Texila International Journal of Public Health
ISSN: 2520-3134
DOI: 10.21522/TIJPH.2013.12.04.Art017

Perceived Barriers towards Tuberculosis Risk Reduction Measures among Health Care Workers in Asokoro District Hospital Abuja FCT Nigeria

Titilayo Oluwatoyin Ilesanmi[1*], Chinenye Glory Mgbe[2], Emeka Kevin Mgbe[3]
[1]*Department of Public Health, Disease Control Division (Wuse DOTS Clinic) Abuja FCT Nigeria*
[2]*Department of Public Health, Esut Teaching Hospital, Enugu, Enugu - State Nigeria*
[3]*Radiation Medicine Department, University of Nigeria Teaching Hospital Enugu, Enugu - State Nigeria*

Abstract

Globally, tuberculosis (TB) remains one of the leading causes of preventable death in adults and children. Significantly, several studies revealed that Hospital-acquired infection (HAI) of TB among Health Care Workers (HCWs) and patients occurs in high, middle and low-income countries. However, with the effective practice of TB risk reduction measures (TB Infection Prevention and Control Practices – TB-IPC) among HCWs, the risk of TB transmission should be prevented and controlled. The study aimed to identify perceived barriers against the practice of TB risk reduction measures among HCWs in Asokoro District Hospital (ADH) Abuja FCT Nigeria. A qualitative study design with a purposive sampling technique was adopted and eight informants were interviewed using Key Informant Interviews with unstructured interview guides the following findings were revealed: limited supply of surgical and N95 masks, lack of space, nonexistence of isolation ward and shortage of manpower, insufficient periodic training of HCWs on TB risk reduction measures, increased workload, need for TB policy and TB designated professional, ineffective triage, lack of incentives, feeling of discomfort using N95 mask and stigmatization. The findings pointed to the need for making budgetary allocations towards TB–IPC activities along with having a plan for constant periodic training of all HCWs on TB risk reduction measures. Moreover, healthcare facilities must have TB – -IPC policy/guidelines with a designated professional who monitors and evaluates the practice of TB risk reduction measures among HCWs within the facility.

Keywords: *Health Care Workers, Hospital - Acquired Infection, TB Infection Prevention and Control Practices, Tuberculosis, TB Risk Reduction Measures, TB Transmission.*

Introduction

The burden of Tuberculosis (TB) has been a huge public health concern globally because it leads to ill health and deformities [1, 2]. Likewise, TB is a global pandemic that results in someone's death approximately every 20 seconds, it is present in every country, and it is the 13th foremost cause of death and the second most prominent infectious killer disease after COVID-19 (above HIV/AIDS) [3, 4, 5]. TB is caused by bacteria called Mycobacterium Tuberculosis (Mtb) and it mostly affects the lungs even though any part of the body could be affected [1,4, 6]. TB spreads when someone with TB of the lungs coughs, sneezes, spits, speaks or sings from person to person through the air especially when people with lung TB cough, sneeze, spit, or sing, then TB germs are expelled into the air [4, 5]. Significantly, TB is preventable and curable therefore, interrupting its transmission with TB risk reduction measures/TB infection Prevention and Control (TB – IPC) is critical to attaining worldwide

Received: 03.07.2024 ***Accepted: 08.10.2024*** ***Published on: 27.12.2024***
****Corresponding Author: titirity2004@gmail.com***

targets which aims to end the TB epidemic by 2035 [4]. WHO delivered the TB risk reduction measures/TB-IPC, it is an evidence-based guidelines that aim to interrupt TB transmission if they are properly implemented [7, 8]. The guidelines are fundamentally the main benchmark to be used in evaluating the implementation of TB risk reduction measures in any healthcare setting [6, 9]. They consist of a three-broad hierarchy of control measures which are: administrative; environmental, and respiratory protection [8, 9].

Administrative Controls

The first set and most important components of TB - -IPC strategy is the administrative controls which comprise specific interventions that are aimed at reducing TB exposure and ultimately trying to equally reduce Mtb transmission [4]. Administrative controls include triage to identify people with presumptive TB and then separate them, prompt evaluation for TB, initiation of effective TB treatment and access to tools for respiratory protection [9, 10]. The Implementation of these controls requires the development of institutional policies, protocols, education and oversight that are aimed at establishing mechanisms for reducing exposure to and transmission of TB within any healthcare facility [9, 10].

The following are the actions to be fulfilled while embarking on administrative controls:

1. Someone should be responsible for TB – IPC assign activities
2. TB transmission risk assessment of the health care facility has to be done
3. A written TB IPC plan should be developed and made freely available to all HCWs
4. All HCWs and volunteers should be trained and educated periodically on TB-IPC
5. Patients and visitors at the health care facility should equally be educated about TB-IPC
6. Appropriate signage that promotes respiratory hygiene should be displayed all over the facility
7. All coughing patients should be separated from others in waiting areas
8. Every patient coughing should have a fast track process to speed up their care and the time spent in the health care facility should be greatly reduced
9. All patients should be provided with a surgical mask and it is to be used when need arise
10. A system for baseline, periodic TB screening and evaluation of all HCWs based on their risk of TB exposure should be in practice
11. Provision of free TB treatment and TB preventive treatment (TPT) should also be available
12. Protocols for triage and airborne precautions following epidemiological principles, and application of standard criteria for isolation or separation of patients with presumptive and infectious TB should be in place
13. Proper cleaning, sterilization or disinfection of equipment (particularly equipment used during procedures such as sputum induction, bronchoscopy, anaesthesia or surgery) needs to be given priority
14. Access to rapid molecular testing for people with presumptive TB should be opened continuously
15. Effective TB treatment should commence promptly based on drug-susceptibility testing (DST) results when TB is confirmed and ensure support for people to adhere to treatment as prescribed
16. All TB data collected should be reviewed periodically by the TB - IPC committee to guarantee effective monitoring and evaluation
17. Every individual identified as having TB should be notified to the expected

stakeholders to ensure appropriate follow-up actions are taken [8, 9].

