the repeated testing were compared (Test- re- test reliability was 0.91 for knowledge) and Cronbach's Alpha reliability was 0.89 for practices.

Field work:

- Before conducting the study, permission was obtained from the directors of the hospitals.
- At the beginning, the researchers introduced themselves and clarified the purpose of study to the patient ones to gain their confidence and trust and convince them to participate in the study, and then the written consent was obtained from them.
- Actual field work was carried out in the period data collected within 6 months in from begging of April to end of September 2024.
- The questionnaires were collected from patients and completed by the researchers' assessment.
- Data collected two days per week (Wednesday and Tuesday) from 8 am-12 pm and interview patients suffering from enteric fever.
- Coaching program was developed, implemented and distributed by the researchers.

Health coaching program construction consists of four phases:**Phase 1 (Preparatory phase):**

Tool of data collection based on review of the past & current related literature reviewing various aspects of patients suffering from enteric fever done using available book, periodical articles and magazines. The aim was acquainted with the research problem to develop the study tool.

Phase 2 (Assessment phase):

This phase involved the pre-testing questionnaire to assess the patient's knowledge and practices about enteric fever. The researchers first introduced their self and explained the purpose of the study briefly to patients. Every patient was met individually and verbal and written consent for participation was obtained. Patients were assured that the obtained information treated confidentially, and used only for the purpose of the study.

Phase 3 (Program planning and implementation):**Planning phase:**

Based on the result obtained from the assessment phase, the researchers designed the coaching program contents according to the patients' needs and after reviewing of the related reviewing literatures. Detected program sessions, and requirements were clarified and discussed in the form of booklet. The booklet included knowledge about enteric fever as: meaning, causes, clinical features, predisposing factors, types, most common places, high risk group, diagnostic test, complications, preventive measures for enteric fever, health instructions to reduce the severity of enteric fever and treatment of enteric fever. Also, contain practices to promote health status of patients with enteric fever regarding hygienic care, environmental sanitation and practices to prevent exacerbation of enteric fever and distribute booklet for patients. The teaching methods were lectures, group discussions, brainstorming, demonstration and re-demonstration and teaching media were PowerPoint presentations, pictures, video for hand washing and booklet were used.

Implementation phase:

Coaching program was improved patients' knowledge and reported practices about enteric fever and aimed explained to all participants. The study sample equal 100 patients divided to 4 groups which consist of 25 patients.

Program session:

Based on the result of the pre-test questionnaire the researchers applied Coaching program include 5 sessions (four theoretical sessions and one practical session) each session teak from 30-45 minutes for meeting one group of patients two days per week. By the end of each session, the patients were intended

about the content of next session and its time. Post-test done after applied all sessions.

Four theoretical sessions by the end of this sessions each patients known the knowledge about enteric fever as meaning, causes, mode of transmission, signs and symptoms, risk factors, what done in appear signs and symptoms, medical and non-medical treatment, diagnosis, complication, effect and causes of high-grade fever and enteric fever prevention.

One practical session by the end of this sessions each patient applied practices related to eating habits, hand and personal hygiene practices, hand washing method clean vegetables and fruits, cold compresses, kitchen and refrigerator cleanliness, the sanitation of the bathroom and preserving the home environment to prevent enteric fever spread.

Phase 4 (Evaluation phase):

This phase aimed to evaluate the patients' knowledge and reported practices immediately after applying coaching program for patients suffering from enteric fever by using the same pretest.

Ethical consideration:

The Scientific Research Ethics Committee granted formal approval to carry out the suggested investigation. Informed consent and voluntary participation are required for the study. Explaining the goal and nature of the study, outlining the potential of withdrawal at any moment, and maintaining the security of the data so that no third party may access it without the participants' consent are all examples of ethical considerations. Respect for ethics, values, culture, and beliefs. Before signing, subjects were fully informed about the study and their role.

Statistical Item:

Upon completion of data collection, data computed and examined using Statistical Package for the Social Science (SPSS), version 24 for analysis. The P value set at 0.05. Descriptive statistics tests as numbers, percentage, mean standard deviation (SD), will be used to describe the results. Suitable inferential statistics such as Chi Square test (X^2) applied as well.

Significance of results:

- When $P > 0.05$, it is a statistically insignificant difference.
- When $P < 0.05$, it is a statistically significant difference.
- When $P < 0.01$ or $P < 0.001$, it is a statistically highly significant difference.

