Original Article

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Biomedical Research and Theory Letters

Vol. 2, No. 1, 2026

Beyond Antibiotic Therapy: Holistic Assessment and Primary Care Management of Typhoid Fever in an Elderly Patient

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Article History

Received : 09 November 2025
Revised : 11 February 2026
Accepted : 22 March 2026
Available Online : 11 April 2026

Keywords:
typhoid fever;
holistic assessment;
primary health care;
salmonella typhi;
environmental sanitation;
infectious disease management.

To cite this article: Hutasuhut, A. F., Putri, C. F., Fadhilah, S., Oktaviani, S. P., Sela, Oktiyanda, S. D., & Yonny, S. A. (2026). Beyond antibiotic therapy: Holistic assessment and primary care management of typhoid fever in an elderly patient. *Biomedical Research and Theory Letters*, 2(1), 26–32. https://doi.org/10.58524/brtl.v2i1.143

Abstract

Typhoid fever remains a significant public health challenge in developing countries, particularly in areas with inadequate sanitation, limited access to clean water, and poor food hygiene practices. Although antibiotic therapy remains the primary treatment strategy, successful management of typhoid fever also requires comprehensive evaluation of environmental, behavioral, nutritional, and social determinants that may influence disease transmission and recovery outcomes. This study aimed to describe the implementation of a holistic assessment approach in the primary care management of typhoid fever in an elderly patient at Sukarame Community Health Center, Bandar Lampung, Indonesia. A 57-year-old woman presented with a three-day history of fever accompanied by headache, nausea, fatigue, and generalized weakness. Clinical examination revealed stable hemodynamic status without severe complications. Laboratory findings demonstrated elevated Widal titers for Salmonella typhi and Salmonella paratyphi, supporting the diagnosis of typhoid fever. Holistic assessment identified several contributing risk factors, including the consumption of unhygienic food, inadequate environmental sanitation, limited awareness of food safety, and age-related vulnerability that potentially increased susceptibility to systemic infection. The patient received protocol-based pharmacological therapy consisting of thiamphenicol, paracetamol, omeprazole, B-complex vitamins, and domperidone, combined with non-pharmacological interventions including adequate rest, nutritional modification, hydration support, hygiene education, and environmental sanitation counseling. Educational interventions emphasized safe food consumption, hand hygiene, and prevention of household transmission. Following comprehensive management, the patient demonstrated significant clinical improvement with reduced fever, decreased nausea, improved physical condition, and recovery of daily functional activities. This case highlights that typhoid fever management in primary healthcare settings should extend beyond antibiotic administration alone. Integrating holistic assessment into clinical management allows healthcare providers to identify behavioral, environmental, and social determinants contributing to disease occurrence and recovery. The implementation of patient-centered and preventive approaches in primary healthcare may improve therapeutic outcomes, strengthen community awareness, and reduce the risk of recurrent enteric infections in endemic settings.

1. Introduction

Typhoid fever remains an important global public health problem, particularly in low- and middle-income countries where sanitation systems, food safety standards, and access to clean water remain inadequate. The disease is caused by Salmonella enterica serovar Typhi, a Gram-negative intracellular bacterium transmitted primarily through contaminated food and drinking water (Zuhdi et al., 2024). Despite significant advances in public health interventions and antimicrobial therapy, typhoid fever continues to cause substantial morbidity and mortality worldwide, especially in densely populated urban and semi-urban environments with limited environmental sanitation infrastructure. The World Health Organization (WHO) estimates that typhoid fever affects approximately 9–12 million individuals annually and causes more than 100,000 deaths globally, with the highest disease burden occurring in Asia and sub-Saharan Africa (Egan et al., 2024; Ulpathakumbura et al., 2026; Zhao et al., 2026).