Environmental Controls

Environmental controls are the second set of TB-IPC measures and should be implemented with other TB-IPC measures [9, 10]. Environmental control aims to reduce the concentration of transmittable elements in the air through a combination of interventions: weakening, elimination, purification or decontamination [9]. WHO recommends the use of upper–room Germicidal Ultraviolent (GUV) systems and ventilation systems: natural, mechanical and recirculated air through high–efficiency particulate air (HEPA) filters [9, 10]. GUV systems aim to create a disinfection zone that is located above the people occupying a room and they kill or inactivate any airborne pathogens that pass through the zone [9, 10]. GUV system can be considered an add-on to ventilation strategies in high-risk areas, particularly where unidentified infectious patients may be present [9]. Ventilation systems include: natural, mixed-mode, mechanical ventilation and recirculated air through HEPA filters to reduce *Mtb* transmission to people in settings with a high risk of transmission [9, 10]. These systems utilize air movement to push or pull infectious particles out of a space to achieve enough air movement to dilute the amount of infectious material and facilitate its removal from a room. [9]. Natural ventilation facilitates the movement of outside air into the building through doors and windows hence, this justifies the reason for ensuring cross ventilation in a setting with high TB transmission [8, 9]. The same effect of natural ventilation can be achieved with mechanical ventilation systems used for air supply, air removal or both [9]. Also, mechanical ventilation can also be combined with air-conditioning and filtration systems or linked with natural ventilation and this is referred to as mixed-mode ventilation [9]. Pointedly, with due consideration given to capital investment, technical capacity and funding for continued maintenance, large-scale implementation of GUV systems is less feasible in low- and middle-income countries [9]. Therefore, the decision on which environmental controls to use (GUV systems or ventilation systems) depends on the TB-IPC needs in a particular setting which will consider: TB transmission level, sustainability, weather and cost-effectiveness [9]. It is important to declare that installing poorly designed environmental controls or failing to maintain them will certainly produce results contrary to those intended and may cause healthcare-associated transmission of TB [9].

Personal Respiratory Protection

Implementation of respiratory protection should be part of the TB - IPC package and it should be used within the framework of a respiratory protection program aiming at reducing TB transmission to HCWs, individuals attending healthcare facilities or other people in settings with a high risk of TB transmission [8, 9]. Inappropriate implementation of respiratory protection measures or reliance on these measures alone may create a false sense of security and increase the risk of TB transmission [9]. WHO declared that the overall protection of respirator/ N95 masks depends on the quality of training received by HCWs concerning its usage, maintenance and fit testing [9].

A comprehensive respiratory protection component of a program has the following elements that ought to be adhered to in any healthcare facility:

1. There should be a TB-IPC focal person at the health facility or congregate setting to coordinate and evaluate the implementation of the respiratory protection program
2. Funding and human resources allocation should be specified and sufficient to ensure constant availability of surgical masks and respirator/N95 masks

3. Education material and training of HCWs on appropriate application, use and disposal of N95 masks should be funded and delivered periodically
4. The procurement team should consider different sizes to fit the range of HCWs in the facility and the choice of standard one should be made
5. Written SOPs should be made available to all users and displayed at strategic locations within the healthcare setting
6. There should be a plan for respirator fit-test and fit-testing after every change of brand of N95 mask in the facility
7. General health screening of those using N95 to assess whether they can perform duties for long hours wearing it; for example those with impaired lung function: asthma or chronic obstructive pulmonary disease; may be unable to perform duties using an N95 mask; hence they should be assigned to different tasks [9].

In the health sector, research plays an essential role in discovering new facts that are relevant to generate evidence-based interventions that will be used to tackle several emerging health challenges [11]. Hence, this study's findings will become very useful in formulating new health policies or improving already existing health policies, strategies or interventions regarding TB infection prevention and control. Eventually, the global goal of eradicating TB by 2035 will become a reality.

Universally, every year it has been estimated that 10 million people develop TB and about 1.3 million deaths occur [1]. In the year 2017, 90% of TB cases were recorded among the adult population and 9% were individuals with HIV [1]. Additionally, 1.7 billion persons are projected to have Latent Tuberculosis Infection (LTBI) with a high likelihood of emerging with active tuberculosis in future [1]. Unfortunately, about one-quarter of the world's population has been estimated to be infected with Mtb [3].

Among the most vulnerable are healthcare workers (HCWs), the elderly, children, and those with HIV/AIDS [3]. Even though TB can affect anyone recent studies revealed that HCWs are at an increased risk of contracting TB compared to the general population [12]. This could be attributed to the frequent exposure to a large number of pulmonary tuberculosis (PTB) patients in healthcare settings along with the inconsistent implementation of TB risk reduction measures especially in TB high burden countries and low- and middle-income countries (LMICs) [12]. Unfortunately, most Health Care Settings within LMICs have not been fully practicing TB risk reduction measures despite the high burden of TB within the communities [12]. This has made all HCWs practicing in such places more vulnerable to the risk of TB transmission [7]. Hence, it will be very fundamental to discover the probable barriers to TB risk reduction measures implementation [13].

Significantly, recent data have shown that Asokoro District Hospital (ADH) Abuja is a high-burden area for TB this is because numerous individuals are diagnosed with TB and managed daily. Therefore, bearing in mind the possible occupational exposure from infectious TB patients, all HCWs in ADH are at higher risk of developing tuberculosis infection or disease. Additionally, TB transmission in healthcare facilities does not only pose a risk for HCWs, and their family members but also to other patients, especially HIV patients, patient caregivers or visitors. Hence, hospital-acquired TB transmission (nosocomial TB transmission) is an urgent public health problem and adopting right-based approaches can be helpful. However, there is a need for financial investments, a supportive legal framework and increased political will to support HCWs in the efforts to decrease TB transmission. Nevertheless, ending the TB epidemic by 2035 is among the health targets of the United Nations Sustainable Development Goals (UN - SDGs) [3]. Hence, all the facts stated above

regarding TB globally, within Nigeria as a country and in ADH which is a health care facility, instigated the researchers' yearning to assess the perception of some informed persons within the health care system of the possible perceived barriers towards the practice of TB risk reduction measures among HCWs in Asokoro District Hospital (ADH) Abuja FCT Nigeria.

