Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol. 5 No. 9 (2024): September 2024 Issue
https://doi.org/10.51168/sjhrafrica.v5i9.1298
Original Article

UPTAKE AND UTILISATION OF NATIONAL GUIDELINES FOR TUBERCULOSIS INFECTION, PREVENTION AND CONTROL AMONG NURSES WORKING IN RESOURCE-LIMITED SETTINGS; A CROSS-SECTIONAL STUDY IN UGANDA.

Ivan Byanga * *Samuel Kabwigu*
Clarke International University

ABSTRACT

Background
This study assessed the uptake and utilization of the "Uganda National Guidelines for TB IPC" among nurses working within health facilities in Bundibugyo District, Western Uganda. With a focus on knowledge, practices, and perceived barriers, based on a customized health belief model.

Methods
Focused on nurses, the research employed a cross-sectional design using qualitative and quantitative methods with a census technique involving 135 participants across 11 healthcare institutions, that manage TB cases within Bundibugyo district. Quantitative data was captured utilizing self-administered questionnaires and qualitative data by 11 KI and observational checklists, analyzed, and then presented in tables and narrations.

Key findings
The majority were enrolled nurses (42.9%), and gaps in nurses' recognition of the TB guidelines were attributed to limited training sessions. While nurses exhibited high knowledge of basic TB aspects, their awareness of the policy of handling TB clients in their facilities was low at 47.4% and only 35.5% of them had participated in a TB-related training or workshop during the past 2 years, weaknesses were further noted in the screening of patient beds, patient isolation units, and nose-covering practices. Perceived barriers included TB stigma, false beliefs, infrastructure inadequacies, and resources like PPE shortages.

Conclusion
There was insufficient uptake and utilization of the Guidelines within medical facilities in Bundibugyo. This is linked to a few trainings and acquaintance of the guidelines among nurses which have created knowledge gaps and other barriers: resources, stigma, and false beliefs within the surrounding communities.

Recommendations
Enhancing training programs, promoting awareness within health facilities, improving infrastructure, implementing monitoring and evaluation systems, allocating more resources, and addressing weaknesses in implementation. MoH Uganda; Policy review, centralize training programs, and continue research and development. Further research recommendations encompass in-depth studies on TB stigma, evaluating training impacts, and conducting longitudinal studies.

Keywords: *Uptake, Guidelines, Tuberculosis infection, Prevention, Nurses, Uganda*
Submitted:2024-07-22 Accepted:2024-08-16

Corresponding author: *Ivan Byanga**
Email: *ivanbyanga16@gmail.com*
Clarke International University

INTRODUCTION

Tuberculosis remains a major health threat worldwide, causing significant morbidity and mortality globally, particularly in nations with poor and medium incomes (Islam et al., 2020). Healthcare-associated TB (HATB) is a serious concern for healthcare givers, especially nurses who are at increased susceptibility to infection due to their frequent interaction with TB patients (Adebimpe et al., 2019). There are an estimated more than 1.4 million cases of HATB each year, with health workers making up a remarkable proportion of these cases (WHO, 2019).
In Africa, the threat of acquiring TB within health facilities from the TB-infected to other non-TB patients and medical

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol. 5 No. 9 (2024): September 2024 Issue
https://doi.org/10.51168/sjhrafrica.v5i9.1298
Original Article

service providers has been registered for numerous years (Matuka et al., 2021) . The incidence and prevalence of nosocomial TB are higher in health units/facilities more so within most low to middle-income nations of Africa and a significant number of health workers have acquired HATB, especially in settings where the guidelines for TB IPC are not applied (Matuka et al., 2021). Pathogen transmission mostly occurs in individuals with unrecognized / poorly managed TB cases in facilities where the standard guidelines of HATB IPC measures are not employed by both patients and healthcare providers like nurses (Semitala et al., 2023).

As per the WHO Global TB Report 2020, the East African region has a high burden of TB, (World Health Organization, 2020) . The report estimated the incidence rate of tuberculosis at 297 clients per 100,000 individuals within the East African region, (World Health Organization, 2020).

Within Uganda, TB is a public health concern, with a projected incidence rate of 253/100,000 people, anchored on a community-based model aimed at management of multi-drug resistant tuberculosis in Uganda (Makabayi-Mugabe et al., 2022; Ministry of Health, 2015) : an experimental investigation that aimed at Developing a patient-centered community-based model for the management of multi-drug resistant tuberculosis in Uganda (Makabayi-Mugabe et al., 2022) . Furthermore, it is recorded that HATB is a serious concern in Ugandan health units where nurses are at a high probability of acquiring TB infection in healthcare settings (Muttamba et al., 2021).

As a reaction to this challenge, the Ugandan Department of Health has developed and delivered TBIPC Guidelines based on WHO's guidelines to lessen the odds of HATB among healthcare workers (Ario et al., 2022). A shortage of information about the extent to which the guidelines have been adopted and their effectiveness in reducing the incidence of HATB in Uganda, particularly in the district of Bundibugyo was noted.

The target of this research was to gauge the uptake and utilization of the Ministry of Health's Guidelines for reducing HATB among nurses working within Bundibugyo district (Ministry of Health, 2015) . By examining the existing state of IPC Guidelines implementation and identifying gaps, this study endeavors to present enlightenment that can inform policy and practice for the prevention and management of HATB in Uganda (Ministry of Health, 2015).

As far as we are aware, this is the first research to assess the uptake and use of IPC Guidelines for HATB prevention by nurses in Bundibugyo district.