Results

Table (1): Frequency Distribution of the Studied Sample Socio-demographic Characteristics (n=100)

Items	N	%
Sex		
Male	74	74
Female	26	26
Age		
<20	20	20
20 >30	17	17
30 – 40	38	38
>40	25	25
X ±S. D = 29.7 ± 4.98		
Marital status		
Single	31	31
Married	52	52
Divorced	9	9
Widow	8	8
Residence		
Urban	32	32
Rural	68	68
Number of family members		
2-4	10	10
5-7	75	75
>7	15	15
X ±S. D =4.13 ± 0.86		
Number of home rooms		
<3	26	26
3- 4	54	54
>4	20	20
X ±S. D =3.52 ± 0.73		
Home crowdedness (no. of rooms/ no. of members)		
less than 1	61	61
From 1 to 2	29	29
More than 2	10	10
Education level		
Read and write	40	40
Basic education	15	15
Secondary education (diploma)	35	35
High education	10	10
Occupation		
Officer	10	10
Technical job	26	26
Not working/ house wife	19	19
Student	45	45
Monthly income		
Enough and sufficient	21	21
Sufficient for basic needs	19	42
Not sufficient for basic needs	60	60

Table (2): Number and Percentage Distribution of the Studied Sample according to their Past Medical History (n= 100)

Items	N	%
Having chronic diseases		
Yes	16	16
No	84	84
If yes, the disease is n=16		
Diabetes	8	50.0
Hypertension	3	18.75
Renal disease	3	18.75
Cardiac disease	2	12.5
Suffering from intestinal diseases		
Yes	55	55
No	45	45
Using antipyretic drugs		
Yes	66	66
No	34	34
Having enteric fever before		
Yes	80	80
No	20	20
Admitted to hospital before		
Yes	21	21
No	79	79
Duration of enteric fever		
3 days	59	59
Week	22	22
More than week	19	19
The disease discovered		
Having symptoms	14	14
Clinical Investigation	54	54
Medical examination	32	32

Table (3): Distribution of the Subjects according to their Current Medical Complain Pre & Post Applying Coaching program about Enteric Fever (n= 100)

Current medical complains	Pre-Program (n=100)		Post-Program (n=100)		Chi Square	
	N	%	N	%	X ²	P-value
Suffering from hyperthermia						
Yes	96	96	7	7	15.582	0.001
No	4	4	93	93		
Suffering from abdominal colic						
Yes	75	75	10	10	12.679	0.003
No	25	25	90	90		
Suffering from diarrhea						
Yes	64	64	3	3	13.025	0.002
No	36	36	97	97		
Suffering from vomiting						
Yes	94	94	5	5	16.347	0.001
No	6	6	95	95		
Suffering from headache						
Yes	97	97	8	8	11.978	0.000
No	3	3	92	92		
Suffering from fatigue						
Yes	91	91	5	5	14.025	0.002
No	9	9	95	95		
Suffering from nausea						
Yes	89	89	0	0.0	17.978	0.000
No	11	11	100	100.0		