Problem Statement

Recently, data have shown that Asokoro District Hospital (ADH) Abuja is a high-burden area for TB this is because numerous individuals are diagnosed with TB and managed daily. Therefore, bearing in mind possible occupational exposure from infectious TB patients, all HCWs in ADH are at higher risk of developing tuberculosis infection or disease. Additionally, TB transmission in healthcare facilities does not only pose a risk for HCWs, and their family members but also to other patients, especially HIV patients, patient caregivers or visitors. Hence, nosocomial TB transmission is an urgent public health problem and adopting right-based approaches can be helpful.

Research Objective

To identify perceived barriers against the practice of TB risk reduction measures among HCWs in ADH.

Research Question

What are the perceived barriers against the practice of TB risk reduction measures among HCWs in ADH?

Material and Methods

Study Area

Asokoro District Hospital (ADH) is the study area with a bed capacity of 143 and the Hospital has since been providing comprehensive healthcare services in both clinical, training and research to the FCT population and her environs [14]. ADH is located at 31, Julius Nyerere Crescent in the Asokoro District of Abuja Federal Capital Territory (FCT). It is one of the 14 hospitals managed by the Hospitals Management Board (HMB) of the Health And Human Services Secretariat (HHSS) of the Federal Capital Territory Administration [9]. The Hospital was commissioned on the 3rd of December 2001 by the then President of the Federal Republic of Nigeria, Chief Olusegun Obasanjo [14].

ADH has a bed capacity of 143 and has been providing comprehensive health care services in clinical areas, training and research to the FCT population and her environs [14]. Administratively the principal officers include: the Medical Director (MD), the head of Clinical Services, the Hospital Secretary and heads of units: administrative and technical heads in units [14]. ADH has twenty-four units and thirteen outpatient departments [14].

Research Design

This is a qualitative study design; Key Informant Interview (KII) was used with the aid of an unstructured in-depth interview guide to conduct one–on–one interviews with selected IPC stakeholders within the healthcare facility. The KII focused on most of the evidence-informed recommendations on TB infection prevention and control to gain a deeper understanding of the practice and implementation of TB risk reduction measures within the health care facility.

Population and Sample

Nine selected stakeholders on Infection Prevention and Control (IPC) were selected but one declined to participate; eight were interviewed using Key Informant Interview (KII). Data collection was done with an unstructured interview guide.

Below is the list of units represented by informants that were interviewed:

1. Clinical Services
2. Nursing
3. DOTS TB Clinic

4. Gene – X - pert TB Laboratory
5. Representative of the IPC Committee
6. Accident and Emergency Nursing Unit
7. General outpatient Nursing Unit
8. Surgical outpatient Nursing Unit

Sample Size Determination

The sample size was determined immediately when data saturation occurred and that justified the small sample size.

Research Instruments - Instruments for Data Collection

Key Informant Interview (KII) with an unstructured interview guide was used to collect data.

Data Collection

In this study, the data was collected in August 2023 by a trained research assistant using key informant interview guides for all the informants (N =8). Before the commencement of the study details of the study were conveyed to each informant and their consent to participate was obtained. Thereafter, a preplanned appointment for the interview (date, time and venue) was booked with each informant and the interview duration ranged from 10 to 25 minutes (average 15 minutes). The interview helped to gain a deeper understanding of the practice and implementation of TB risk reduction measures among HCWs in ADH. Data saturation was reached at the 8^{th} informant, even though the 9^{th} informant declined to participate. Responses from the interview were recorded with the permission of each informant.

Data Analysis

The researcher listened to the audio recordings of all the interviews severally. Subsequently, the interview was transcribed to text and thematic synthesis was done where themes were generated. The analysis emphasized the interpretation, description and writing of the actual participant's responses.

Rigour

The trustworthiness of the entire study was assessed using these criteria: credibility, transferability, dependability and confirmability of the study [15]. Credibility was achieved through having a whole month dedicated to the collection of the data with the help of a well-informed research assistant. Furthermore, ensuring that the interview was done by engaging each informant individually at an agreed date, time and venue. Transferability was achieved by using purposive sampling, having a comprehensive description of the data collection procedure and including some illustrative direct quotes of informants. An audit trail was reserved as proof of dependability which will be available on enquiry. The confirmability of this study was achieved using the entire study appraisal which was done by my supervisor who is an independent expert researcher.

Ethical Consideration

Ethical approval was obtained from the Medical Ethic Committee Asokoro District Hospital Abuja FCT Nigeria. Additionally, informed consent was obtained verbally and documented from each informant before the commencement of the interview.

Results

The following barriers emerged: insufficient supply of N95 masks and surgical masks for HCWs and Patients, Lack of space, Shortage of manpower and increased workload, lack of Isolation ward for TB cases, limited periodic training of HCWs on TB risk reduction measures, need for TB policy and designated professional for monitory and evaluation of TB risk reduction measures practices, lack of incentives, Feeling of discomfort while using N95 mask, poor triage and stigmatization.

Insufficient Supply of N95 Mask and Surgical Mask for HCWs and Patients

Nearly all participants conveyed the need for continuous provision of surgical and N95 masks for both patients and HCWs respectively. Most reported that the supply was low, and some complained that the N95 mask had never been supplied at all.

Informant's responses:

> *What we have is just a mask, the N95 mask is not available we don't have it. Maybe when it comes we have it in shortage.*
>
> *We do see Doctors with N95 masks but we the Nurses do not have access to it. The one I have was been given to me by a private laboratory.*
>
> *Lack of availability of face masks for both HCWs and patient*
>
> *Constant Availability of Masks is the major thing because it may not be all the time you will have masks whether disposable/surgical or N95 masks. N95 mask is even scarce*
>
> *The question on the supply of N95mask should be directed to the Hospital Management of this Hospital (DOTs Clinic) but Public Health does supply us here with a time*
> *N95 mask is limited and costly*
>
> *Surgical masks are relatively available and not as scarce as N95 masks. Even though giving means the hospital has to make provisions, it just the resources and it is challenging for the hospital to give to everybody which means a Nurse has to give to anybody coughing*
>
> *We have N95 masks in the DOT Clinic and TB Lab. But I don't know about the availability of it in other clinics*

Lack of Space

Most Informants truthfully expressed lack of space as a huge barrier to effective practice of TB risk reduction measures within the health care facility.