The persistence of typhoid fever in developing countries is strongly associated with multiple interconnected environmental, socioeconomic, behavioral, and healthcare-related determinants. Poor sanitation systems, inadequate sewage management, unsafe drinking

water, overcrowded settlements, and unhygienic food handling practices create favorable conditions for Salmonella typhi transmission. In many urban communities, food contamination frequently occurs through improper food preparation, poor hand hygiene, or exposure to contaminated water during cooking and storage processes. These factors are further aggravated by limited public awareness regarding food safety and infectious disease prevention. Consequently, typhoid fever remains highly endemic in many tropical and subtropical regions, including Indonesia (Zhou et al., 2026). Indonesia continues to experience a substantial burden of typhoid fever, particularly within urban and semi-urban populations characterized by high population density and heterogeneous sanitation quality. Several epidemiological studies conducted across Indonesia have demonstrated that environmental sanitation and hygiene behavior play dominant roles in determining disease transmission (Anggraeni et al., 2025). In addition, variations in bacterial virulence, increasing antimicrobial resistance, and delayed healthcare-seeking behavior further complicate disease management. The emergence of multidrug-resistant (MDR) Salmonella typhi strains has become an increasing concern because antibiotic resistance may prolong disease duration, increase hospitalization risk, and reduce treatment effectiveness. These challenges emphasize the importance of early diagnosis, rational antibiotic use, and integrated preventive strategies within primary healthcare systems (Ayadi et al., 2026; Blaney et al., 2025; Condorí-fern & Gandoy-crego, 2026). Typhoid fever presents with a wide spectrum of clinical manifestations ranging from mild systemic symptoms to severe gastrointestinal and systemic complications. The disease commonly begins with gradually increasing fever accompanied by malaise, headache, abdominal discomfort, nausea, anorexia, fatigue, and gastrointestinal disturbances such as constipation or diarrhea. In more severe cases, patients may develop hepatosplenomegaly, intestinal bleeding, ileal perforation, sepsis, or neurological manifestations (J. Wang et al., 2025). However, early-stage typhoid fever often presents with nonspecific symptoms that resemble other infectious diseases such as dengue fever, malaria, viral gastroenteritis, leptospirosis, or upper respiratory tract infections. This diagnostic overlap frequently contributes to delayed diagnosis and inappropriate treatment, especially in primary healthcare settings with limited laboratory resources (Slee et al., 2026; W. Wang et al., 2026).

Accurate diagnosis of typhoid fever remains challenging in many resource-limited healthcare facilities. Although blood culture remains the gold standard for definitive diagnosis, its use is frequently limited by cost, laboratory availability, delayed results, and reduced sensitivity following antibiotic administration. Consequently, serological tests such as the Widal test continue to be widely utilized in primary healthcare settings despite known limitations in sensitivity and specificity (Amril et al., 2025). Clinical diagnosis therefore still relies heavily on a combination of patient history, symptom progression, epidemiological context, physical examination findings, and supportive laboratory results. These challenges highlight the critical role of primary healthcare providers in recognizing early clinical patterns and initiating prompt management to prevent disease progression and complications (Lin et al., 2025; Tsai et al., 2025).

Primary healthcare centers (Puskesmas) play a strategic role in typhoid fever management in Indonesia because they serve as the first point of healthcare access for most community members. In addition to providing pharmacological treatment, primary healthcare facilities are expected to conduct patient education, nutritional counseling, hygiene promotion, environmental sanitation interventions, and disease prevention activities (Mandolesi et al., 2025). However, conventional typhoid fever management often focuses predominantly on pharmacological therapy while underestimating broader determinants such as hygiene behavior, environmental exposure, nutritional status, and social conditions that significantly influence disease transmission and recovery outcomes. As a result, recurrence risk and ongoing community transmission may remain inadequately addressed (Borah et al., 2023; Khandelwal et al., 2024; Suralaga & Usman, 2025). Recent public health perspectives increasingly emphasize the importance of holistic and patient-centered approaches in infectious disease management. Holistic assessment integrates biological, psychological, social, environmental, nutritional, and behavioral dimensions into clinical evaluation and therapeutic planning (Al et al., 2025; Hoyek et al., 2025). This approach allows healthcare providers to identify risk factors contributing not only to disease occurrence but also to delayed recovery, treatment non-adherence, recurrent infection, and reduced quality of life. In enteric infectious diseases such as typhoid fever, behavioral and environmental determinants are particularly important because disease transmission is strongly linked to sanitation conditions, food hygiene, and community health practices (Chen et al., 2025; Lien et al., 2025).