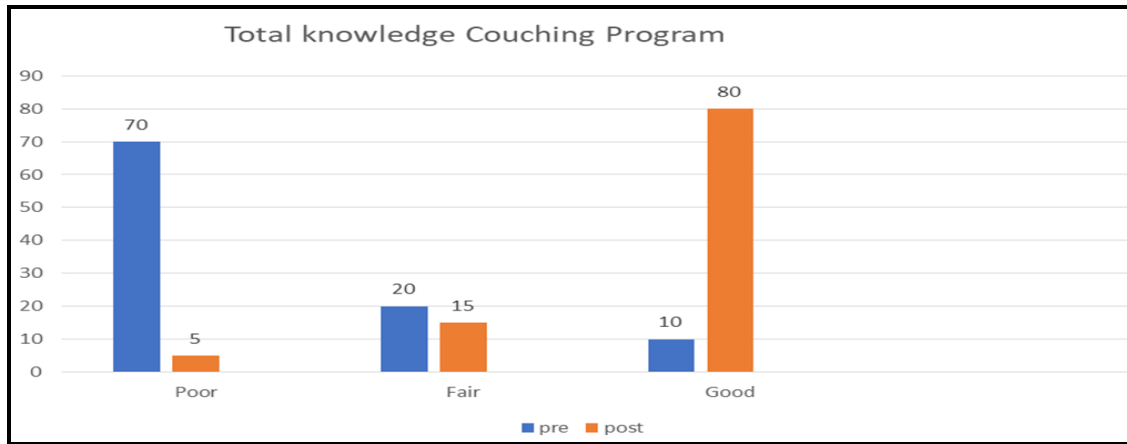
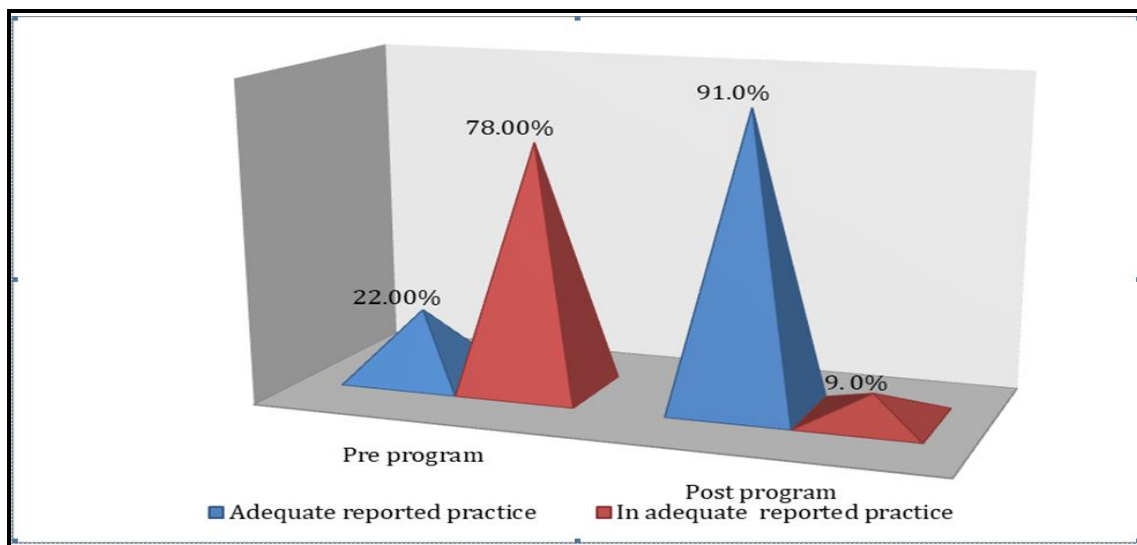


Figure (1): Differences between the Studied Subjects at Pre and Post program regarding to their Total Knowledge about Enteric Fever (n=100)



P<0. 001 & paired t test =*251.21.

Figure (2):Frequency distribution of Studied Subjects at Pre and Post Coaching program regarding to their Total Reported Practices (n=100).

Table (4): Relation between Socio-Demographic Characteristics and Total Score of Knowledge for Studied Subjects Post Coaching Program (N=100).

Items	Total knowledge						χ^2	P value
	Post Coaching Program							
	Poor (5)		Fair (15)		Good (80)			
No.	%	No.	%	No.	%			
Sex								
Male	5	5.0	10	10.7	59	59.8	16.842	0.002
Female	0	0.0	5	5.0	21	21.1		
Age								
<20	5	5.0	0	0.0	15	15.0	22.622	0.000
20 >30	0	0.0	5	5.0	12	12.0		
30 – 40	0	0.0	10	10.0	28	28.0		
>40	0	0.0	0	0.0	25	25.0		
Marital status								
Single	0	0.0	0	0.0	31	31.0	17.826	0.001
Married	0	0.0	6	6.0	46	46.0		
Divorced	0	0.0	9	9.0	0	0.0		
Widow	5	5.0	0	0.0	3	3.0		

Items	Total knowledge						χ^2	P value
	Post Coaching Program							
	Poor (5)		Fair (15)		Good (80)			
	No.	%	No.	%	No.	%		
Residence								
Urban	0	0.0	5	5.0	27	27.0	18.826	0.001
Rural	5	5.0	10	10.0	53	53.0		
Number of family members								
2-4	5	5.0	1	1.0	4	4.0	15.161	0.012
5-7	10	10.0	45	45.0	20	20.0		
>7	6	6.0	3	3.0	6	6.0		
Number of home rooms								
<3	0	0.0	5	5.0	21	21.0	19.826	0.002
3-4	5	5.0	4	4.0	45	45.0		
>4	0	0.0	10	10.0	10	10.0		
Home crowdedness (no. of rooms/ no. of members)								
less than 1	5	5.0	0	0.0	56	56.0	17.826	0.002
From 1 to 2	0	0.0	5	5.0	24	24.0		
More than 2	0	0.0	10	10.0	0	0.0		
Education level								
Read and write	0	0.0	5	5.0	35	35.0	17.826	0.002
Basic education	3	3.0	5	5.0	7	7.0		
Secondary education (diploma)	5	5.0	10	10.0	20	20.0		
High education	0	0.0	1	1.0	9	9.0		
Occupation								
Officer	5	5.0	0	0.0	5	5.0	17.826	0.002
Technical job	2	2.0	5	5.0	19	19.0		
Not working/ house wife	0	0.0	11	11.0	8	8.0		
Student	1	1.0	4	4.0	40	40.0		
Monthly income								
Enough and sufficient	0	0.0	10	10.0	11	11.0	10.221	0.000
Sufficient for basic needs	5	5.0	0	0.0	14	14.0		
Not sufficient for basic needs	0	0.0	5	5.0	55	55.0		