Informant's responses:

> *There is space constraint in ADH and I also know that it is doable where one consulting room can be used for any patient who is coughing and also separates their seat from others.*
>
> *In GOPD, it is a tight space and anybody who is coughing there might infect other people, it is just for the Nurses to go out of their way to ensure that those who are coughing are seen quickly and moved out of that place.*
>
> *Availability of space or if the management can create a TB hospital just like a psychiatric hospital was created so that all TB patient that requires admission can be referred to the hospital.*
>
> *Also, we have space restraints and it is a little bit difficult to even triage because the Hospital has already been built and from the planning TB was not captured. Maybe we should create a special Clinic for patients who are coughing or dedicate one of the consulting rooms only for those who are coughing so that anyone who is coughing can be separated from others. It is not every cough that is TB. You may be exposing somebody who is having possibly pneumonia, bronchitis and any other upper respiratory tract infections to somebody who has TB and the thing you've succeeded in doing is that you've removed them, so you've reduced the number of people that would have come in contact with the person that has TB.*

That will be very good if we can have a TB session but what we do here is to put them in the cubicle and screen them because of lack of space.

Shortage of Manpower and Increased Workload

Shortage of manpower and heavy workload have been stated as foremost barriers against effective practice of TB risk reduction measures by some informants.

Informant's responses:

Ideally, ADH should have a professional in charge of TB–-IPC, but we don't have the manpower and spaces are the major challenge.

The number one barrier is a shortage of staff and apart from that, I think the hospital is doing a lot because they supply us with things to prevent us from infectious diseases and also lack of space in the hospital in other to have an isolation ward.

The shortage of staff and the workload is much hence this does not favour the full practice of TB risk reduction measures.

In my view, I think a whole lot more can be done it is just that due to the Shortage of Manpower we cannot do as much as we can.

Lack of Isolation Ward for TB Cases

Some participants responded that there is no isolation unit where TB patients could be admitted if there is reason for that. Unfortunately, such cases are admitted to the same ward as others with their bed placed at the end of the ward and screened.

Informant's responses:

Well, having an isolation ward for TB patients will be a good thing but then it is a bit difficult in this particular place because it is a small place that is really tight and there is little room for expansion but it is an ideal thing.

An isolation ward is highly needed so that any TB case that requires admission can be treated.

It is highly needed because a patient cannot be admitted on account of stomach ache in the ward and next to that patient is a TB patient. There is a tendency that after treatment such a patient can go home having TB. Therefore, there is a need for isolation centres in all hospitals, so that once a patient is suspected of having TB can be admitted there and all the patients can wear face masks.

Once a patient is diagnosed with TB and needs admission. We admit such patients with other patients because there is no isolation ward. After review, they will transfer the patient to the ward to continue medication and sometimes we refer such patients out to pulmonology in Kubwa General Hospital or National Hospital where they have an isolation unit.

The problem is that most time when they want to build a hospital, I don't think they include HCWs in planning how to build, because if there is something like that I think in every hospital there should be an isolation centre for infection disease but they don't have anything like that here. Most of our patients they admitted together with the other patients in the ward, maybe while on admission they will send them for a TB test and find out that the person has TB. They will ask us to initiate treatment even when the patient is still in the ward with other patients. Even in all the general hospitals, I've not seen a place that is for TB patients, the only place I know

here in Nigeria in Abakaliki Mile 4 Hospital it is for TB and Leprosy patients only.

Limited Periodic Training of Health Care Workers on TB Risk Reduction Measures

Some participants indicated that HCWs have not been having constant periodic training on TB risk reduction measures which is crucial to its successful practice.

Informant's responses:

> *HCWs need to be reminded through training from time to time that TB is there to take precautions and then for coughing patients if they have to examine them they need to turn their faces to one side and as much as possible those that are coughing should be seen earlier in the clinic so that they do not stay too long with the other people and cause infection.*
>
> *Continuous screening, workshops and educating the HCWs and patients on TB risk reduction measures is a necessity.*
>
> *Education and Sanitation are the major things that should be considered*
>
> *Periodically, people need to remember that TB is there and be reminded to take precautions.*
>
> *More awareness that TB is around us and as HCWs, we need to live healthy. The truth is that if you are HCWs you are exposed and if you are working in the TB Lab. and DOT Clinic you are further exposed, so you can have latent TB. So in the IPC, we should start screening for latent TB because what we know about TB is that if you are not coughing, you don't have TB and that is not true. I could have TB, not coughing and symptomatic. It may be latent (hidden). So we should move away from preventing and managing symptomatic TB to also managing and preventing un-symptomatic*

Need for TB Policy and Designated Professional for Monitory and Evaluation of TB Risk Reduction Measures Practices within ADH

Most participants agreed to the fact that there should be a TB policy with a TB-designated professional to monitor and evaluate every TB risk reduction measure practice among all HCWs in ADH. Nevertheless, each one who agreed complained seriously about the extreme shortage of manpower as a main challenge that would hinder such a move.

Informant's responses:

> *Ideally yes there is a need for TB-designated professionals but we don't have the manpower and spaces are the major challenge.*
>
> *It is good to have a designated TB professional because it helps to curtail the spread of TB so that immediately they notice a patient coughing in any of the clinics such patient can be moved to the appropriate place for diagnosis.*
>
> *Yes, I think we should have a TB designation professional but the problem is that the ward managers are doing a lot of work. The ward managers are those in charge but if we say we should have a specific Nurse for TB infection, prevention and control you know we are short of staff. The shortage of staff is a problem in our department.*

Lack of Incentives

An informant expressed a lack of incentive as a source of barrier to TB risk reduction measures practice within the health care facility.

> *Public Health has never come to give us incentives in my unit and*

unfortunately, it is a great issue against TB risk reduction measures practice.

The Feeling of Discomfort While Using N95 Mask

An informant expressed that the discomfort experienced while using an N95 mask could be a source of barrier to its constant usage when it is needed.

