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ORIGINAL RESEARCH

Experience and Perception of Healthcare Workers on the Challenges of Follow-Up and Treatment of Tuberculosis Patients in Southern Ethiopia: An Exploratory-Descriptive Qualitative Study

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Background: There is a scarcity of research evidence on TB follow-up and treatment challenges from a healthcare worker's perspective in Ethiopia. Therefore, this study aimed to explore and describe the experience and perception of healthcare workers on the challenges of follow-up and treatment of TB patients in Southern Ethiopia.

Material and Methods: A qualitative exploratory-descriptive study was employed among 26 purposely selected Healthcare Workers (HCWs) from Wolaita Sodo University-Comprehensive Specialized Hospital and Achura, Boloso Sore, and Tida Health Centers in December 2021 and January 2022. Initially, the maximum variation purposive sampling technique was employed, then based on the data requirement of the study it was enriched by a theoretical sampling method. The required data were collected through one-on-one face-to-face audio-taped in-depth interviews. Data analysis was conducted by using a qualitative data analysis framework for the applied research method. NVivo Software Version 11 was used to ease data organization and analysis. Detailed textual narration of subthemes, and themes was done using direct verbatim quotations in the respective headings and subheadings.

Results: In the current study, three major themes and eleven sub-themes emerged from the data. The three major themes include the experience of healthcare workers, perceived challenges, and suggestions for improvement of TB patients' follow-up and treatment. Healthcare worker's experience, compliance with infection prevention protocols, fear of contracting and/or spreading TB, public awareness of TB, socio-economic burdens, providers-related problems, shortage of medical supplies, uncondusive physical work environment, provision of holistic support for the patients, provision of in or out of service training, and supportive supervision were the sub-themes.

Conclusion: This study explored the multidimensional challenges adjoining follow-up and treatment of TB patients. Regular monitoring and supportive supervision accompanied by appropriate and timely decisions and feedback are vital to ensure effective follow-up and treatment of TB patients in Ethiopia.

Keywords: challenges, experience, follow-up, healthcare workers, patients, perception, TB, treatment

Introduction

Tuberculosis (TB) is a highly infectious, airborne disease and it remains one of the major public health concerns worldwide, despite the current improvements due to global efforts. TB is a major cause of illness and death affecting millions of people, particularly in resource-strained developing countries.¹ Approximately, more than 33% of the world population is infected with the mycobacterium tuberculosis, even though, a larger proportion of the population shows no TB manifestations.² Globally, approximately 10.4 million TB incidences and 1.5 million deaths from the disease were recorded in 2020 alone.³

Africa is the second-peak TB prevalent continent with a prevalence of 25% and Asia ranks the first with a prevalence of 44% in the world.⁴ The African continent is home to about 11% of the population of the world but more than 33% of the global burden of TB incidence and 34% of related mortalities occur in Africa.⁵ About three million individuals with TB remain undiagnosed and untreated in the African continent.⁶

In 2015, the United Nations adopted the “End TB Strategy” which targets a 95% reduction of deaths due to TB, a 90% reduction in TB incidence as well as eradication of all catastrophic costs suffered by affected families between 2015 and 2035. The WHO TB control standard restructured in 2017, further emphasized that when the Directly Observed Treatment Short course (DOTS) is administered, simultaneously other treatment adherence interventions such as material and psychological support and patient and staff education should be provided.⁷

Delays in case detection and treatment are a major challenge to the TB prevention and control strategy in Ethiopia.⁸ Inaccessibility and unavailability of health facilities and adequately trained health personnel are the major contributors to the delays in the timely detection and treatment of TB in Ethiopia.⁹ Moreover, the current DOTS strategy which is being implemented in Ethiopia requires frequent visits of the patients to the health facilities, prolonged duration of the treatment, mostly not less than six months, adverse effects of TB medications, poor adherence, and discontinuation of the treatment altogether are also unfinished public health challenges in the country.^{10,11}

To avert this problem, the Ethiopian government is implementing many strategies and programs. For instance, improving the laboratory detection and diagnosis capacity, and expansion of better quality care and treatment service including availability and accessibility of health facilities, and health personnel are among the TB prevention and control policy focus in Ethiopia.²

The health extension program is another strategy that is designed to improve community health. Home-to-home identification of TB suspects, prompt referral of the suspected cases to higher-level health facilities for better diagnosis and health education on disease prevention and health promotion, and TB treatment adherence for those confirmed TB patients are some of the activities being implemented by community health extension workers.¹²

Contrary to this government effort, in Ethiopia, TB continued to be a major public health threat. Ethiopia is placed 7th among the 22 countries with the highest TB burden and high undiagnosed TB infection in the community.¹³ In Ethiopia, TB is one of the ten top causes of hospital admissions, morbidity, and mortality.¹⁴ According to WHO, Ethiopia is one of the 30 high TB, TB/HIV, and multidrug-resistant TB burden countries in the world. In 2019 alone, the estimated TB incidence, in Ethiopia, was 151 per 100,000 population and the mortality rate was 22 per 100,000 population.^{2,15}

Research evidence found in Ethiopia and other countries so far has focused on the TB control program challenges from patients’ perspectives.^{16–19} Moreover, a few available works of literature mainly focus on the prevalence and associated factors, and in terms of the study designs, most of them are done using a quantitative research approach. However, the number of studies that explored the challenges of healthcare providers, the key actors, and perspectives is extremely scarce.^{20–22} Therefore, this study aimed to explore the experience and perception of HCWs regarding the challenges of follow-up and treatment of TB patients in Southern Ethiopia.

