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Original Research Article

Knowledge, attitude and practice regarding enteric fever among doctors of Bangabandhu Sheikh Mujib medical university

Kaoser Alam[1]*, Mohammad Jahan Shams[2], Chowdhury Rehnuma Tabassum[3], Mahfuzur Rahman Uzzal[4], M. Zakir Hasan[5], M. A. Jalil Chowdhury[1], Mohammad Ferdous Ur Rahaman[1]

[1]Department of Internal Medicine, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh
[2]Department of Clinical Oncology, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh
[3]Department of Pediatric Neurology, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh
[4]Department of Orthodontics, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh

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***Correspondence:**
Dr. Kaoser Alam,
E-mail: kariul@hotmail.com

ABSTRACT

Background: Enteric fever remains a significant public health challenge, particularly in developing countries. Understanding the knowledge, attitudes, and practices of general practitioners regarding enteric fever is crucial for effective disease management and control. This study aims to assess these aspects among general practitioners, providing insights into current practices and identifying areas for improvement.
Methods: This cross-sectional survey was conducted with 200 general practitioners. The questionnaire covered various aspects, including baseline characteristics, knowledge about enteric fever causative agents and symptoms, diagnostic practices, antibiotic preferences, and general attitudes towards management and prevention. Data were analyzed to determine the prevalence of specific knowledge and practices.
Results: Majority of practitioners (74%) were residents, predominantly working indoors (61.5%). All respondents correctly identified *Salmonella typhi* and *para typhi* as causative agents and fever as a primary symptom. However, there was variability in recognizing other symptoms and diagnostic methods. Ceftriaxon was the most preferred antibiotic (67%), and blood culture correctly identified as gold standard for diagnosis by 71% of respondents. Attitudes and practices varied, with significant number not adhering to recommended diagnostic and treatment protocols.
Conclusions: The study reveals a solid foundation of basic knowledge about enteric fever among general practitioners but also highlights significant gaps in the understanding of clinical symptoms, diagnostic practices, and treatment protocols. These findings underscore the need for enhanced educational initiatives and standardized guidelines to improve the management of enteric fever.

Keywords: Enteric fever, General practitioners, Knowledge, Attitudes, Practices, Diagnostic methods, Treatment Protocols

INTRODUCTION

Enteric fever, a systemic infection caused by *Salmonella enterica* serotype *Typhi*, is a significant health concern.[1] This disease is particularly prevalent in tropical regions, especially in our subcontinent, where it leads to substantial mortality and morbidity.[2] A deeper understanding of doctors' knowledge, attitudes, and practices regarding enteric fever is crucial. As one of the most common febrile illnesses in developing countries, enteric fever typically presents after an incubation period of 7 to 14 days. The onset of bacteremia is characterized by fever and malaise. Patients often exhibit symptoms towards the end of the