> *The N95 mark is very uncomfortable to wear and even if it is available most HCWs are not going to wear it because it is difficult to breathe for TB minors I don't think it requires an N95 mask that weighs too high. I don't think is necessary to make N95 masks available for TB prevention. A simple face surgical mask is enough for TB prevention.*

Poor Triage

Some informants declared that effective triage is not been the practice in the healthcare facility. The questions on triage and responses are:

"What would you rate the triage in our patients' clinic (on a scale of 1 -10); 1 is very bad and 10 is very good

> *I don't think enough has been done about practising TB–IPC in ADH because our entire patient lumps together in the waiting area and not doing detailed triaging for patients. Most often patients try to hide their ailment, somebody may be coughing and when the cough is about to come the person will just suppress it.*
>
> *Well, I know that behind the MOPD there is a tent where people that are thought to have TB and all that is supposed to wait but is not been carried out as it needs to be and that's the ideal thing; it is 6*
>
> *There is no triaging in any Outpatient Clinic in ADH.*
>
> *The rating is still 1; it is 3; so very poor*

Stigmatization

Some informants expressed fear of stigmatization if TB risk reduction measures are effectively carried out within the health care facility.

> *Lack of space: there is space constraint in ADH and I also know that it is doable where one consulting room can be used for any patient who is coughing and also separates their seat from others. The majority of the time you solve one problem and create another, so the stigma is bound to occur. Immediately, you start separating some people because other people start looking at them in a way, so the solution to that problem that will arise due to stigma I don't have the answer to it.*

Discussion

Globally, TB has been an important cause of death from a single infectious microorganism [16]. In recent times there have been increased efforts to end TB but several fundamental gaps prevent it from being accomplished especially in resource-constrained settings and settings with a high burden of the disease [16]. In every healthcare facility especially those with a high risk of TB exposure by HCWs; there should be a designated professional along with TB-IPC policies and procedures which should be developed, reviewed periodically (annually, if possible), and evaluated for effectiveness to define the necessary interventions that will minimize the risk for transmission of TB (Center for Diseases Control [17]. The evaluation could include: unanticipated or incorrectly managed TB exposures in the facility, infections of healthcare personnel or patients because of exposures in the facility, operational problems and other factors as determined by the person or group with responsibility for TB infection control [17].

Significantly, this study has revealed diverse gaps stated as barriers against effective practice of TB risk reduction measures among HCWs in a health care facility. Interestingly, WHO TB – IPC guidelines (TB risk reduction measures) were developed by the WHO Department of Service Delivery and Safety and were adopted in 2019 to integrate 2016 evidence-based, consensus-based recommendations and good practice statements to end TB globally [9]. The guidelines emphasized the importance of implementing TB–IPC measures systematically and objectively with priority given to the hierarchy of TB-IPC controls: administrative, environmental and personal Protection [9]. Therefore, no TB–IPC intervention should be implemented individually rather it should be considered as an integrated package with a focus on preventing TB transmission [9].

In this study the informants revealed several perceived barriers: lack of space, Shortage of manpower and heavy workload, lack of periodic training of HCWs on TB risk reduction measures, nonexistence of Isolation ward for TB cases, need for TB policy and designated professional for monitory and evaluation of TB risk reduction measures practices, inadequate supply of N95 mask and surgical mask for HCWs and Patients, ineffective triage, lack of incentives, feeling of discomfort due to the use of N95 mask and stigmatization.

The point of reference of this discussion will be rooted in WHO-prescribed TB risk reduction measures which are the globally available evidence-based technical guidelines that should be adhered to in any health care facility especially with a high risk of TB transmission if TB transmission is to be controlled and prevented.

Insufficient Supply of N95 Masks and Surgical Masks

Usage of N95 masks and surgical masks are classified as respiratory protectors as stated in WHO TB – IPC guidelines. WHO TB – IPC standard states that all HCWs working in a TB high-burden or risky place should use N95 masks and all patients coughing in any of the clinics should be offered surgical masks [9]. Most informants stated that there is grossly insufficient or no supply of N95 masks most times but surgical masks are sometimes available. This is consistent with the studies conducted in Mozambique by [18, 19]. Insufficient or total lack of N95 and surgical masks is against effective practice of TB risk reduction measures [20]. This is because all HCWs working in facilities with high TB burden without the usage of N95 masks are automatically exposed to the risk of TB transmission [19]. Unfortunately, the risk of exposure would gradually spread to others: HCWs, patients, family and visitors and eventually the entire community. Hence, it is compulsory that N95 masks and surgical masks should be made freely available for HCWs usage when the need arises.

Lack of Space

Having effective triage and isolation units is part of the administrative controls to be fulfilled in a high TB burden facility with TB risk of transmission [9]. Unfortunately, lack of space will prevent a plan of expansion that would have created sufficient space for effective triage or having an isolation unit for TB presumptive/cases. Lack of space was one of the main barriers identified by most informants and this aligns with some studies that were conducted in Malawi among HCWs and a systematic review carried out by [19, 21]. Having effective cross-natural ventilation is one of the important environmental controls of TB–IPC. [9]. By implication, lack of space would hinder effective natural cross ventilation which is an ideal one for any healthcare facility situated in a resource-limited setting [22]. It is ideal because it does not require huge capital investment, uninterrupted availability of electricity or extremely skilled staff for maintenance of complex mechanical

ventilation systems which would have been another big burden for such a setting. [16].

Shortage of Manpower and Increased Workload

Shortage of manpower leads to increased workload which later could result in staff burnout [23]. Several challenges were encountered by HCWs while implementing TB-IPC in Mozambique and these include: increased workload, lack of local TB policy to follow, no N95 mask for HCWs and stigmatization against patients as a result of the usage of N95 masks. Some informants complained of a shortage of manpower and increased workload as major barriers against the full implementation of TB risk reduction measures [17, 24]. By implication, having HCWs with burnout creates barriers around patient safety, positive outcomes, efficiency and HCW satisfaction which are major tools to the successful practice of TB–IPC [25]. Hence, adequate provision should be made to create an enabling environment in terms of having the required ratio of HCWs to a specified number of patients, especially in a TB high-burden healthcare facility to achieve full implementation of TB risk reduction measures practices.