Methods and Materials

Study Design, Setting, and Period

An exploratory-descriptive qualitative study design was employed in the present study. An exploratory-descriptive qualitative study design is chosen because it enables the elicitation of the concepts, views, and factors shaping experience and perception.^{23,24} This design also provides the advantage of entering into the participants’ world to discover the practical insight, possibilities, and understandings regarding the phenomenon under scrutiny to produce scholarly and coherent evidence to guide practices.²⁴

This study was conducted in Wolaita Zone which has 17 districts and seven town administrations, with 375 kebeles (the lowest administrative structure in Ethiopia). Wolaita Zone is located 330 km southwest of Addis Ababa, the Ethiopian capital city, through the Addis Ababa- Butajira-Halaba-Wolaita Sodo route. It is bordered in the north by Kambata Tambaro and Hadiya Zones, in the East by the Sidama region, in the South by Gamo and Gofa Zones, and in the West by the Southwest peoples region of Ethiopia. When compared to the national population density which is

102.9 persons per square km, Wolaita Zone is among the most densely populated areas in the country, with a population density of 356.67 persons per square km.^{25,26} Currently, Ethiopia follows a four-tier healthcare system, which is organized into Primary Health Care Units (PHCUs), District Hospitals, General Hospitals, and Specialised Hospitals. The PHCU is a Health Centre surrounded usually by five Health Posts. Each Health Post serves approximately 5000 people and five together 25,000 people are served by each Health Centre.²⁷ According to the reports obtained from Zonal Health Department, the potential health coverage (percentage of the population who have access to basic healthcare facilities) is over 95% in 2020 taking into account the health posts (community level frontline health facilities providing basic preventive, curative and referral service) functioning in each village. In Wolaita Zone there are 10 hospitals; two private and eight public, 427 PHCU (77 health centers and 350 health posts), and several pharmacies and drug vendors working in the Zone.²⁸ This study was done between December 2021 and January 2022.

Study Participants' Recruitment Procedure

Healthcare providers who have experience caring for TB patients previously or currently caring for TB patients were eligible for participation. Healthcare workers who have been selected purposively and met the inclusion criteria participated in the study, regardless of their professional differences. The diversity of professions was considered to take the advantage of capturing the range of perspectives, detect areas of divergence of opinion and improve the trustworthiness of the research results.

Healthcare workers who were an employee of the selected healthcare facility, who have worked and/or currently working with TB patients, who have studied at least one of the health science disciplines at a university/ college with a diploma (10+4) or undergraduate degree level and above and who were willing to participate in the study were eligible for the study. Healthcare providers who have not served at least for 6 months and who were seriously ill and could not make the interview were excluded. Participants had been traced through their contact addresses from their respective hospital or health center human resource management department and contacted. After obtaining informed consent for participation, the time, date, and place of the interview were established based on the participants' recommendations for the actual interview.

Sample Size and Sampling Procedure

A total of twenty-six HCWs from Wolaita Sodo University Comprehensive Specialized Hospital and three health centers (Achura Health Center, Boloso Sore Health Center, and Tida Health Center) healthcare workers participated in the current study. To ensure an adequate pool of participants, all the healthcare providers who were working and/or have worked with TB patients were identified as potential participants and invited to participate in the study. An invitation to participate in the study was made by the researchers using guidance from respective health facility managers. Eight participants from Wolaita Sodo University Comprehensive Specialized Hospital and six from each of the rest health centers participated in the study.

Wolaita Sodo University Comprehensive Specialized Hospital and three health centers (Achura Health Center, Boloso Sore Health Center, and Tida Health Center) were purposively selected. Considering the extent of diversified services provided by Wolaita Sodo University-Comprehensive Specialized Hospital, the hospital was purposively included. The three health centers were selected based on the Zonal annual report on adherence of TB patients to DOTS, and they were the lowest achievers of adherence to DOTS.

The maximum variation purposive sampling method was employed to select the study participants. Maximum variation of participants was maintained giving attention to variations such as demographic characteristics (age, sex, level of education, work experiences), health facility types (hospitals or health centers), and geographic locations of the health facilities (urban or rural and rural or remote rural areas).

The information obtained from the initial maximum variation purposive sampling was used to guide the theoretical sampling. Theoretical sampling is a type of purposive sampling which is conducted to enrich the themes that emerged from the analysis of the data from the initial qualitative sampling method. It is guided by initial data collection field experience about what data, from where, and whom to collect the data required.

Information richness was ensured by the collection of additional data or seeking clarification. Information saturation and richness were guided by constant comparative analysis of the earlier data and memoing. Further interviewing and probing were terminated when the data analysis confirms information saturation and richness were achieved.

Data Collection Method and Tool

The data required for the current study were collected using the interview method. Evidence shows that the interview method is the best qualitative data collection technique if the qualitative inquiry aims to learn what is important in the mind of informants, their meanings, perspectives, and definitions; how they view, categorize, and experience the world.²⁹

Qualitative interviews allow participants to describe experiences in detail and to give their perspectives and interpretations of these experiences. Interview methods provide an opportunity for the researcher and the participants to construct or reconstruct their daily lives and experiences.³⁰ To utilize the above advantages, the interview method of qualitative data collection was used for this particular research. An interview guide and field notes were used to collect the data keeping flexibility in the structure and sequence of conversation with the study participants ([Supplementary Files Section 1](#)).