Elderly patients represent a particularly vulnerable population in typhoid fever management. Age-related immune decline, comorbid conditions, nutritional vulnerability, and reduced physiological reserve may increase susceptibility to systemic infection and prolong recovery duration (Fischman et al., 2025; Peng et al., 2025; Terrin et al., 2025). In older adults, clinical manifestations may also appear atypical or less specific, potentially delaying diagnosis and treatment initiation. Furthermore, elderly individuals frequently experience greater functional impairment during acute illness, affecting mobility, appetite, hydration status, and daily activities. These factors emphasize the importance of comprehensive clinical and functional evaluation in elderly patients presenting with suspected typhoid fever (Garcia-cabello et al., 2026; Ko et al., 2026; Li et al., 2025; Patel et al., 2020). In Bandar Lampung, environmental sanitation challenges, population density, and variable food hygiene practices continue to contribute to the persistence of enteric infectious diseases within the community. Sukarame Community Health Center serves a large urban population with diverse socioeconomic backgrounds, making it an important frontline healthcare facility for infectious disease detection and management. Early recognition and comprehensive management of typhoid fever cases at the primary healthcare level are therefore essential to reduce disease severity, prevent complications, and minimize household and community transmission (Cannizzaro & Spessotto, 2025; Ding et al., 2025; Garg et al., 2025).

This case report aims to describe the identification and management of typhoid fever in an elderly patient at Sukarame Community Health Center using a holistic assessment approach. Unlike conventional case reports that focus primarily on clinical symptoms and antibiotic therapy, this study highlights the added value of integrating environmental, behavioral, nutritional, and functional assessments into primary care management. Through this multidimensional approach, the study seeks to demonstrate how holistic evaluation may improve therapeutic outcomes, strengthen preventive education, and support more effective infectious disease management in community healthcare settings.

2. Materials and Methods

2.1. Study Design and Setting

This study was conducted as a descriptive clinical case report using a holistic primary healthcare approach to evaluate the identification and management of typhoid fever in an elderly patient at Sukarame Community Health Center, Bandar Lampung, Indonesia. The study emphasized

comprehensive patient assessment integrating biological, behavioral, environmental, nutritional, social, and functional dimensions to support patient-centered infectious disease management in a primary care setting. The methodological framework was designed to demonstrate how holistic assessment can improve diagnostic accuracy, identify transmission-related risk factors, strengthen preventive education, and optimize therapeutic outcomes in typhoid fever management.

The case was managed at Sukarame Community Health Center (Puskesmas Sukarame), Bandar Lampung, Indonesia. Bandar Lampung is one of the major urban areas in southern Sumatra characterized by relatively high population density, heterogeneous sanitation quality, and increasing environmental health challenges associated with urbanization and food hygiene practices. The primary healthcare center serves a diverse community population with varying socioeconomic and environmental backgrounds, making it an important frontline healthcare facility for infectious disease detection and management.

2.2. Patient Information and Clinical Assessment

A comprehensive clinical evaluation was performed during the patient's initial presentation. The assessment included detailed medical history taking, symptom evaluation, physical examination, laboratory investigation, and holistic risk assessment. Clinical assessment focused on:

- Fever characteristics,
- Gastrointestinal symptoms,
- Nutritional condition,
- Hydration status,
- Systemic infection signs,
- Potential complications.

Vital signs including blood pressure, pulse rate, respiratory rate, body temperature, body weight, and Body Mass Index (BMI) were recorded to evaluate the patient's general condition and functional status. Laboratory investigations included complete blood count examination and Widal serological testing to support the clinical diagnosis of typhoid fever. Elevated antibody titers against Salmonella typhi and Salmonella paratyphi were interpreted together with clinical findings and epidemiological exposure history.