first week, including fever, influenza-like symptoms with chills, headache, malaise, anorexia, nausea, abdominal discomfort, dry cough, and myalgia. Physical findings may include a coated tongue, tender abdomen, hepatomegaly, and splenomegaly.[3,4] The introduction of antibiotics has altered the classic presentation of the disease, with the slow, stepladder rise in fever and toxicity now being rare. In regions where malaria and schistosomiasis are endemic, enteric fever may present atypically.[5] Reports of polyarthritis and mono-arthritis as symptoms have emerged.[3] In adults, constipation is common, whereas diarrhea is more frequent in young children and adults with HIV. The disease's impact is particularly severe in children under five, who experience higher complication rates and hospitalization.[3] Globally, enteric fever remains significant health issue.[2] Annually, there are approximately 13-17 million cases, resulting in around 600,000 deaths, with 80% of these occurring in Asia.[6] While specific epidemiological data for Bangladesh is lacking, a study in the Dhaka metropolitan area estimated about 871 cases per year.[7] Disease burden is high in developing countries with poor sanitation. Changing presentation of enteric fever and emergence of multidrug resistance pose diagnostic and therapeutic challenges, particularly in subcontinent and Southeast Asia. Moreover, its symptoms are often masked by other febrile illnesses such as malaria, dengue fever, leptospirosis, and rickettsial diseases.[2] Enteric fever is transmitted through the fecal-oral route, either directly via contaminated hands or indirectly through ingestion of contaminated water, milk, food, or via flies.[8] It remains a major public health concern globally, especially in developing world.[9] High incidence of enteric fever in Bangladesh warrants attention, emphasizing need to understand its prevalence and potential for immunization to reduce disease burden and antimicrobial treatment costs.[10] Historically, chloramphenicol preferred treatment after its introduction in 1948. However, plasmid-mediated resistance and serious side effects like bone marrow aplasia have reduced its use. Alternatives like trimethoprim-sulfamethoxazole and ampicillin were also eventually sidelined due to resistance.[11] In 1992, a study in Bangladesh highlighted emergence of multidrug-resistant enteric fever, with about 36.58% of cases showing resistance to chloramphenicol, ampicillin, and trimethoprim-sulfamethoxazole.[12] Preventive strategies for enteric fever should focus on educating physicians about the disease, its prevention methods, and importance of *S. typhi* vaccination, particularly for preschool children and those in contact with an active case. Understanding evolving patterns of infectious organisms and their transmission methods is vital, especially among doctors, to prevent spread of enteric fever. Lack of knowledge about clinical examination principles, diagnosis, treatment, and counseling for enteric fever contributes to its spread, morbidity, complications and mortality. Increasing incidence of enteric fever poses a significant public health challenge in Bangladesh, a densely populated country with low living standards, inadequate access to safe water, poor sanitation, and general lack of education about transmission of enteric fever. Many physicians, often pressed for time, focus predominantly on drug treatment, neglecting to advise patients on lifestyle modifications to prevent disease transmission. There is notable gap in data regarding doctors' knowledge, attitudes, and practices in diagnosing, treating, and preventing enteric fever. This study aims to bridge this gap, enhancing our understanding of how doctors manage enteric fever.

METHODS

Study, conducted at department of medicine, Bangabandhu Sheikh Mujib medical university, Dhaka, was a cross-sectional analysis spanning 6 months from March-August 2017. Involved 200 participants, including honorary medical officers, residents, research assistants, and medical officers at BSMMU who involved in treating both inpatient and outpatient cases and did not hold postgraduate qualifications. Participants over age of 28 who provided informed written consent were included, while doctors with postgraduate qualifications excluded. A purposive sampling technique was employed following these criteria. Data collection was conducted using a predetermined questionnaire and form, administered after obtaining written consent from each participant. Questionnaire aimed to assess knowledge, attitude, and practice regarding enteric fever. All data were collected personally by researcher to minimize errors. Participants were informed about the study's purpose and assured of their right to withdraw or refuse participation without any impact on their practice. Personal information was kept confidential. Data processing involved computer entry and subsequent editing and cleaning to ensure consistency and validity. Statistical analysis was performed using SPSS (version 22), with results presented in tables and figures. Analysis included mean, standard deviation, frequency, percentage, and chi-square tests, with significance level set at $p<0.05$. Ethical considerations were in line with the Helsinki declaration for medical research involving human subjects (1964). Voluntary participation was emphasized, and ethical clearance was obtained from the institutional review board (IRB) of BSMMU. Data confidentiality was strictly maintained, and no experimental drugs or placebos were used. The protocol received approval from the academic committee of the department of medicine, ensuring respect and safety for all subjects.

RESULTS

In the study comprising 200 participants, the distribution of baseline characteristics revealed a predominant representation of residents, accounting for 74% (n=148) of the sample. Medical officers comprised 9% (n=18), while trainees made up 17% (n=34). Regarding the duty place of participants, a majority were assigned to indoor duties, representing 61.5% (n=123) of the total. Those working in outdoor settings constituted 12.5% (n=25), and 26% (n=52) of the participants were involved in both indoor and outdoor duties. Gender distribution among participants showed higher proportion of males (62.5%, n=125)

compared to females (37.5%, n=75). This demographic breakdown provides comprehensive overview of participant characteristics in terms of their professional designation, duty placement, and gender, offering contextual background for subsequent analysis of their knowledge, attitudes and practices regarding enteric fever.