The initial semi-structured interviews were carried out with each selected participant in a private room. In addition to that, each interview was tape-recorded, and memos were written regarding each interview and the whole process. The researchers collected the required data. To avoid any anxiety of participants owing to immediate interview, selected eligible participants' contact address was obtained and further contact with the researchers and the participants were made. Finally, the researchers and the participants negotiated the date, time, and place of the actual interview, and the actual interview was collected.

Data Management and Analysis

The collected data, field notes, and audio-taped transcripts were systematically organized to address the research objectives. Each audio interview transcript was loaded into a computer and using the play-pause button audio transcripts were typed on the computer in Microsoft Office Word in the Amharic language. Text transcripts and field notes were translated into English before the coding of the data began.

Data analysis was conducted by using a qualitative data analysis framework for the applied research method. Framework analysis is a characteristically comparative form of thematic analysis which follows a systematically organized structure of inductively- and deductively-derived themes.³¹ Framework analysis consists of two major components: creating an analytic framework and application of the analytic framework. These two major components occur through five steps: (1) data familiarization; (2) identifying a thematic framework; (3) indexing all study data against the framework; (4) charting to summarize the indexed data, and (5) mapping and interpretation of patterns found within the charts.³²

In the first step, each interview transcript was read and re-read for an overall understanding and familiarization of the data. Preliminary potential thematic frameworks were initiated developing immediately after completing the first one-on-one face to face interview. In the second step after adequately being familiarized with the data, identification of units of initial thematic frameworks was developed. The initial thematic frameworks were used as potential themes and a guiding tool for the subsequent coding and in the formulation of the more abstract, more inclusive themes and concepts. In the third step, we indexed (coded) all interview transcripts using the already developed thematic framework. Patterns, experiences, feelings, thoughts, perceptions, and emotions from each transcript and field note and memo were systematically coded using thematic keywords. NVivo Software Version 11 was used to ease data organization and analysis. In the fourth step, sequencing and abstracting of the indexed study data were done which enabled us to examine the data systematically and comprehensively. In the fifth step, we charted the data using the potential themes and subthemes built from the thematic framework and described by the data analysis spreadsheet ([Supplementary Table 1](#)). This step provided the opportunity to revisit and refine the emerged thematic frameworks and the sub-components in which those found to be too broad were split, too narrow were enriched with further data, and deviant cases were either further enriched or removed based on the relevance to the objectives of the study. Finally, the detailed textual narration of each theme and subthemes was conducted in the respective heading and sub-headings supported by direct verbatim quotations of the participants. Furthermore, in this step, the researchers present an analytical account of the data more clearly and explicitly.^{31,32}

Data Quality Assurance

Content validity of the data collection tool was ensured by incorporating suggestions obtained from experts in the field. A pilot study was conducted on four healthcare providers from other health facilities who were not included in the final study. Objectives-centered data collection tools (Interview guide) were developed and used to collect the required data. Repeated contacts were made with the study participants using the previously obtained contact addresses until we get sufficient experience and understanding of the local context, health facility's specific variations, and organizational differences. Spot checking of the recorded data, review of the field notes, and discussion on the process were done immediately after completing each interview.

Definition of Key Terms

Follow-up and treatment: a patient-centered approach in which TB patients are closely monitored by continuous and complete assessment of patient prognosis accompanied by appropriate and timely interventions.

Perception: it is a subjective belief of HCWs which is founded on sound reasoning and explanation regarding TB patients' follow-up and treatment challenges.

Healthcare workers: are health professionals who are directly involved in the follow-up and treatment of TB patients.

DOTS: a strategy designed to ensure the appropriate taking of the prescribed anti-TB medications in which a trained health care worker or other designated individual, excluding a family member, observes while the patient takes the medications.

Trustworthiness of the Study Results

Trustworthiness refers to confidence in the truthfulness of data and interpretations. To ensure the trustworthiness of the study results in qualitative studies there are four common parameters to be maintained: credibility (validity), transferability, dependability, and confirmability: the credibility of this study was ensured by prolonged engagement with the participants until trust and rapport were built. Persistent observation by constant comparative method for any disagreement between the data and sufficient representation was conducted. Negative case analysis was done to identify instances where the data set was not fit with the objectives of the study or fit, but, was not sufficiently found in the transcripts. Transcripts that fit with the objectives of the study were enriched with further data and transcripts which did not fit with the objectives of the study were refined and removed from the analysis. A referential adequacy audit of materials was also conducted before the final research report. Finally, member checks of the transcripts and draft results were conducted to confirm whether participants' responses were appropriately described or not.

To ensure confirmability (objectivity of the data and interpretations), a senior qualitative researcher audited the entire research process. Moreover, the clearly and explicitly described plans of the researcher's role and responsibilities were implemented accordingly. Dependability (consistency of data) was maintained by making the researcher's accounts of field notes part of the data analysis and by using direct verbatim quotations of the participants as original as they provided. Finally, the transferability of the results was ensured by initial purposive sampling and subsequent theoretical sampling based on further data requirements. In addition to that, a thick description of the findings was done in the respective headings and subheadings.