2.3. Holistic Assessment Framework

A multidimensional holistic assessment was conducted to identify factors contributing to disease occurrence, symptom progression, recovery barriers, and transmission risk in the patient with typhoid fever (Fig. 1). The biological assessment focused on evaluating the patient's fever pattern, nausea, fatigue, gastrointestinal symptoms, nutritional condition, hydration status, immune vulnerability, and overall infection severity (Trismiyana & Agung, 2020). This evaluation was essential to determine the systemic impact of Salmonella typhi infection and to identify potential complications associated with prolonged fever and gastrointestinal involvement. Behavioral assessment included an evaluation of food hygiene practices, handwashing behavior, eating habits, medication adherence potential, and personal hygiene patterns (Annisa & Rahmadani, 2022). Since typhoid fever is strongly associated with foodborne and sanitation-related transmission, identifying risky behavioral practices was considered important to support both treatment success and infection prevention. The assessment also explored the patient's awareness regarding hygienic food consumption and routine hygiene practices in daily life.

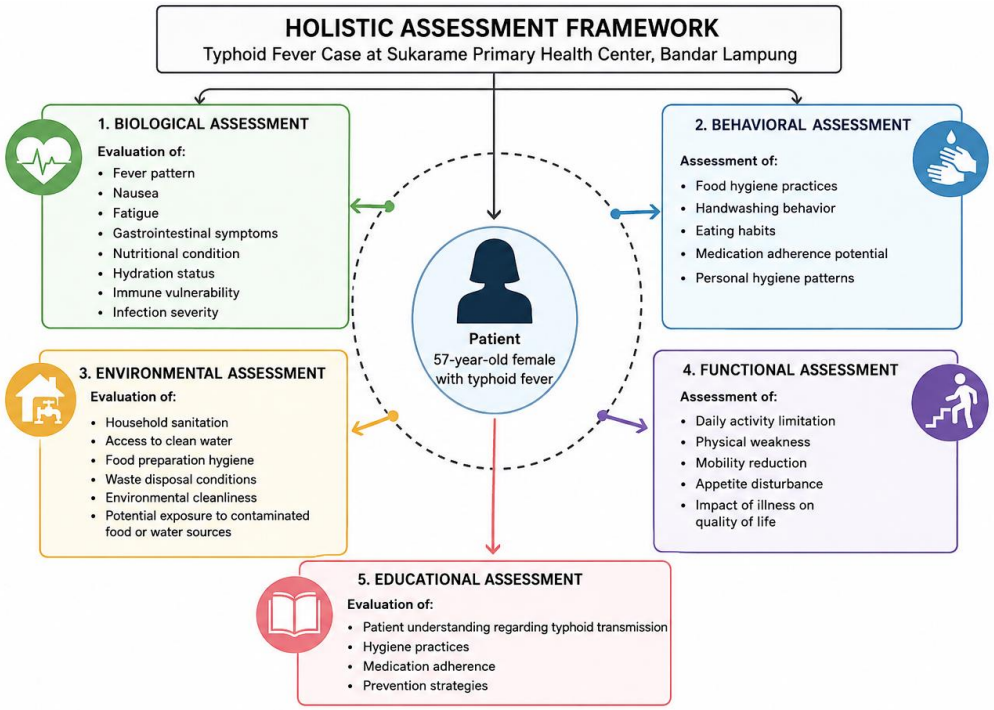

Fig. 1. Holistic assessment framework applied in the primary care management of typhoid fever at Sukarame Community Health Center, Bandar Lampung, Indonesia. The framework integrates biological, behavioral, environmental, functional, and educational assessments to identify multidimensional factors influencing disease transmission, clinical progression, treatment response, and recovery outcomes in an elderly patient with typhoid fever.