(*) statistically significant & (**) high statistically significant

Table (5): Correlation between Total Score Knowledge and Reported Practices of Studied subjects Pre & Post Coaching Program (N = 100).

Item	Total reported practice			
	Pre- program		Post –program	
	R	P value	R	P value
Total Knowledge	- 0.028	0.763	0.353	0.000**

(*) statistically significant & (**) high statistically significant $P \leq 0.000$.

Table (1): Reveals that, 74% of the studied subjects were male while, 26% of them were female. 38% of them aged from 30-40 years old and 52% of them were married. Moreover, 68% of them lived in rural residence and 54% of them from 3 to 4 rooms at their homes. 61% of them reported home crowdedness from 1 to 2 persons at each room. Regarding education level, 40% of them were read and write while, 45.0% of them students.

Table (2): Reports that, 84.0% of the studied subjects had not chronic diseases while, out of 31.0% of them 8.0% had diabetes and 3.0% of them had hypertension. 55.0% of the studied subjects suffered from intestinal diseases while, 66.0% of them used

antipyretic drugs. 80.0% of the studied subjects reported not having enteric fever before Moreover, only 21.0% of them admitted to hospital before. Also, 59% of them suffered from enteric fever for 3 days. 54% of them were discovered through clinical investigations while, 32.0% of them were diagnosed through medical examination.

Table (3): Shows that 96.0 % of the studied subjects suffered from hyperthermia preprogram which improved and become 7.0 % post program, 75.0 % of them suffered from abdominal colic preprogram which improved and become 10.0 % post program and 64.0% of them suffered from vomiting and diarrhea preprogram which improved and become

3.0% post program. Also, there was statistically significant improvement between pre and post program implementation in all items of current complain and health status.

Figure (1): Shows that, there was statistically significant improvement between pre and post program implementation in total knowledge. 10.0 of studied subjects had good total knowledge pre which improved and became 80% post apply coaching program. While 5.0 % of studied subjects had poor total knowledge post program which was 70.0% before applied program where P value <0.000 and paired t test =*14.88.

Figure (2): Presents that, there was statistically significant enhancement between pre and post program implementation in total reported practices. 91.0 % of the studied subjects had total adequate reported practices post coaching program while only 22.0 % of them had total adequate reported practices pre coaching program. On the other side, 78.0 % of the studied sample had total inadequate reported practices pre coaching program while only 9.0 % of them had total inadequate reported practices post coaching program.

Table (4): Shows that, there was highly statistically significant relation between socio-demographic characteristics and total knowledge of studied subjects about enteric fever post coaching program in all items where p value less than 0.005.

Table (5): States that, there was positive correlation between studied subjects' total knowledge and their total reported practices regarding to enteric fever. Moreover, there was highly significance improvement of studied subjects' total knowledge and total reported practices about enteric fever in post coaching program than pre-program.

Discussion

Salmonella Typhi and Salmonella paratyphoid bacteria are the cause of the possibly fatal illness known as enteric fever. Eating or drinking contaminated food or water can spread these microorganisms. An estimated 11–21 million persons worldwide are afflicted with enteric and paratyphoid fever each year. While enteric fever is prevalent in several developing countries, these illnesses are exceptional in the US. (Aiemjoy et al., 2023).

Travelers visiting Bangladesh, India, and Pakistan should take care to avoid contracting enteric fever, which is prevalent around the world, especially in South Asia. Parts of East Asia, Africa, the Caribbean, Central and South America, and the Middle East are among the other regions with the highest risk. Approximately 548 individuals in the US receive a diagnosis of enteric fever per year, with 224 cases occurring most frequently following international

travel (Buczowska et al., 2023). Enteric fever was expected to affect 59 out of 100,000 people annually. Primary care physicians treat an estimated 71% of patients with enteric fever. Nearly 29% of patients had multidrug-resistant (MDR) Salmonella Typhi, which is resistant to ampicillin, trimethoprim-sulfamethoxazole, and chloramphenicol (Shaheen et al., 2024).