Results

Socio-Demographic Profile of the Study Participants

A total of 26 study participants with a mean age of 36.9 years participated in the study. Nearly three fourth, 19 (73%) of the participants are females and 23 (88%) are married. As to the profession of the participants, more than (80%) were Nurses. Regarding the duration of work experience of participants in TB follow-up and treatment, it ranges from 9 months to 9 years. More than half, 17 (65%) of the participants were protestant Christianity followers, 7 (27%) are Orthodox Christians and the remaining two are Islam religion followers (Table 1).

Table I Socio-Demographic Profile of the Study Participants, 2021

Participant Code	Age	Sex	Total Work Experience in Health-Care	Work Experience in TB Patients' Follow-Up and Treatment	Educational Status	Profession	Religion	Marital Status
PIM	45	Female	10 years	4 years	BSc	Nurse	Protestant	Married
P2G	28	Male	3 years	1 year	BSc	Nurse	Muslim	Single
P3A	29	Female	3 years	1 year	BSc	Nurse	Protestant	Married
P4K	36	Female	11 years	5 years	BSc	Nurse	Orthodox	Married
P5T	50	Female	20 years	6 years	BSc	Nurse	Orthodox	Widowed
P6S	35	Female	7 years	4 years	BSc	Medical laboratory	Protestant	Married
P7H	48	Female	13 years	1 year	BSc	Nurse	Orthodox	Married
P8Z	37	Female	5 years	3 years	BSc	Nurse	Protestant	Married
P9W	45	Female	11 years	3 years	BSc	Health officer	Protestant	Married
P10T	45	Male	20 years	7 years	BSc	Nurse	Protestant	Married
P11E	37	Female	10 years	5 years	Diploma	Clinical Nurse	Protestant	Married
P12Z	42	Female	10 years	9 months	Diploma	Clinical Nurse	Orthodox	Married
P13G	34	Male	6 years	1 year	BSc	Health officer	Protestant	Married
P14K	26	Male	2 years	11 months	BSc	Nurse	Muslim	Married
P15C	39	Female	9 years	3 years	BSc	Nurse	Orthodox	Married
P16I	30	Female	4 years	2 years	BSc	Nurse	Orthodox	Married
P17U	27	Male	1 year	1 year	BSc	Medical laboratory	Protestant	Single
P18E	45	Female	15 years	7 years	Diploma	Clinical Nurse	Protestant	Married
P19V	36	Female	8 years	3 years	BSc	Nurse	Protestant	Married
P20R	28	Female	2 years	1 year	BSc	Nurse	Protestant	Married
P21Y	37	Female	5 years	1 year	BSc	Nurse	Orthodox	Married
P22Q	45	Male	11 years	3 years	BSc	Nurse	Protestant	Married
P23O	35	Female	7 years	4 years	BSc	Nurse	Protestant	Married
P24L	26	Female	1 year	1 year	BSc	Health officer	Protestant	Married
P25M	47	Female	19 years	9 years	BSc	Nurse	Protestant	Married
P26F	27	Male	2 years	2 years	BSc	Nurse	Protestant	Married

The Themes and Sub-Themes Emerged from the Study

In the current study, three major themes and eleven sub-themes emerged from the data. The three major themes include the experience of HCWs in TB patient follow-up and treatment, HCWs perceived challenges of TB patients' follow-up and treatment, and HCWs' suggestions for improvement of TB patients' follow-up and treatment. HCWs experience with TB patients' follow-up and treatment, compliance with infection prevention protocols, fear of contracting and/or spreading TB, public awareness of TB, socio-economic burdens, providers-related problems, shortage of medical supplies, uncondusive physical work environment, provision of holistic support for the patients, provision of in or out of service training for HCWs, and supportive supervision were the sub-themes emerged from the data (Table 2).

Theme One: Experience of Healthcare Workers with TB Patients' Follow-Up and Treatment

This theme is developed by clustering participant responses that explain the experience of HCWs in their TB patients' follow-up and treatment jobs. HCWs experience with TB patients' follow-up and treatment, compliance to infection prevention protocols, fear of contracting and/or spreading TB, and public awareness of TB were the sub-themes.

Sub-Theme One: Tuberculosis Patients' Follow-Up and Treatment Experience

This sub-theme included the experience of HCWs-related to the responsibilities expected from them during TB patients' follow-up and treatment. The follow-up and treatment duty of TB patients on DOTS requires more commitment from HCWs than other works. The follow-up and treatment responsibility of TB patients requires the provision of holistic care for the patients and thinking about the possibility of spreading the disease to others. HCWs who are in the TB patient's follow-up and treatment need to provide psychological, nutritional, physical, and medical care concurrently. This notion is well described by a 36-year-old female Nurse who has been working in TB patients' follow-up and treatment in a health center as follows:

You know (the interviewer) someone who is involved in the TB patient's follow-up and treatment needs to follow whether the patient strictly adheres to the appointment dates and observes the patient while taking the drugs. The DOTS approach is designed to minimize defaulters from the treatment which has a dangerous consequence of treatment failure or developing drug-resistant TB. HCWs in the TB patients' follow-up and treatment need to avoid absenteeism and have to be punctual because if the patient cannot get the providers in place, they go back and may default the treatment. To be a role model for the patients, the provider is expected to be in his/her workplace. TB patients' follow-up and treatment require the provision of Anti-TB drugs on a daily bases and conducting an ongoing clinical and nutritional evaluation, health education, and psychological assurance of the patient, which again makes working in TB patients' follow-up and treatment more burdensome. P19V