Environmental assessment was performed to evaluate household sanitation, access to clean water, food preparation hygiene, waste disposal conditions, environmental cleanliness, and potential exposure to contaminated food or water sources. Particular attention was given to environmental factors that could facilitate Salmonella typhi transmission, including inadequate sanitation systems and unsafe food handling practices within the household and surrounding community environment. Functional assessment focused on the impact of illness on the patient's daily activities and quality of life (Fairuza, 2020). This included evaluation of physical weakness, mobility reduction, appetite disturbance, fatigue-related activity limitation, and the extent to which symptoms interfered with routine functioning. In addition, an educational assessment was conducted to evaluate the patient's understanding regarding typhoid transmission, hygiene practices, medication adherence, and preventive strategies aimed at reducing reinfection and household transmission risk.

2.4. Therapeutic Intervention

The patient received pharmacological therapy according to primary healthcare management guidelines for uncomplicated typhoid fever. The treatment regimen included:

- Thiamphenicol 500 mg three times daily,
- Paracetamol 500 mg three times daily,
- Omeprazole 20 mg once daily,
- B-complex vitamins,
- Domperidone for nausea management.

Non-pharmacological interventions included adequate rest, hydration optimization, nutritional modification, hygiene education, environmental sanitation counseling, and prevention of foodborne transmission. While the patient was also educated regarding:

- Safe food consumption,
- Proper hand hygiene,
- Clean water utilization,
- Household sanitation,
- Early recognition of danger signs requiring immediate medical attention.

Clinical follow-up was conducted to evaluate symptom progression, therapeutic response, and functional recovery. Outcome assessment included reduction of fever, improvement of nausea, recovery of appetite, improvement of physical strength, and restoration of daily activities. Patient understanding regarding hygiene behavior and disease prevention was also reassessed during follow-up evaluation.

3. Results and Discussion

A 57-year-old woman presented to Sukarame Community Health Center, Bandar Lampung, with a primary complaint of fever persisting for three days accompanied by dizziness, nausea, generalized weakness, and fatigue. The patient reported that the fever progressively worsened and interfered with her routine daily activities, particularly during the evening. She denied any history of chronic illness, smoking, alcohol consumption, or drug allergy. The patient also had no previous history of hospitalization related to gastrointestinal or systemic infectious disease. However, further history-taking revealed possible exposure to unhygienic food consumed outside the home several days before symptom onset, which was considered a potential source of Salmonella typhi transmission (Larry & Maria, 2024). Physical examination demonstrated that the patient was in mild-to-moderate clinical condition with compos mentis consciousness. Vital signs showed blood pressure of 130/80 mmHg, pulse rate of 84 beats per minute, respiratory rate of 22 breaths per minute, and body temperature of 37.2°C. Anthropometric evaluation revealed a body weight of 61 kg with a Body Mass Index (BMI) of 25.39 kg/m², categorized as mildly overweight. Lung examination revealed symmetrical chest expansion, normal fremitus, sonorous percussion, and normal breath sounds without additional pathological findings. Cardiovascular, abdominal, neurological, and extremity examinations showed no significant abnormalities (Parama Cita, 2011). The absence of severe gastrointestinal manifestations such as intestinal bleeding, severe abdominal tenderness, or altered mental status suggested that the patient had uncomplicated typhoid fever without evidence of systemic complications (Egan et al., 2024; Ulpathakumbura et al., 2026).

Laboratory examination showed hemoglobin level of 15.3 g/dL, leukocyte count of 4,900/µL, erythrocyte count of 4.79 million/µL, platelet count of 185,000/µL, and hematocrit of 45.9%. Serological examination using the Widal test demonstrated elevated antibody titers against Salmonella typhi O antigen (1/320) and H antigen (1/320), along with elevated titers for Salmonella paratyphi AO and BO antigens (1/160). Although the Widal test has recognized limitations related to sensitivity and specificity, the laboratory findings, when interpreted together with the patient's clinical presentation and epidemiological history, strongly supported the diagnosis of typhoid fever. The biological assessment demonstrated that the patient experienced systemic infectious manifestations including fever, fatigue, nausea, appetite disturbance, and generalized weakness (Murthy et al., 2025). These findings are consistent with the pathophysiology of typhoid fever in which Salmonella typhi penetrates the intestinal mucosa, survives intracellularly within macrophages, and disseminates through the reticuloendothelial system. The resulting inflammatory response triggers systemic symptoms such as prolonged fever, malaise, and gastrointestinal complaints (Rahmat et al., 2019). In elderly patients, age-related immune decline may contribute to increased vulnerability to bacterial infection and slower recovery compared to younger individuals. Previous studies have shown that older adults frequently present with less specific symptoms and may experience delayed diagnosis due to atypical clinical manifestations (Slee et al., 2026; W. Wang et al., 2026; Zhou et al., 2026).