The findings of the current study showed that over two-thirds of the participants were men. These results differed from those of a study published in India by Pereira-Dias et al. in 2023 who found that men made up 65% of the study participants. According to researchers' point of view, men are more prone to participate in sports, outdoor activities, and part-time employment that expose them to unhygienic conditions, particularly in specific cultural situations. These activities may entail consuming food and water from untrustworthy sources or street sellers, which are frequent ways that enteric fever is spread.

In observes to age, over one-third of the participants were between the ages of 30 and 40. This result was consistent with the findings of Joshi et al. (2023), who carried out a published study in North India and discovered that 39% of the participants were between the ages of 30 and 40. This, according to the researchers, might be because some people in this age bracket might have physical problems that require help when they visit outpatient clinics.

Over one-third of the subjects in this study were literate, according to the study's findings regarding education level. This finding differs from that of Selimaj et al. (2022), who conducted a published study in the Kilimanjaro Region, Tanzania, which found that 35.1% of participants were literate.

According to the current study's findings, over half of the participants had recently received a diagnosis of enteric and paratyphoid fever. These findings are consistent with those of Choudhary et al. (2020), who published a study in a southern Indian tertiary care hospital which discovered that 58.6% of the participants had received a diagnosis of intestinal diseases within the previous five years.

Similar to Ahmad et al. (2020), who conducted a published study at Mediterranean Rawalpindi and Islamabad, Pakistan, and found that 98.1% and 73.8% of participants, respectively, had experienced fever and used antipyretic drugs, the current study also showed that the majority and less than three-quarters of the studied subjects had experienced hyperthermia and used antipyretic medications.

The results of this study showed that most of the participants had never experienced enteric fever before. This finding was consistent with that of Mohan et al. (2021), and discovered that 88.1% of participants had never suffered from enteric fever.

Regarding the duration of illness, the current study's findings indicated that over half of the participants experienced three days of enteric. This finding is in line with a study published by **Halder et al. in 2021** which found that 56.6% of the participants had recently suffered from three days of enteric.

Additionally, the current study found that over half of the participants suffered from diarrhea or vomiting. This finding agreed with that of **Malik et al. (2021)**, who discovered that 58.1% of participants experienced diarrhea or vomiting.

In terms of overall knowledge, the current study revealed that less than two-thirds of the participants gave incorrect answers in the pre-program regarding the meaning and causes of enteric and paratyphoid fever. This result was consistent with a study published in northern Italy by **De Conto et al. in 2022**. Additionally, it was discovered that less than two thirds of the participants in the study gave the wrong answer when asked about the definition and causes of enteric and paratyphoid fever.

This study showed that 5.0% of studied subjects had poor total knowledge post program. **Gupta et al. (2020)**, who conducted a published study in Nepal found that 8.6% of studied subjects had incorrect answers regarding medical treatment of enteric and paratyphoid disease & signs and symptoms in post-program. According to researchers point of view this may be most of patients take knowledge from them self and not gain accurate information from the medical staff.

Moreover, the current study showed that there was a highly statistically significant difference between the total adequate reported practice before and after the implementation of the coaching program in terms of using clean water for cooking. This finding agreed with that of **Mylona et al., (2023)**, who found that the difference between the total adequate reported practice before and after the implementation program in terms of using clean water for cooking was 13.0%, and improved to 88.6%.

Regarding the effectiveness of the coaching program on total reported practices studied subjects most of them had adequate total practice after applying coaching program in vegetables and fruits cleaning methods. This finding was similar to **Zhang et al.'s (2019)** which found that 88% of participants had reported vegetables and fruits cleaning methods.

The current study showed a significant relationship between their demographic characteristics and total knowledge. This finding was consistent with **Diwaker et al.'s (2024)** which found a statistically significant relationship between total knowledge and the demographic characteristics of patients after completing a health education program. Furthermore, this result is consistent with a study conducted in

Ghana by **Chidambaram et al. (2024)** which found a significant correlation between the demographic characteristics of the study participants and their overall level of knowledge. In order to grasp what is already known about enteric fever, its prevalence, risk factors, and the levels of knowledge among different populations, experts believe that it is crucial to begin by evaluating the body of existing literature on enteric fever.