Lack of Isolation Ward

Having an isolation unit is equally part of the administrative controls of WHO TB – IPC [9]. An informant disclosed that TB cases are usually admitted in the same ward as other cases [26]. This is a crucial gap that needs urgent attention, therefore, a healthcare facility with a high TB burden needs to have an isolation ward to reduce the risk of TB transmission to HCWs or other persons attending healthcare facilities. To ensure satisfactory implementation of isolation, it is fundamental that the healthcare facility considers the rights and freedoms of the TB patient [9]. It has been declared that isolating TB presumptive cases is seen as a form of isolation and discrimination [18]. Therefore, to rule out negative feelings around isolation and discrimination while practising TB risk reduction measures; implementation of available patient care and support measures should be carried out along with adequate consultation with TB patients on the need for isolation so that it will be carried out in medically appropriate and acceptable setting/manner [9].

Limited Periodic Training of HCWs

Education, training and reminders of HCWs are parts of key multimodal strategies of WHO TB – IPC guidelines and it is also classified as one of the administrative controls [9]. Limited training of HCWs has been identified as a major barrier by some of the informants [27]. The discovery in the systematic review conducted also showed that lack of staff training has been a very big obstacle to TB–IPC practice [18]. Having periodic training for HCWs on TB risk reduction measures will surely build and improve HCWs' capacities to ensure full implementation of TB risk reduction measures practices [9]. Hence, this should be given maximum priority since it has been expressed as one of the barriers to TB risk reduction measures practices among HCWs. For example, N95 masks are effective only if HCWs know how to use or discard them, this further reveals the importance of training of HCWs periodically. Moreover, it is training that will empower any HCWs to also know that N95 masks should not be used by HCWs inappropriately but should be used along with other TB risk reduction measures, otherwise, it will give a false sense of security which increases the risk of TB transmission within a health care facility [9].

Need for TB Policy and Designated Professional

Having TB – IPC policy and designated profession for TB–IPC is one of the administrative controls recommended by WHO

[9]. For that reason, not having TB – TB-IPC policy and a designated profession for TB–IPC in the health care facility as stated by an informant would create a gap in the practice of TB risk reduction measures. Another study also revealed that not having a visible TB–IPC policy was a barrier in the study conducted among HCWs in Malawi [21]. To achieve the desired goal regarding TB risk reduction measures practice demands having a TB policy as a means of quality control [28]. Likewise, having a designated professional for TB–IPC who will be responsible for driving appropriate change, monitoring, receiving feedback and documenting all TB risk reduction measures practices as required is an essential standard that should not be compromised.

Ineffective Triage

Triage is one of the indispensable administrative controls that aim at identifying people with presumptive TB and it entails: separating all coughing patients from others, instigating prompt evaluation for TB, initiating effective TB treatment, and ensuring access to tools for respiratory protection [9]. In this study, informants were asked to rate triage effectiveness on a scale of 1 -10 (1 is very bad and 10 is very good). Significantly, some rated it as low as: 1, 3, 6, 7. Triage has not been effectively carried out, hence, the risk of TB transmission is inevitable. Poor training of HCWs on TB–IPC was found as one of the main barriers to its implementation. Achieving effective triage requires full embrace of the entire WHO TB – IPC guidelines to become well informed on all the requirements which consist of: having a health care facility that has been recently assessed for the risk of TB transmission, having a well informed HCWs that have been properly trained on TB risk reduction measures and well-educated patients on cough etiquette, knowing the importance of using surgical mask and separation of patient when need, having a health care facility with sufficient space for proper separation of coughing patient into a totally different waiting area where air space would not be shared with other patients, ensuring efficient and prompt medical consultation for TB presumptive cases to reduce time spent in the hospital, providing well equipped laboratory that can diagnose TB promptly, making provision for a well-stocked up TB clinic with all required drugs to commence TB treatment, having constant supply of N95 masks and surgical masks and nominating a resourceful professional on TB – IPC dedicated to monitor, audit and ensuring provision of feedback regarding all TB – IPC activities [9,13, 29].In the long run, it is advisable that all these requirements of standards to ensure effective triage should be in place before any facility could claim to be having triage.

Stigmatization

WHO, 2023 declared openly that Protocols for triage and airborne precautions following epidemiological principles, and application of standard criteria for isolation or separation of patients with presumptive and infectious TB should be in place to avoid stigmatization [9]. One of the informants expressed fear of stigma against TB patients if TB–IPC measures are to be fully implemented. A study conducted in Mozambique among HCWs disclosed that TB presumptive patients associated discrimination and stigmatization with the wearing of N95 masks by HCWs [18]. Full implementation of TB risk reduction measures in any setting with a high risk of TB transmission is a necessity to curb the transmission. Therefore, all HCWs should be educated and trained on protocols for triage, airborne precautions and standard criteria for isolation of TB patients and stigma reduction interventions [9, 30].

Likewise, every patient in a TB high-burden facility should be well informed on all the TB–IPC measures to remove bias and fear of stigmatization [9]. Ultimately, giving timely and intense commitment to all these standards will surely dispel any form of stigmatization

while implementing TB risk reduction measures in any healthcare facility.

Lack of Incentives

Incentives in IPC mean that moral or material rewards were adopted to encourage HCWs to achieve set goals and also to produce high-quality performance effectively [19, 31]. Incentives are seen as sources of motivation to enhance effectiveness and efficiency which could be informed of: ensuring high payment of HCWs, provision of suitable workload and involvement of HCWs in TB – IPC policy development to give a sense of ownership [18]. In this study, lack of incentive was expressed by some informants during the interview and this is in agreement with the discoveries made in Mozambique revealed that HCWs encountered low pay, lack of career development, inadequate working conditions, increased workload and not having ownership of TB – IPC policy [18]. Therefore, effort should be made to create some form of incentives to motivate HCWs who are facing the risk of TB transmission to be diligent while implementing TB risk reduction measures.