Table 2 The Themes and Sub-Themes Developed from the Data,2021

Themes	Sub-Themes
Experience of HCWs with TB Patients follow-up and treatment	Healthcare worker's experience with TB follow-up and treatment. Compliance with infection prevention protocols. Fear of contracting and/or spreading TB. Public awareness of TB.
HCWs perceived challenges of TB Patients' follow-up and treatment	Socio-economic burdens. Provider-related problems. Shortage of medical supplies. Uncondusive physical work environment.
HCWs suggestion for improvement of TB Patients' follow-up and treatment	Provision of holistic support for the patients. Provision of in or out-of-service training for HCWs. Supportive supervision.

Sub-Theme Two: Compliance with Infection Prevention Protocols

This sub-theme has emerged from the data about attributes related to the actions and behavior demanded to maintain the infection prevention protocols. Maintaining and strictly following infection prevention principles in TB patients' follow-up and treatment were among the critical duties of the participants. Ensuring the compliance of the patients and HCWs with the principles of infection prevention is the ongoing responsibility of the HCWs. This claim was well described by the following verbatim quotation obtained from a 39-year-old female Nurse working in a public hospital in the following manner:

Ensuring wearing of a mask, adequate ventilation of the working environment, keeping physical distance between the patients and worker, rehearsing infection prevention guidelines and signage, and knowing rules for self and making them known by others are the routine duties we perform on the daily basis. P15C

Sub-Theme Three: Fear of Contracting and/or Spreading Tuberculosis

This sub-theme is developed from the data in reference to the scare participants experienced due to the nature of their work. The current study identified that the HCWs working in the TB patients' follow-up and treatment are scared because TB is a highly communicable airborne disease. The workers are fearful of the risk of acquiring the disease even with the availability of basic protective equipment and applying the infection prevention protocols. This study also revealed that HCWs are worried about spreading the disease to their families, and vulnerable family members such as the elderly, pregnant women, and/or children. The participants of the study also experience fear about the spread of TB in the community by the patients negligently or unknowingly. This idea was best described by a 27-year-old male HCW working in the medical laboratory unit of the TB patients' follow-up and treatment in a health center as follows:

People who work in the TB patients' follow-up and treatment are at high risk of acquiring TB and transmitting it to their families or the community at large. In the health facility currently, I am working, there is an extreme shortage of personal protective equipment. Leave alone providing them to the patients, sometimes we the healthcare workers face a lack of protection. For instance, I am always scared of acquiring TB myself and I also fear transmitting it to my family members. It is one year since I started working here in the TB clinic, but there is no difference in the level of fear I experienced when I was assigned to work in this unit. HCWs assigned in other units with me before one year familiarized themselves with the organizational culture and they are enjoying their life but I am still worried about working in this unit. P17U

Sub-Theme Four: Public Awareness of Tuberculosis

The participants of this study revealed that public awareness about TB in the study setup is extremely poor. This study verified that public awareness regarding TB in the community is inadequate and/or misunderstood. A 45-year-old male Nurse HCW who has been working in the TB patients' follow-up and treatment for seven years in a public hospital stated as follows:

On many occasions, we experience struggle to make the patients aware of how TB is a dangerous and deadly disease. The patients perceive the common cold and TB as similar, they do not differentiate TB symptoms from a common cold. The community does not know the importance of wearing protective equipment and the separation of household utensils from TB patients. They just try to tell us not to worry about wearing a mask, they perceive TB as a self-limiting disease with no treatment. Many patients tell us they have used unprescribed drugs from drug stores or traditional healers and spit anywhere as usual. Some other patients also correlate TB with an evil spirit and give less attention to professional advice. Many of the patients do not know the risk of comorbidity of TB and HIV, and some consider TB as a hereditary disease. P10T

Theme Two: Healthcare Workers Perceived Challenges of TB Patients' Follow-Up and Treatment

HCWs perceived challenges of TB patients' follow-up and treatment is the second major theme developed from the data. The theme describes the perceived and/or actual challenges of TB patients' follow-up and treatment. The theme

comprises four logically coherent and conceptually strongly linked sub-themes which include socio-economic burdens, Providers-related problems, shortage of medical supplies, and an unconducive physical work environment.

Sub-Theme One: Socio-Economic Burdens

TB follow-up and treatment is chronic care which is an economically unsettling treatment modality that affects the overall life status of the patients and their families. This sub-theme has emerged from the data about the economic strains imposed on TB patients. The economic burdens identified in the data include loss of financial capability due to interruption of job due to illness, unaffordability of respiratory protective equipment, transportation, and the cost of food and accommodation. This result is well captured by a 45-year-old female Nurse who has been on DOTS treatment for TB patients for 7 years in a health center in the following ways:

TB patients' follow-up and treatment is an extremely challenging job. TB is a disease of poverty, and many of our patients cannot afford the direct and indirect costs of follow-up and treatment. We recommend the patients eat well and strictly adhere to the treatment but they cannot do that because they cannot afford it. The treatment modality by itself is DOTS which requires the HCWs directly observe while the patients take their medications. Hence, the patients need to attend TB clinics on daily bases. Many of the patients come from remote rural areas which again increases the cost of transportation, sometimes they do not get the transport and miss appointments. P18E