Sekwadi et al. (2024), who published a study in Matlosana, South Africa, reported that there was a significant correlation between the studied sample and knowledge and practices. This finding was corroborated by the current study, which shows a significant correlation between total score knowledge and practice after applying a coaching program. According to the researchers, recommendations for treatments or public health campaigns that aim to increase understanding of enteric fever especially among demographic groups with lower levels of awareness must be made in light of these findings.

Conclusion:

Patients' overall knowledge about enteric fever improved significantly after the coaching program compared to before. Also, compared to before the coaching session, patients' overall reported practices about enteric fever enhanced. Furthermore, after the accomplishment of the coaching program about enteric fever, the patients' health status improved.

Recommendations:

1. Establish an ongoing coaching program for enteric fever patients in outpatient clinics.
2. Create banners or posters about enteric fever prevention and display them in the outpatient clinic of hospitals.
3. Hold recurring reorientation seminars for patients in outpatient clinics regarding the enteric fever.
4. Conduct additional studies with a larger sample size and in different contexts to make generalizations of the results.

References:

- **Adesegun, O., Adeyemi, O., Ehioghae, O., Rabor, D., Binuyo, T., Alafin, B. & Osonuga, A. (2020):** Current trends in the epidemiology and management of enteric fever in Africa: a literature review. *Asian Pacific Journal of Tropical Medicine*, Vol. (13), No. (5), Pp. 204-213.
- **Ahmad, I., Khan, H., Rahman, G., & Ali, G. (2020):** Prevalence of Enteric Fever in the Local Population of Rawalpindi and Islamabad Pakistan. *Abasyn Journal of Life Sciences*, Vol. (2), No. (3), Pp. 1-3