The Feeling of Discomfort While Using N95 Mask

The usage of N95 masks **as** a means of personal respiratory protection should be done as part of the TB-IPC package [9]. For that reason, it should be used within the framework of a respiratory protection program aiming at reducing TB transmission to health workers, individuals attending healthcare facilities or other people in settings with a high risk of transmission [9]. Significantly, WHO declared that to achieve maximum benefits of using N95 masks depends on the quality of training received by HCWs concerning its usage, maintenance and fit testing [9]. An informant expressed that some HCWs find it difficult to wear an N95 mask for a long time because of the discomfort it creates and due to this reason some do not use an N95 mask which is highly recommended. A similar discovery of difficulty while using N95 masks by HCWs was made in a systematic review of cross-sectional hospital-based studies by [32, 33]. By implication, the usage of N95 masks by HCWs requires that a respirator fit test should be carried out to certify the fitness of each HCWS and this could have ruled out most challenges that arise as a result of its usage [9]. The respirator program includes: the selection of suitable types of respirators, formation of a pool of respirator-fit-testers, procurement of qualitative respirator fit test kits, adoption of a medical evaluation of fit test form, fit-test-certificate and fit-test register, conduction of qualitative fit testing of staff attending to TB patients, procurement of selected N95 masks or FFP2 respirators. Development of a Standard Operating Procedure (SOP) on the use and storage of respirators, distribution of the respirators, preparation of information education and communication (IEC) materials (poster, pamphlets and signage) and evaluation of the program after one year [9]. As a result, every necessary recommendation concerning the safe usage of N95 masks should be carried out before subjecting any HCWs to their usage.

Conclusion

Globally, occupational TB is a multidimensional problem in most healthcare facilities, especially in resource-constrained settings and settings with a high burden of the disease and that is why WHO TB – IPC guidelines were developed to end TB globally [8,9,34]. Moreover, emphasis is stressed on the fact that no TB – IPC intervention should be implemented individually rather it should be considered as an integrated package [8, 9]. This study has revealed varied gaps stated as perceived barriers against the effective practice of TB risk reduction measures among HCWs in ADH. All these expressed barriers have been judiciously deliberated along with their notable influences on TB risk reduction measures developed by WHO as the point of reference

since it is the globally available foremost evidence-based technical guideline. Conclusively, there is a need for the management of the hospital to make budgetary allocations towards TB–IPC activities along with having a plan for constant periodic training of all HCWs on TB risk reduction measures and the need to have TB – ---IPC policy/guidelines with a designated professional to monitor and evaluate the practice of TB risk reduction measures among HCWs within the health care facility.

Limitation of the Study

A small sample size was used. However, data saturation was reached and this suggests that the sample size was sufficient. Likewise, only one healthcare facility was utilized; in the future other district healthcare facilities could be involved to ensure the generalization of findings.

Recommendations

Based on the findings in this study, the following are therefore recommended:

1. Make budgetary allocation for TB – IPC
2. Constant periodic training of all HCWs on TB–IPC measures should be encouraged and carried out
3. Develop TB – IPC policy
4. Engage a designated professional to monitor and evaluate TB – IPC activities in the health care facility
5. Further research should be done on TB–IPC in healthcare settings with multiple data collections from other district healthcare facilities for generalization

Conflict of Interest

The author declared that there is no conflict of interest related to this paper.

Acknowledgements

I appreciate my supervisor Dr. Chineye Glory Mgbe for her vast guidance and backing to complete this study. I would equally say a big thank to my husband Dr. Charles Olajide Ilesanmi for his unimpeded and inestimable support. Also, my gratitude goes to Mrs. Abolade, Mr. Isaac and Mr. Moses for their great assistance during the collection, transcribing and thematic identification process. Likewise, I would like to thank all the informants who shared their ideas and experiences.

References

[1]. Shadreck, M & Stapley, S; 2020, An exploration of health workers risks of contracting tuberculosis in the workplace: a qualitative study. British Medical Journal, 20 (1), 1037, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7664041/

[2]. Masuku, S; Olorunju, S; Mooa, RS; 2023, Association of knowledge and practice of Tuberculosis infection prevention and control policies among health care personnel at a regional hospital, in Gauteng province of South Africa. International Journal of African Nursing Sciences, 19, 100588, https://www.sciencedirect.com/science/article/pii/S221413912300063X

[3]. The TB Alliance; 2022, TB is a Pandemic, https://www.tballiance.org/why-new-tb-drugs/global-pandemic

[4]. World Health Organization; 2023a, Tuberculosis, https://www.who.int/news-room/fact-sheets/detail/tuberculosis

[5]. Tiruneh, MG; Anagaw, TF & Fenta, ET; 2023, Tuberculosis infection control practice among healthcare workers in Ethiopia: a protocol for systematic review and meta-analysis. British Medical Journal, 13 (11), e073634, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10685950/

[6]. Baral, MA & Koirala, S; 2022, Knowledge and Practice on Prevention and Control of Tuberculosis among Nurses Working in a Regional Hospital

Nepal. Frontiers in Medicine, 8, 788833, https://www.frontiersin.org/journals/medicine/articles/10.3389/fmed.2021.788833/full

[7]. Paleckyte, A., Dissanayake, O., Mpagama, S; 2021, Reducing the risk of tuberculosis transmission for HCWs in high incidence settings. Antimicrobial Resistance and Infection Control, 10, 106, https://aricjournal.biomedcentral.com/articles/10.1186/s13756-021-00975-y#citeas

[8]. WHO; 2019a, WHO guidelines on tuberculosis infection prevention and control 2019 update, https://iris.who.int/bitstream/handle/10665/311259/9789241550512-eng.pdf

[9]. World Health Organization; 2023b, Module 1: Infection Prevention and Control https://tbksp.org/en/node/2582

[10]. WHO; 2019b, WHO guidelines on tuberculosis infection prevention and control: 2019 update Executive Summary, https://www.ncbi.nlm.nih.gov/books/NBK539299/

[11]. NHS Northern Care Alliance; 2020, Research and Innovation, https://www.northerncarealliance.nhs.uk/research-education/research-innovation

[12]. Main, S; Triasih, R; Greig, J; Hidayat, A; Brilliandi, I,B; Khodijah, S; Chan, G; Wilks, N; Parry, A, E; Nababan, B; Cros, P & Dwihardiani, B; 2023, The prevalence and risk factors for tuberculosis among healthcare workers in Yogyakarta, Indonesia. PLOS ONE, 18(5), e0279215, https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0279215