Study's findings on the knowledge of enteric fever among the 200 respondents revealed unanimous awareness (100%, n=200) that Salmonella typhi and para typhi are the causative organisms of enteric fever. Similarly, all respondents identified fever as 1st week symptom of disease. When asked about the most frequently observed signs in enteric fever patients, 39% (n=78) of the participants identified splenomegaly, followed by a step ladder pattern of fever (25%, n=50), and increased temperature (15.5%, n=31). Rose spots were noted by 11% (n=22), while hepatomegaly, relative bradycardia, and coated tongue were less commonly identified, at 4% (n=8), 2.5% (n=5), and 1.5% (n=3), respectively. A combination of fever, coated tongue, and splenomegaly was recognized by 1.5% (n=3) of respondents. Regarding appearance of pink color spots on body, 65.5% (n=131) correctly identified that they appear after 7 days, while 25.5% (n=51) thought it was after 5 days. In terms of white blood cell count observations in enteric fever patients, 56.5% (n=113) of respondents noted absolute neutropenia with relative lymphocytosis, and 21% (n=42) associated leucocytosis with complications of enteric fever. When asked about gold standard for diagnosing enteric fever, 71% (n=142) correctly identified blood culture, while 24% (n=48) mistakenly thought it was the Widal test.

When asked about antibiotics typically used for typhoid fever, majority (67%, n=134) identified ceftriaxon as their choice. Other antibiotics mentioned included azithromycin (13.5%, n=27), ciprofloxacin (10%, n=20), cefixime (6%, n=12), ofloxacin (2.5%, n=5), and amoxicillin (1%, n=2). Regarding indications for using parenteral antibiotics, the most common response was taking multiple oral drugs without improvement (37.5%, n=75), followed by long duration of fever (20.5%, n=41), and toxaemia (23.5%, n=47). Persistent vomiting (11.5%, n=23), severe diarrhea, and abdominal distension were each cited by 3.5% (n=7) of respondents. In terms of antibiotic combinations, 62.5% (n=125) of practitioners did not use any combination, while 19% (n=38) used ceftriaxon with either cefixime or azithromycin, and 15.5% (n=31) used cefixime with azithromycin. Only a small fraction used ciprofloxacin with azithromycin (2.5%, n=5), and an even smaller group (0.5%, n=1) reported using other combinations. When asked about potential hazards of improperly treated enteric fever, 75% (n=150) correctly identified intestinal perforation and bleeding as major risk. Other responses included high fever and vomiting (20%, n=40) and bleeding with high fever (5%, n=10). Regarding percentage of people who become carriers of enteric fever after acute illness, responses split between 5-7% (42.5%, n=85) and 3-5% (51%, n=102), with a minority citing 10-12% (3%, n=6) or none of the above (2.5%, n=5).

Table 1: Baseline characteristics distribution of the participants, (n=200).

Variables	N	Percent (%)
Designation		
Medical officer	18	9
Resident	148	74
Trainee	34	17
Duty place		
Indoor	123	61.50
Outdoor	25	12.50
Both	52	26
Sex		
Male	125	62.50
Female	75	37.50

Table 2: Distribution of the respondent by knowledge of enteric fever, (n=200).

Knowledge of enteric fever	N	Percent (%)
Which organisms cause enteric fever?		
Salmonella typhi and *para typhi*	200	100
Others	0	0
First week symptoms of enteric fever-		
Fever	200	100
Which sign you get frequently in a enteric fever patient?		
Splenomegaly	78	39
Rose spot	22	11
Hepatomegaly	8	4
Step ladder pattern fever	50	25
Coated tongue	3	1.50
Relative bradycardia	5	2.50
Increase temperature	31	15.50
Fever, coated tongue and splenomegaly	3	1.50
Enteric fever patients may develop pink color spots in the body after		
5 days	51	25.50
12 days	14	7
7 days	131	65.50
11 days	4	2
What is your observation about white blood cell count in enteric fever patient?		
Absolute neutropenia with relative lymphocytosis	113	56.50
Leucocytosis in invariably followed with Complication of enteric fever	42	21
Above all	24	12
Not known	21	10.50
Gold standard for diagnosis of enteric fever is		
Widal test	48	24
Stool culture	6	3
Blood culture	142	71
None of above	4	2

Table 3: Responses (%) of the general practitioners exhibiting their knowledge related to typhoid fever (n=200).