- **Aiemjoy, K., Seidman, J., Charles, R., & Andrews, J. (2023):** Seroepidemiology for enteric fever: emerging approaches and opportunities. In *Open Forum Infectious Diseases* (Vol. (10), No. (1), Pp. S21-S25).
- **Browne, A., Kashef Hamadani, B., Kumaran, E., Rao, P., Longbottom, J., Harriss, E., & Dolecek, C. (2020):** Drug-resistant enteric fever worldwide, 1990 to 2018: a systematic review and meta-analysis. *BMC medicine*, Vol. (18), No. (6), Pp. 1-3
- **Buczowska, M., Jenkins, C., Hawker, J., Hungerford, D., Katwa, P., Kirkbride, H., & Byrne, L. (2023):** Socioeconomic and ethnic inequalities in incidence and severity of enteric fever in England 2015–2019: analysis of a national enhanced surveillance system. *Epidemiology & Infection*, 151, e29. Vol. (4), No. (6), Pp. 29
- **Carey, M., MacWright, W. R., Im, J., Meiring, J. E., Gibani, M. M., Park, S. E., ... & Marks, F. (2020).** The surveillance for enteric fever in Asia project (SEAP), severe enteric fever surveillance in Africa (SETA), surveillance of enteric fever in India (SEFI), and strategic enteric alliance across Africa and Asia (STRATAA) population-based enteric fever studies: a review of methodological similarities and differences. *Clinical Infectious Diseases*, 71(Supplement_2), Vol. (3), No. (2), Pp. S102-S110.
- **Choudhary A, Gopalakrishnan R, Senthur Nambi P, Ramasubramanian V, Abdul Ghafur K, & Thirunarayan MA (2020):** Antimicrobial susceptibility of *Salmonella enterica* serovars in a tertiary care hospital in southern India. *Indian J Med Res* 2020; 137:800–802.
- **Chidambaram, Y., Dhas, C., Juhi, R., Petchiappan, V., & Sujithkumar, S. (2024):** Tracking the shift in enteric fever trends and evolving antibiotic sensitivity patterns. *Ghana Medical Journal*. Vol.(58), No.(1), Pp. 86-90
- **De Conto, F., Di Stefano, S., Buttrini, M., Maccari, C., Arcangeletti, M., Chezzi, C., & Calderaro, A. (2022):** Detection of potential enteric pathogens in children with severe acute gastroenteritis using the filmarray: Results from a three-years hospital-based survey in northern Italy. *Diagnostic Microbiology and Infectious Disease*, Vol.(102), No.(3), Pp. 115611.
- **Diwaker, A., Tiwari, A., Jain, S., Rupali, K., Ram, J., Singh, S., & Kishore, D. (2024):** Enteric fever and the diagnostic tools: defining the accuracy. *Frontiers in Bacteriology*, 3, 1332180.
- **Gupta, S., Panday, R., Sah, J., Dhakal, G., Mahaseth, D., Shah, K., & Sharma, B. (2020):** Prevalence of *Salmonella* species with nalidixic acid resistance in the enteric fever patients of Nepal. *British Journal of Medical & Health Sciences* (BJMHS). Vol.(2), No.(7), Pp. 115-119
- **Halder, S., Rahman, M., Sarker, M., Mone, F., Roy, K., & Tajkia, G. (2021):** Identification of Risk Factors for Enteric Fever in Children Admitted in a Tertiary Care Hospital.
- **Imran M, Herekar F, Sarfaraz S, Ghouri N, Shahid S, & Mahesar M (2024):** Clinical spectrum and outcomes of patients with different resistance patterns of *Salmonella enterica*. *Pak J Med Sci*. 2022 Jan;38(2):356-361. doi: 10.12669/pjms.38.ICON-2022.5789. PMID: 35310803.
- **Irunde, M., Im, J., Ahmmed, F., Kim, D., Khan, A., Zaman, K., & Clemens, J. (2023):** Use of Typhoid Vi-Polysaccharide Vaccine as a Vaccine Probe to Delineate Clinical Criteria for Typhoid Fever. *The American journal of tropical medicine and hygiene*, 103(2), 665.
- **Iyer, V., Sharma, A., Nair, D., Solanki, B., Umrigar, P., Murtugudde, R., & Sapkota, A. (2021):** Role of extreme weather events and El Niño Southern oscillation on incidence of enteric fever in Ahmedabad and Surat, Gujarat, India. *Environmental research*, 196, 110417.
- **Joshi, D., Gupta, V., Bhat, D., Gupta, M., & Dhooria, G. (2023):** Profile of Enteric Fever in Children Admitted to a Tertiary Care Center in North India. *Journal of Gastrointestinal Infections*. Vol.(13), No.(2), Pp. 074-078
- **Lee, S., Howard-Jones, A., Lavu, V., Norton, S., Sintchenko, V., Britton, P., & Khatami, A. (2024):** The increasing healthcare burden of enteric fever in a low-incidence setting. *Infectious Diseases Now*, Vol.(54), No.(4), Pp. 104919.
- **Malik, I., Kanani, A., Elgadi, A., & Hassan, W. (2021):** The dilemma of diagnosing enteric fever in Sudan. *Khartoum Medical Journal*, 14(1).
- **McCann, N., Nabarro, L., Morris-Jones, S., Patel, T., Godbole, G., Heyderman, R., & Brown, M. (2022):** Outpatient management of uncomplicated Enteric fever: a case series of 93 patients from the hospital of tropical diseases, London. *Journal of Infection*, Vol.(85), No.(4), Pp. 074
- **Meiring, J., Shakya, M., Khanam, F., Voysey, M., Phillips, M., Tonks, S., & Pollard, A. (2021):** Burden of enteric fever at three urban sites in Africa and Asia: a multicentre population-based study. *The Lancet Global Health*, Vol.(9), No.(12), Pp. 074-078 e1688-e1696.
- **Mohan, V., Srinivasan, M., Sinha, B., Shrivastava, A., Kanungo, S., Natarajan Sindhu, K., & Kang, G. (2021):** Geographically weighted regression modeling of spatial clustering and determinants of focal enteric fever incidence. *The*