Behavioral assessment identified several important transmission-related risk factors. The patient reported consuming food from external sources with uncertain hygiene quality before symptom onset. In many urban communities in Indonesia, improper food handling, poor hand hygiene, and inadequate food storage practices remain major contributors to enteric infectious disease transmission. Typhoid fever transmission is closely associated with fecal–oral contamination pathways, particularly through contaminated food and water. Therefore, identifying behavioral risk factors is important not only for diagnosis but also for preventing recurrent infection and reducing community transmission (Garcia-cabello et al., 2026; Ko et al., 2026; Li et al., 2025; Patel et al., 2020).

Environmental assessment further demonstrated the relevance of sanitation and environmental hygiene in typhoid fever occurrence. Although the patient did not report extreme environmental deprivation, suboptimal household sanitation and potential exposure to contaminated food or water sources were considered contributing factors (Leukosit et al., 2025). Environmental sanitation remains one of the most important determinants of typhoid fever incidence globally, particularly in densely populated urban regions where access to clean water and proper waste disposal systems may be inconsistent (Rahmi, 2023). Previous epidemiological studies conducted in Indonesia have consistently demonstrated significant associations between sanitation quality, food hygiene behavior, and typhoid fever incidence (Chen et al., 2025; Lin et al., 2025; Tsai et al., 2025).

Functional assessment showed that the patient experienced temporary impairment in daily activities due to weakness, dizziness, nausea, and persistent fever. Fatigue and reduced appetite significantly affected her physical condition and quality of life during the acute phase of illness. In elderly patients, acute infectious diseases may substantially reduce physical functioning and increase vulnerability to dehydration and nutritional decline. Therefore, supportive management focusing on hydration, adequate nutrition, and physical recovery is essential in addition to antimicrobial therapy (Cannizzaro & Spessotto, 2025; Lien et al., 2025).

Management consisted of pharmacological and non-pharmacological interventions implemented through a holistic primary healthcare approach. Pharmacological therapy included thiamphenicol 500 mg three times daily as antibiotic treatment, paracetamol 500 mg three times daily for fever reduction, omeprazole 20 mg once daily for gastric protection, B-complex vitamins to support general physical condition, and domperidone to relieve nausea. Antibiotic administration aimed to eradicate Salmonella typhi and prevent further systemic bacterial dissemination. Early initiation of appropriate antimicrobial therapy remains essential to reduce symptom duration, minimize complications, and prevent disease progression (Ding et al., 2025; Garg et al., 2025; Hoyek et al., 2025).

Non-pharmacological interventions focused on behavioral modification and preventive education. The patient was advised to obtain adequate rest, maintain hydration, consume hygienic and nutritionally balanced food, and avoid potentially contaminated food sources. Education regarding hand hygiene, safe food preparation, clean water utilization, and environmental sanitation was also provided. These educational interventions are important because successful typhoid fever management extends beyond bacterial eradication alone. Prevention of reinfection and interruption of fecal–oral transmission pathways require behavioral and environmental modifications at both individual and household levels (Al et al., 2025; Mandolesi et al., 2025; J. Wang et al., 2025).