Sub-Theme Two: Providers-Related Problems

Poor attitude, lack of motivation and negligence of HCWs about the severity of disease, frustration of unsuccessful treatment, transfers within the facility and out of the facility, termination of work, ignorance of caring responsibility, follow-up fatigue, shortage of HCWs, and not following appropriately the treatment guidelines were identified in the data regarding HCWs-related problems of TB patients follow-up and treatment. The following verbatim quotation obtained from a 45-year-old Nurse who has been working on TB patients' follow-up and treatment in a health center stated as follows:

There are a lot of problems related to the HCWs which challenge the successful treatment of TB. For instance, the treatment team sometimes does not appropriately realize the danger of this disease. The HCWs may have different demands but they have no additional incentive mechanism for working here in a high-risk setup. Consequently, some of the workers are not loyal to their professional pledges. Moreover, some HCWs fade up with the routine tasks and lack the appropriate attitude and skill to follow and treat TB patients. Any, verbal or practical actions of a HCW have a high impact on the patient's adherence to the course of treatment. This requires the HCWs to be role models for their patients but this may not be true for some of the providers. Patients on TB follow-up and treatment are very curious, anything told by the HCWs has a positive or negative impact with immediate effect, but sometimes healthcare workers lack such skills and disappoint the patients. This also has an impact on the patient's already fragile adherence to the course treatment. P22Q

Sub-Theme Three: Shortage of Medical Supplies and Equipment

This study revealed that both hospitals and health centers are not providing the necessary services up to the minimum standard for free. Lack of supplies and basic equipment was one of the major snags to giving standard service. Shortage, interruptions, and/or complete absence of essential supplies such as basic medications, laboratory reagents, and protective equipment like masks and gloves were common at all levels of the health facilities. A 50-year-old female HCW who has been working for 6 years in TB care and follow-treatment in a health center stated this problem as follows:

Shortage of medical supplies is one of the major problems in our hospital. As it is known, TB patients' follow-up and treatment are extremely sensitive issues. If the services are interrupted or terminated due to a shortage of supplies, it is easy to imagine how the progress of the disease is dangerous. The patients expect to get every treatment during their appointment, they don't want to miss anything and don't want to be appointed for another time. We don't blame the patients because many of the patients who are on this treatment are poor and come from remote areas. If we appoint them to come back, they become extremely disappointed. We as HCWs are sometimes caught between dealing with the shortages and convincing the patients not to miss or default the DOTS. P5T

Sub-Theme Four: Unconducive Physical Work Environment

The present study disclosed that an unconducive physical work environment is one of the major challenges in the study setting. This sub-theme emerged from the data about participant responses regarding challenges related to the physical setups. The narrowness of TB clinic setup, unconducive and uncomfortable seating facilities, sub-standard windows and ventilation systems, interruption of water and electric supplies, poor illumination of the rooms, and distant laboratory service facility were the challenges frequently identified in the participants' data. This notion is well stated by a verbatim quotation from a 37- year- old female Nurse who was working on TB patients' follow-up and treatment for 5 years in a public hospital in the following ways:

It is very difficult, I do not know, how to explain the problems in TB follow-up and treatment physical setup. You can see how narrow the room we are working in is. The officials do not give much attention to this setup, but they always demand to get the job done. The room we are working in has not had enough chairs, no secured water supply system, the windows are very narrow and they cannot allow sufficient ventilation. We have reported many times the risk of working in this kind of setup but we could not get an appropriate response from the officials. They give us promises to improve but it is always the same, no implementation of the promises. P11E

Theme Three: Improvement of TB Patients' Follow-Up and Treatment

This theme is the third major theme and developed from the clustering of the sub-themes that emerged from the recommendations of the participants for improvement of TB patients' follow-up and treatment. The theme comprises three sub-themes which include: holistic support of the patients, supportive supervision of HCWs, and provision of in or out-of-service training.

Sub-Theme One: Holistic Support of the Patients

This study identified that the lack of support for the patients by governmental or non-governmental organizations has worsened the challenges for the patients. The lack of adequate support has increased the missing of appointments, treatment default, and/or early discontinuation from the treatment. The data of the participants indicated that TB patients on the follow-up and treatment should get holistic psychological, social, nutritional, and economic support to fulfill the aimed DOTS strategy effectively.

Provision of respiratory hygiene equipment such as masks and training on how to collect and dispose of respiratory excretions, encouraging the patients for follow-up, assurance and re-assurance of the patients as TB is a curable disease, training on how to control the spread of TB for their families and the community, life skill training of the family members and improving the living standards were some of the supports suggested. The following verbatim quotation obtained from a 35-year-old female medical laboratory healthcare worker who has been working in the TB patients' follow-up and treatment for 4 years in a health center well explains the above result:

Everyone in this health facility is focusing on following whether the patients are appropriately receiving their prescribed doses of the medications or not. However, TB patients' follow-up and treatment require the holistic support of the patients. If the patients don't eat well, don't keep their personal and living area hygiene, and if comorbidities are not well controlled only the provision of medication is not enough to be successful with the treatment. Focusing on the follow-up of whether the patients had taken their medications is an important part of the treatment, but it is not sufficient, when we fail to consider the other aspects of the care, the patient may default or even discontinue the treatment. Default or premature discontinuation of the treatment opens the way for developing drug-resistant TB, which is more dangerous and more difficult to treat. P6S