- Journal of Infectious Diseases, 224(Supplement_5), Vol.(13), No.(2), Pp. S601-S611.
- **Mylona, E., Hefele, L., Tran Vu Thieu, N., Trinh Van, T., Nguyen Ngoc Minh, C., Tran Tuan, A., & Baker, S. (2023):** The identification of enteric fever-specific antigens for population based serosurveillance. The Journal of Infectious Diseases.
 - **Nabarro, L., McCann, N., Herdman, M., Dugan, C., Ladhani, S., Patel, D., & Godbole, G. (2022):** British infection association guidelines for the diagnosis and management of enteric fever in England. Journal of Infection, Vol.(84), No.(4), Pp. 469-489.
 - **Ndako, J., Olisa, J., Ifeanyichukwu, I., Ojo, S. S., & Okolie, C. (2020):** Evaluation of diagnostic assay of patients with enteric fever by the box-plot distribution method. New Microbes and New Infections, 38, 100795.
 - **Neupane, D., Dulal, H., & Song, J. (2021):** Enteric fever diagnosis: current challenges and future directions. Pathogens, Vol.(10), No.(4), Pp. 410
 - **Nusrat, N., Islam, M., Paul, N., Rahman, N., Krishnapillai, A., Haq, M., & Haque, M. (2022):** Clinical and laboratory features of enteric fever in children and antibiotic sensitivity pattern in a tertiary care hospital of a low-and middle-income country. Cureus, 14(10).
 - **Parry, C., Qamar, F., Rijal, S., McCann, N., Baker, S., & Basnyat, B. (2023):** What should we be recommending for the treatment of enteric fever?. In Open Forum Infectious Diseases (Vol. 10, No. Supplement_1, pp. S26-S31). US: Oxford University Press.
 - **Pereira-Dias, J., Taneja, N., Mahindroo, J., Maheshwari, G., Patel, P., Thu, T., & Mylona, E. (2023):** The genomic characterization of Salmonella Paratyphi A from an outbreak of enteric fever in Vadodara, India. Microbial Genomics Vol.(9), No.(1), Pp. 201
 - **Qamar, F., Hussain, W., & Qureshi, S. (2022):** Salmonellosis including enteric fever. Pediatric Clinics, Vol.(69), No.(1), Pp. 65-77.
 - **Rahman, S., Nguyen, T., Khanam, F., Thomson, N., Dyson, Z., Taylor-Brown, A., & Qadri, F. (2021):** Genetic diversity of Salmonella Paratyphi A isolated from enteric fever patients in Bangladesh from 2008 to 2018. PLoS Neglected Tropical Diseases, Vol.(15), No.(10), Pp. 410e0009748.
 - **Saha, S., Sayeed, K., Saha, S., Islam, M., Rahaman, A., Islam, M., & Saha, S. (2020):** Hospitalization of pediatric enteric fever cases, Dhaka, Bangladesh, 2017–2019: incidence and risk factors. Clinical Infectious Diseases, 71(Supplement_3), Vol.(10), No.(4), Pp. S196-S204.
 - **Sekwadi, P., Smith, A., Maruma, W., Mongolola, G., Tsele, G., Ngomane, M., & Thomas, J. (2024):** A prolonged outbreak of enteric fever associated with illegal miners in the City of Matlosana, South Africa, November 2020–September 2022. In Open Forum Infectious Diseases (p. ofae118). Oxford University Press.
 - **Selimaj Kontoni, V., Lepage, P., Hainaut, M., Deyi, V., Maatheus, W., & Pace, D. (2022):** Paediatric enteric fever in Brussels: a case series over 16 years. European Journal of Pediatrics, 1-8.
 - **Shaheen, M., Abd Al-Daim, S., Ahmed, N., Khalifa, M., Seif, W., Ahmed, S. & Khairy, W. (2024):** Prevalence and molecular characterization of rotavirus strains circulating among children with gastroenteritis in Egypt. Egyptian Pharmaceutical Journal, Vol.(23), No.(2), Pp. 410223-236.
 - **Sinha, B., Rongsen-Chandola, T., Goyal, N., Arya, A., Kumar, C., Chakravarty, A., & SEF tier 1 collaborators John Jacob Mohan Venkata Raghava Bavdekar Ashish Dutta Shanta Kang Gagandeep. (2021):** Incidence of enteric fever in a pediatric cohort in North India: comparison with estimates from 20 years earlier. The Journal of Infectious Diseases, 224(Supplement_5), Vol.(10), No.(4), Pp.S558-S567.
 - **Yousafzai, M., Irfan, S., Thobani, R., Kazi, A., Hotwani, A., Memon, A. & Qamar, F. (2020):** Burden of culture confirmed enteric fever cases in Karachi, Pakistan: Surveillance for Enteric Fever in Asia Project (SEAP), 2016–2019. Clinical Infectious Diseases, 71(Supplement_3), Vol.(3), No.(1), Pp. S214-S221.
 - **Zhang H, Kou W, Bibi A, Jia Q, Su R, Chen H, & Huang K (2019):** Internal Extractive Electrospray Ionization Mass Spectrometry for Quantitative Determination of Fluoroquinolones Captured by Magnetic Molecularly Imprinted Polymers from Raw Milk. Sci Rep. 2019 Nov 7;7(1): Vol.(7), No.(1), Pp.14714.

This is an open access article under
[Creative Commons by Attribution Non-Commercial \(CC BY-NC 3.0\)](https://creativecommons.org/licenses/by-nc/3.0/)
(<https://creativecommons.org/licenses/by-nc/3.0/>)