Following treatment, the patient demonstrated significant clinical improvement characterized by reduced fever, improvement of nausea, increased appetite, and recovery of physical strength. The patient reported improvement in daily functional activities and no longer experienced significant dizziness or generalized weakness. These findings indicate a favorable therapeutic response and successful short-term management outcome at the primary healthcare level (Terrin et al., 2025). This case highlights the importance of integrating holistic assessment into typhoid fever management within primary healthcare settings. Conventional management approaches frequently emphasize pharmacological therapy while overlooking broader determinants such as hygiene behavior, environmental sanitation, nutritional condition, and patient education. However, enteric infectious diseases such as typhoid fever are strongly influenced by environmental and behavioral factors. Consequently, comprehensive patient-centered management may improve treatment effectiveness, strengthen preventive awareness, and reduce the risk of recurrent infection and household transmission (Garcia-cabello et al., 2026; Ko et al., 2026; Li et al., 2025; Patel et al., 2020).

The case also demonstrates the strategic role of primary healthcare centers (Puskesmas) in infectious disease control in Indonesia. As frontline healthcare facilities, primary care centers not only provide diagnosis and treatment but also function as community-based preventive and educational institutions. Integrating clinical management with hygiene education and environmental health counseling may contribute substantially to reducing the burden of typhoid fever in endemic urban communities. Overall, this study emphasizes that typhoid fever management should adopt a multidimensional approach integrating biological, behavioral, environmental, functional, and educational assessments. Such an approach may enhance therapeutic outcomes, improve patient quality of life, and strengthen community-level infectious disease prevention strategies within resource-limited primary healthcare settings.

4. Conclusions

This case report demonstrates that typhoid fever management in primary healthcare settings requires more than conventional antibiotic therapy alone. The diagnosis and treatment of typhoid fever in this elderly patient were successfully achieved through a holistic assessment approach integrating biological, behavioral, environmental, functional, and educational dimensions. Clinical findings supported the diagnosis of typhoid fever associated with probable exposure to contaminated food and suboptimal hygiene practices, while multidimensional assessment helped identify additional factors influencing disease transmission, symptom severity, and recovery outcomes. Comprehensive management consisting of appropriate antimicrobial therapy, symptomatic treatment, hydration support, nutritional recommendations, hygiene education, and environmental sanitation counseling resulted in significant clinical improvement, including reduction of fever, decreased nausea, improved appetite, and restoration of daily functional activities. The integration of preventive education into patient management also strengthened patient awareness regarding food hygiene, handwashing practices, and infection prevention strategies, which are essential to minimize recurrent infection and household transmission. This study highlights the important role of primary healthcare centers in managing enteric infectious diseases through patient-centered and preventive approaches. Holistic assessment enables healthcare providers to address not only the biological aspects of infection but also the behavioral and environmental determinants that contribute to disease persistence within the community. Therefore, incorporating holistic evaluation into routine typhoid fever management may improve therapeutic outcomes, enhance quality of care, and support more effective community-based infectious disease prevention strategies in endemic settings.

Author Contributions: Conceptualization, AFH and CFP; methodology, SF; software, SPO and SDO; validation, AFH, CFP, and SF; formal analysis, SF and SAY; investigation, AFH, CFP, SF, SPO, S, SDO, and SAY; resources, AFH; data curation, SPO and SDO; writing—original draft preparation, AFH and SF; writing—review and editing, CFP and SPO; visualization, SDO; supervision, AFH; project administration, CFP.

Funding: This study did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Ethical Clearance: Not applicable. Ethical clearance was not required for this case report as it involved routine clinical management without experimental intervention.

Informed Consent Statement: Written informed consent has been obtained from the patient's guardian to publish this case report, including clinical details and images.

Data Availability Statement: All data supporting the findings of this study are contained within the article. No additional datasets were generated or analyzed.

Acknowledgments: The authors would like to express their sincere gratitude to Sukarame Community Health Center, Bandar Lampung, for supporting the clinical observation and data collection process for this case report. The authors also appreciate the cooperation of the patient and family for their willingness to participate and provide relevant clinical information. Special appreciation is extended to the Faculty of Medicine, Universitas Malahayati, Bandar Lampung, for academic support and guidance throughout the preparation of this manuscript.

Conflicts of Interest: The authors declare that there are no conflicts of interest regarding the publication of this article.

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