Sub-Theme Two: Provision of in or Out-of-Service Training for Healthcare Workers

This sub-theme is developed from the participants' data about the training needs of the healthcare work team which has to be fulfilled to get the providers effective in the TB patients' follow-up and treatment. Fair selection of the providers when training is available, training of newcomer healthcare professionals about the entire context of TB patients follow-up and treatment, ensuring the availability of updated information about TB treatment, making available up-to-date

national and international TB care guidelines, giving further education opportunities and training on infection prevention protocols were the training needs identified in the data. A 47-year-old female Nurse who was working on TB patients' follow-up and treatment for 9 years at a health center stated the above result in the following manner:

Training opportunities for healthcare workers in TB patients' follow-up and treatment are very scarce in this health facility. Whenever the training is available, the selection of participants is not transparent, objective, and fair. Some people get the training many times again and again some do not get the chance. Many of the HCWs working here have stayed for many years but they are still working with certificates or bachelor's degrees, no one is above that level. As you know things are changing very fast, HCWs need to be updated with the current knowledge through in-service and/or out-of-service training and further education, otherwise, it is very difficult to give effective and scientific treatment to the patients. P25M

Sub-Theme Three: Supportive Supervision of the Healthcare Team

This sub-theme is inductively developed from the participant responses about the recommendations of the participants on what kind and how the supervision and reporting system of the TB patients' follow-up and treatment should look like. Legal measures should be taken on the workers who do not work according to their job descriptions, a reward system for achievements, incentive mechanisms have to be established, a monitoring and evaluation system should be strengthened and identification of problems and timely intervention should be taken were the recommendations identified in the data regarding the preferred supportive supervision of healthcare care team working on the TB patients follow-up and treatment. This result is well explained by a 45-year-old female health officer who was working in the TB clinic for 3 years at the health center in the following ways:

The supervision system in our health facility is very poor. The higher officials only want the job to be done. They don't care or want to know or solve the problems we face. The system currently we work on emphasizes only the reports, even though there is no way how much the reports are true. The workers are obliged to report the way the higher officials want the report to be, because sometimes reporting the truth may be dangerous for your job. There is no appropriate motivation mechanism, some workers work extra jobs than they are expected to work, but simply some of the providers work as they wanted to do, but finally, both groups are treated equally. There is no reward system for achievements as well as there is no penalty for failure. This kind of worker handling is discouraging for those who are committed to their responsibility because there is no difference between appropriately and timely accomplishing the assigned jobs and failures. P9W

Discussion

This study attempted to explore the experience and perception of follow-up and treatment challenges of patients with TB in Southern Ethiopia from HCWs perspective. In the current study, three major themes and eleven sub-themes emerged from the data. The three major themes include the experience of HCWs with TB patients' follow-up and treatment, HCWs perceived challenges of TB patients' follow-up and treatment, and HCWs suggestions for improvement of the TB patients' follow-up and treatment. HCWs experience with TB patients' follow-up and treatment, compliance with infection prevention protocols, fear of contracting and/or spreading TB, public awareness of TB, socio-economic burdens, providers-related problems, shortage of medical supplies, unconducive physical work environment, provision of holistic support for TB patients, provision of in or out of service training, and supportive supervision were the sub-themes emerged from the data.

This study revealed that the follow-up and treatment responsibility of TB patients requires more commitment from HCWs than other jobs. In addition to thinking about the prevention of the possibility of the spread of TB to others, TB patients' follow-up and treatment responsibility require the provision of holistic care including psychological, nutritional, physical, and medical concurrently. This finding is reported similarly in other studies conducted in Accra Metropolis, Ghana, and Australia.^{33,34}

This study also demonstrated that maintaining and strictly following infection prevention protocols in TB patients' follow-up and treatment were the critical duties of the HCWs. Ensuring the compliance of the patients and HCWs with the principles of infection prevention is the ongoing responsibility of the HCWs working in the TB follow-up and

treatment. This finding is also corroborated by a qualitative synthesis of studies where infection prevention and control were identified as among the key roles of the HCWs and the WHO recommendation.^{7,35,36}

The current study identified that the HCWs working in the TB patients' follow-up and treatment are scared because TB is a highly communicable airborne disease. The workers are fearful of the risk of acquiring the disease even with the availability of basic protective equipment and applying the infection prevention protocols. Similar results were reported by studies conducted in Ethiopia, Metropolis Accra, Ghana, and Pakistan.^{18,33,37}

This study also revealed that due to poor public awareness and poor socio-economic status of TB patients, the HCWs were worried about acquiring TB themselves and spreading it to their families, vulnerable family members such as the elderly, pregnant women, and/or children, and the community. This result is supported by a study result of a Regional Hospital in Limpopo Province, South Africa, where the study reported TB as a major occupational hazard for HCWs worldwide. The HCWs who participated in the study reported that they were frightened of acquiring TB for themselves and transmitting it to their families and the community.^{38,39}