Variables	Frequency	Percentage (%)
Antibiotic usually		
Ciprofloxacin	20	10
Azithromycin	27	13.50
Amoxicillin	2	1
Celfixime	12	6
Ofloxacin	5	2.50
Ceftriaxon	134	67
Indication for use parenteral antibiotic		
Persistent vomiting	23	11.50
Severe diarrhea	7	3.50
Abdominal distension	7	3.50
Toxaemia	47	23.50
Taking multiple oral drug without improvement	75	37.50
Long duration of fever	41	20.50
Combination of antibiotic use		
Cefixime+azithromycin	31	15.50
Ciprofloxacin+azithromycin	5	2.50
Ceftriaxon+cefixime/zithromycin	38	19
Other	1	0.50
No	125	62.50
If enteric fever is not treated properly for 2-3 weeks, what would be possible hazards that may happen to the patients		
Intestinal perforation and bleeding	150	75
High fever and vomiting	40	20
Bleeding and high fever	10	5
% of people become carrier of enteric fever suffering with acute illness of enteric fever		
5-7%	85	42.50
3-5%	102	51
10-12%	6	3
None of above	5	2.50
Other	2	1

Table 4: Attitude and practices related questionnaire showing responses (%) of the general practitioners (n=200).

Questions	Always	Most of the time	Occasionally	Never
	N (%)	N (%)	N (%)	N (%)
Do you diagnose enteric fever only by clinical examination?	30 (15.0)	67 (33.5)	31 (5.5)	72 (36.0)
Do you measure temperature with thermometer during examination of suspected enteric fever patient?	93 (46.5)	51 (25.5)	4 (2.0)	52 (26.0)
Do you count pulse rate of suspected enteric fever patient routinely?	103 (51.5)	34 (17.0)	3 (1.5)	60 (30.0)
Do you think of relative bradycardia/tachycardia in a suspected enteric fever patient?	96 (48.0)	8 (4.0)	4 (2.0)	92 (46.0)
Do you inspect tongue for coating in a suspected enteric fever patient?	92 (46.0)	84 (42.0)	16 (8.0)	8 (4.0)
Do you inspect abdomen to find rose spots in a suspected enteric fever patient?	26 (13.0)	9 (4.5)	2 (1.0)	163 (81.5)
Do you palpate abdomen to note caecal gurgling in a suspected enteric fever patient?	32 (16.0)	13 (6.5)	5 (2.5)	150 (75.0)
Do you palpate abdomen for hepato/splenomegaly in a suspected enteric fever patient?	142 (7.0)	22 (11.0)	6 (3.0)	30 (15.0)
Do you give advice for Widal test?	22 (11.0)	58 (29.0)	29 (14.5)	91 (45.5)
Do you give advice for blood culture in a suspected enteric fever patient during first week of illness?	66 (33.0)	42 (21.0)	14 (7.0)	78 (39.0)

Continued.

Questions	Always	Most of the time	Occasionally	Never
	N (%)	N (%)	N (%)	N (%)
Do you give advice for repeat Widal test in positive cases after 7 days?	4 (2.0)	20 (10.0)	29 (14.5)	147 (73.5)
Do you give supportive care in an enteric fever patient?	122 (61.0)	45 (22.5)	11 (5.5)	22 (11.0)
Do you apply empirical antibiotic in a suspected enteric fever patient?	35 (17.5)	95 (47.5)	26 (13.0)	44 (22.0)
Do you give advice for further lifestyle change for prevention of enteric fever?	36 (18.0)	25 (12.5)	16 (8.0)	123 (61.5)