[13]. Adu,PA; Yassi, A; Ehrlich,R; 2020, Perceived Health System Barriers to Tuberculosis Control among Health Workers in South Africa. Ann Glob Health, 86 (1), 15, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7019201/

[14]. Health and Human Services Secretariat; 2019, Profile on Asokoro District Hospital Abuja FCT, https://fcthhss.abj.gov.ng/site/

[15]. National University; 2024, Applied Doctoral Center, https://resources.nu.edu/c.php?g=1013606&p=8394398

[16]. World Health Organization; 2024, 2.2 TB Mortality, https://www.who.int/teams/global-tuberculosis-programme/tb-reports/global-tuberculosis-report-2021/disease-burden/mortality

[17]. Center for Diseases Control; 2023, Tuberculosis Infection Control, https://www.cdc.gov/tb-healthcare-settings/hcp/infection-control/index.html

[18]. Brouwer, M; Cohelho, E; Mosse, C; 2014, Healthcare Workers' Challenges in the Implementation of Tuberculosis Infection Prevention and Control Measures in Mozambique. PLOS ONE, 9 (12), e114364, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4266607/pdf/pone.0114364.pdf

[19]. Dorward, J; Roberts, N & Butler, C; 2022, Health worker experiences of implementing TB infection prevention and control: A qualitative evidence synthesis to inform implementation recommendations. PLOS Global Public Health, 2 (7), e0000292, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10021216/pdf/pgph.0000292.pdf

[20]. Islam, MS; Chughtai, AA; Banu, S; 2021, Context matters: Examining the factors impacting the implementation of tuberculosis infection prevention and control guidelines in health settings in seven high tuberculosis burden countries. Journal of Infection and Public Health, 14 (5), 588 – 597, https://www.sciencedirect.com/science/article/pii/S1876034121000289

[21]. Tu, R; Elling, H; Behnke, N; TSeka, JM; Kafanikhale, H; Mofolo, I et al; 2022, A qualitative study of barriers and facilitators to adequate environmental health conditions and infection control for healthcare workers in Malawi. H_2Open Journal, 5 (1), 11 – 22, https://iwaponline.com/h2open/article/5/1/11/86224/A-qualitative-study-of-barriers-and-facilitators

[22]. Kielmann, K; Karat, AS; Zwama, G; 2020, Tuberculosis infection prevention and control: why we need a whole systems approach. Infectious Diseases of Poverty, 9 (56), https://idpjournal.biomedcentral.com/articles/10.1186/s40249-020-00667-6#citeas

[23]. Ashipala, DO & Nghole, TM; 2022, Factors contributing to burnout among nurses at a district hospital in Namibia: A qualitative perspective of nurses. Journal of Nursing Management, 30 (7), 2982 – 2991, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10083902/

[24]. Kluwer, W; 2023, Three key challenges facing infection prevention and control programs, https://www.wolterskluwer.com/en/expert-insights/3-key-challenges-facing-infection-prevention-and-control-programs

[25]. Tshitangano T, G; 2014, The practices of isolating tuberculosis infectious patients at Hospitals of Vhembe district. African Journal of Primary Health Care & Family Medicine, 6 (1), 555, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4502866/pdf/PHCFM-6-555.pdf

[26]. International Council of Nurses; no date, TB Guidelines for Nurses in the Care and Control of Tuberculosis and Multi-drug Resistant Tuberculosis 3rd Edition, https://www.icn.ch/sites/default/files/inline-files/tb_mdrtb_guideline.pdf

[27]. Priyadarshini, P, Jeevanandan, G, Govindaraju, L, Subramanian, E. M. G., 2020, Clinical evaluation of instrumentation time and quality of obturation using paediatric hand and rotary file systems with conventional hand K-files for pulpectomy in primary mandibular molars: a double-blinded randomized controlled trial. *Eur Arch Paediatr Dent.* 21: 693–701. doi:10.1007/s40368-020-00518-w

[28]. Marme, G; Kuzama, J; Zimmerman, P; 2023, Tuberculosis infection prevention and control in rural Papua New Guinea: an evaluation using the infection prevention and control assessment framework. Antimicrobial Resistance & Infection Control, 12 (31), 01237 – 9, https://aricjournal.biomedcentral.com/articles/10.1186/s13756-023-01237-9#citeas

[29]. Adebimpe, WA; Folayan, W; Shittu, AA; 2019, Infection Prevention and Control Practices among health care workers in TB clinics in Ondo state Nigeria. Libyan Journal of Medical Sciences, 3 (2), 51 – 6, https://www.researchgate.net/publication/333974652

[30]. Stop TB Partnership; 2019, TB Stigma Assessment Tool. https://www.stoptb.org/tb-stigma/tb-stigma-assessment-tool

[31]. Wang L, Zhang D, Liu J, Tang Y, Zhou Q, Lai X et al; 2023, The mediating role of incentives in association between leadership attention and self-perceived continuous improvement in infection prevention and control among medical staff: A cross sectional Survey. Frontiers in Public Health, 11, 984847, https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2023.984847/full

[32]. Zwama , G; Diaconu, K; Voce, AS; 2021, Health system influences on the implementation of tuberculosis infection prevention and control at health facilities in low-income and middle-income countries: a scoping review. BMJ Global Health, 6 (5), e004735, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8118012/pdf/bmjgh-2020-004735.pdf

[33]. Kurmar, P, Nath, K, Prasad, A, Tiwan, LK, Chowdhry, BK, Sinha, AK et al; 2023, Effects of the Use of N95 Masks on the Vital Signs of Healthy Healthcare Workers during the COVID-19 Pandemic: A Hospital-Based Cross-Sectional Study. Cureus, 15 (16), e40622, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10355089/pdf/cureus-0015-00000040622.pdf

[34]. Ehrilich, R; Spiegel, JM; Adu, P; 2020, Current Guidelines for Protecting Health Workers from Occupational Tuberculosis Are Necessary, but Not Sufficient: Towards a Comprehensive Occupational Health Approach. International Journal of Environmental Research and Public Health, 17 (11) 3957, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7313452/pdf/ijerph-17-03957.pdf