Poor attitude, lack of motivation and negligence of HCWs about the severity of TB, the frustration of unsuccessful treatment, transfers within the facility and out of the facility, termination of work, ignorance of caring responsibility, follow-up fatigue, shortage of HCWs, and not following appropriately the treatment guidelines were identified as HCWs-related problems of TB patients follow-up and treatment. A qualitative study conducted in Pakistan and Southern, Ethiopia reported a similar result where the studies revealed that the HCWs and patient's dissatisfaction, poor provider-patient relationship, non-commitment to their profession, and unconvinced with the idea of the DOTS strategy were the challenges to successful TB follow-up and treatment.^{11,18}

This study also shows that financial burdens, lack of supplies and basic equipment, an unconducive working environment, and absence or unfair selection of workers for training were the major obstacles to the provision of service fulfilling minimum standards in TB patients' follow-up and treatment. This finding is contrary to the Ethiopian government's effort to make every TB patient follow-up and treatment service free of charge, creating a favorable physical and working environment for both the patients and the HCWs and designing and implementing HCWs capacity-building schemes through continuous professional development and training.⁴⁰ Similar findings were reported in the studies done in Ethiopia and Regional Hospital in Limpopo Province, South Africa, where the studies revealed that an unconducive physical environment, lack of equipment and working resources, lack of sufficient skills and in-service training, and financial strains of patients were among the major obstacles to deliver successful TB patients follow-up and treatment service.^{19,22,38}

According to this study, some of the HCWs are not fulfilling their professional obligations and legal measures are also not being taken in the respective health facilities. Moreover, there is no mechanism for rewarding best practices and achievements. In addition, no appropriate and timely monitoring and evaluation system in TB patients' follow-up and treatment service units. This result is also reported similarly in studies conducted in Ethiopia and Regional Hospital in Limpopo Province, South Africa where the studies revealed that lack of close follow-up and support from stakeholders were cited challenges for effective TB follow-up and treatment.^{38,41}

According to this study's findings, policymakers, governmental and non-governmental organizations, and other stakeholders who are working on TB prevention and control should follow a holistic approach emphasizing the healthcare providers, health facility, and patient side challenges of TB patients' follow-up and treatment to prevent, control and ultimately eliminate TB from Ethiopia. HCWs and other stakeholders should focus on providing continuous health education regarding the danger of TB, its transmission mechanism, treatment-seeking behaviors, and treatment adherence for patients and the community. In addition, active and passive case detection and timely treatment of those found to be TB-positive should be strengthened. Wolaita Zone and other policymakers should design and implement poverty reduction schemes since the hardest hit population with TB are those economically and socially disadvantaged groups. Furthermore, further large-scale studies using mixed methods and implementation science principles are recommended.

Strength of the Study

In this study, data collection and analysis were not limited based on predetermined variables; an inductive thematic approach was followed which increased the deeper understanding and familiarization of the phenomena studied. This study also addressed TB prevention and control program challenges from HCW's perspective where little is known. In addition, the study implemented an initial purposive and subsequent theoretical sampling method, a qualitative data analysis framework for the applied research method, and a thick description of the findings which improved the transferability (applicability) of the findings in the same contexts and settings.

Limitation of the Study

Due to the qualitative nature of the study, this study has been conducted using a purposely selected small sample size which makes the generalizability of the findings to other larger populations impossible. This study explored and described the experience and perception of TB patients' follow-up and treatment challenges from a healthcare professional's perspective which might introduce information bias because the study participants played the role of healthcare provider and study participant simultaneously. During translation and transcription of the data for analysis and write-up, there might be a deviation in some too contextual expressions of the participants.

Conclusions

This study highlighted the multidimensional challenges adjoining follow-up and treatment of TB patients in Southern Ethiopia. Lack of supportive supervision and rewarding mechanism of best achievements, absence or unfair selection of HCWs for training, economic strains of patients, poor attitude and lack of motivation of HCWs, and poor public awareness of TB are the major problems compromising the successful TB follow-up and treatment in the study setting. Regular monitoring and supportive supervision of HCWs accompanied by appropriate and timely decisions are vital to ensure effective follow-up and treatment of TB patients in Ethiopia.

Abbreviations

DOTS, Directly observed Treatment Short course; HCWs, Healthcare Workers; PHCU, Primary Health Care Units; TB, Tuberculosis; WHO, World Health Organization.

Data Sharing Statement

All data generated or analyzed during this study are included in this published article and its [Supplementary Information Files](#).

Ethical Consideration

Before beginning this study, researchers obtained permission from Wolaita Sodo University Institutional Review Board with the reference number WSU 41/19/568. Permission was also obtained from the selected health facility's administrative bodies. Informed written consent was sought from each study participant. Study participants were encouraged to seek clarification or to ask questions regarding the study. Participation in the current study was entirely based on the willingness of the participants. To ensure the confidentiality of the information, participants' actual names and other personal identifiers were omitted. Code labels of participants were used to maintain the privacy, confidentiality, and anonymity of the participants. The study participants also voluntarily consented to publish their anonymized responses in scientific journals for better dissemination of the results. All the information; interview transcripts, field notes, and memos were accessed only by the researchers ([Supplementary Files Section 2](#)).

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Author Contributions

All authors equally contributed to this work beginning from the conception, study design, execution, acquisition of data, analysis, and interpretation. Authors of this work took part in the drafting, revising, and/or critically reviewing of the article and finally agreed on the journal to which the article was submitted. All authors are also reviewed and agreed on all versions of the article before submission, during revision, and the final version is accepted for publication and agreed to be accountable for all aspects of the work.

Disclosure

The authors declare that they have no competing interests.

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