The survey of 200 general practitioners regarding their attitudes and practices in managing suspected enteric fever cases revealed varied responses. When diagnosing enteric fever, 15% (n=30) always relied solely on clinical examination, while 33.5% (n=67) did so most of the time, and 36% (n=72) never used this method alone. In examining suspected patients, 46.5% (n=93) always measured temperature with a thermometer, and 51.5% (n=103) routinely counted the pulse rate. However, only 48% (n=96) always considered relative bradycardia/ tachycardia, and 46% (n=92) inspected the tongue for coating. The inspection of abdomen for rose spots was rarely performed, with 81.5% (n=163) never doing so, and palpation for caecal gurgling was also uncommon, with 75% (n=150) never practicing it. However, palpation for hepatosplenomegaly was more routinely conducted, with 71% (n=142) always or most of the time performing it. Regarding diagnostic tests, only 11% (n=22) always advised a Widal test, and 33% (n=66) always recommended a blood culture in the first week of illness. The practice of advising a repeat Widal test in positive cases after 7 days was infrequent, with 73.5% (n=147) never recommending it. Supportive care in enteric fever patients was commonly provided, with 61% (n=122) always doing so. Empirical antibiotic use in suspected cases was varied, with 17.5% (n=35) always applying it and 47.5% (n=95) doing so most of the time. However, advice for lifestyle changes for the prevention of enteric fever was less common, with 61.5% (n=123) never giving such advice.

DISCUSSION

The results of this study offer a comprehensive insight into the knowledge, attitudes, and practices of general practitioners regarding enteric fever. A striking 100% of respondents correctly identified Salmonella typhi and para typhi as causative agents, and fever as a primary symptom, indicating a high level of basic knowledge. This unanimous awareness surpasses findings in other infectious disease contexts, such as the study by Sakr et al which reported significant but not complete knowledge among parents about fever in children.[13] However, when delving into specific symptoms and diagnostic practices, the knowledge appears less consistent. For instance, only 39% identified splenomegaly, and 71% correctly recognized blood culture as the gold standard for diagnosis, suggesting gaps in understanding finer clinical details. This is in contrast to Jamil et al who found a lower overall good practice rate (48.2%) among participants in managing Crimean-Congo hemorrhagic fever.[14] In terms of antibiotic usage, the preference for ceftriaxon (67%) aligns with current treatment guidelines, yet the varied responses indicate a lack of consensus or potential over-reliance on certain antibiotics, a concern also echoed in Boran and Kahriman's study on fever management.[15] The attitude and practice patterns revealed in the study, such as 61% always providing supportive care and 17.5% always applying empirical antibiotics, reflect a proactive approach towards management but also highlight the need for more standardized treatment protocols. Moreover, the study uncovers a significant reliance on healthcare professionals for information, paralleling findings by Ng et al where parents predominantly turned to health personnel for information on childhood fever.[16] This underscores the critical role of healthcare professionals in information dissemination and the need for continuous medical education to address the 20% prevalence of misconceptions about enteric fever found in this study. In conclusion, while the study reveals a commendable level of basic knowledge about enteric fever among general practitioners, it also highlights areas for improvement, particularly in understanding specific clinical symptoms, diagnostic practices, and treatment protocols. The comparative analysis with other studies suggests a similar trend in infectious disease management, emphasizing the need for ongoing education and standardized guidelines to enhance the quality of care.

Limitations

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

CONCLUSION

This study provides valuable insights into the knowledge, attitudes, and practices of general practitioners regarding enteric fever in a specific demographic. The findings reveal a commendable level of basic knowledge among practitioners, with unanimous recognition of Salmonella typhi and para typhi as causative agents and fever as a primary symptom of enteric fever. However, the study also uncovers gaps in understanding specific clinical symptoms and diagnostic practices, with only a fraction of respondents correctly identifying less common symptoms and the gold standard for diagnosis. The preference for

ceftriaxon in antibiotic treatment reflects adherence to current guidelines, yet the diversity in antibiotic choices and combinations indicates a need for more standardized treatment protocols. The study also highlights the critical role of healthcare professionals in disseminating accurate information and the necessity for ongoing medical education to address misconceptions and enhance the quality of care. In conclusion, while there is a strong foundation of basic knowledge about enteric fever among general practitioners, there is a clear need for further education and standardization in clinical practice. This study underscores the importance of continuous professional development and adherence to updated guidelines to ensure effective and consistent management of enteric fever, ultimately contributing to better patient outcomes and public health standards.

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