Major Objective

To assess the uptake and utilization of the National Guidelines for TB IPC among nurses working in resource-limited settings.

METHODOLOGY

Study layout

This study employed a cross-sectional design using both qualitative and quantitative methods with a census technique (Muthoni Wangari et al., 2023). Key informant interviews, observational checklists, and self-administered questionnaires were employed to gather data (Muthoni Wangari et al., 2023).

Study Area

The research domain was Bundibugyo District; located in Western Uganda. It is situated within the Rwenzori sub-region of Uganda, (Grace, 2005)The district is bordered by DRC to the west, the Ntoroko district to the North, the Kabarole district to the East, and Kasese district to the south. The district's geographical coordinates range approximately from latitude 0.5 ^{0}N to 1.2^{0}N and longitude 30.0^{0}E to 30.7^{0}E, (Grace, 2005). The study lasted 10 months, and data was gathered from 10/10/2023 to 25/10/2023.

Bundibugyo District had 31 functional health units of different grades, 11 of them were purposively sampled to suit the study; these were the General hospital, 3 health center fours and the rest were health center IIIs (Ministry of Health, 2015).

The study area encompassed a selection of health facilities within Bundibugyo District, located in Western Uganda. These health facilities were carefully chosen due to their importance in handling tuberculosis (TB) cases and the potential threat of TB exposure for healthcare workers.

Demography of the Study

The population of the study comprised 11 public health facilities in the Bundibugyo district and a sum of 135 nurses who worked within those health facilities and were often directly in contact with TB patients while in the health centers.

Sample size determination

A census technique was used to ensure that the complete target population was included, (South Korea, 2022). There were 135 nurses employed throughout 11 healthcare institutions, that serve the population, (Wallner et al., 2022).

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol. 5 No. 9 (2024): September 2024 Issue
https://doi.org/10.51168/sjhrafrica.v5i9.1298
Original Article

As a result, the research covered all 135 of the nurses who work in these healthcare institutions, (Wallner et al., 2022). We included 11 lower health facilities and 1 general district hospital. To ensure a thorough examination of the complete population of nurses at risk of developing TB in various healthcare settings, all caregivers from these facilities were taken into account(Ministry of Health, 2015).

Study variables

Dependent variable

The dependent variable of this research was the uptake and utilization of Healthcare Associated Tuberculosis (HATB) IPC
Guidelines.

Independent variables

Knowledge of nurses on TB-IPC, Practices of TB-IPC among nurses, and Perceived barriers influencing to implementation of TB IPC Guidelines.

Sampling technique

Data was acquired from every nursing staff member working in HC IIIs, IVs, and the General Hospital. The risk of TB exposure among nurses in the chosen facilities was fully portrayed by this census design for thorough data-gathering (Wallner et al., 2022).

Selection criterion

Inclusion criteria

All healthcare nurses who engaged straightforwardly with TB patients were encompassed in the study; just those who expressed a willingness to consent were included.

Exclusion criteria

All nursing professionals who had no proximity to TB sufferers or who were unavailable during the period of data collection were bypassed in this research.

Data collection methods

The study used qualitative and quantitative approaches to collect data from 135 participants working in healthcare institutions, that manage TB cases within Bundibugyo district. Quantitatively data was collected using self-administered questionnaires and qualitatively by interviews with key informants (KI) and observational checklists, analyzed then presented in tables as frequencies, percentages, and narrations, (Fetters & Tajima, 2022). The self-administered questionnaires were given to all participants of the study, and the interviews with crucial informants covered 11 nurse leaders of TB clinics within the facilities (Fetters & Tajima, 2022) . Observational checklists were filled by the researchers based on what they saw within the facilities (Fetters & Tajima, 2022). The data-gathering tools used the English language.

Quality control issues

The researcher adjusted WHO data collection tools for TB IPC within health facilities (questionnaire and interview guide) in consultation with the supervisor to ensure the validity of the items in the tools, (Muthoni Wangari et al., 2023). There was a selection of research assistants (Health worker trainee interns), who were trained on data collection techniques and ethical issues in research. The tools were pre-tested for validity and reliability in Nyahuka HC IV. After the pre-testing, the tools were adjusted accordingly. The researchers and the research assistant checked for completeness for every questionnaire before leaving the facility, for all data collected (Muthoni Wangari et al., 2023).

Data analysis and presentation

The researchers utilized a statistical package for the social sciences (SPSS) software version 20 to analyze quantitative data and for qualitative data we based on themes to draw meaning. The findings were dispensed in the format of frequencies and percentages tabulated and narrations quoted.

Ethical considerations

Approval of the research was acquired from Clarke International University (CIU) Institute of Public Health and Management. After the approval, a permit was requested from the District Health Office of Bundibugyo to perform the study. Before requesting everyone's assent to take part in the census study, a detailed description of the study's goal was given to every one of them.

RESULTS

Response rate

A total of 135 questionnaires were issued and all were returned filled giving a response rate of 100%. All the 11 Key informants participated in the study also giving a 100% response rate.

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol. 5 No. 9 (2024): September 2024 Issue
https://doi.org/10.51168/sjhrafrica.v5i9.1298
Original Article

General information about the respondents

To determine the makeup of the respondents who took part in the study, the population information from candidates who filled out the questionnaires was gathered and appropriately examined. The general information on the respondents, for instance; age, gender, and job experience, is incorporated in the following subsections.

Table 1: General information about respondents of the study

Variable	Cadre	Frequency (n)	Percentage (%)
Nursing Cadre	Senior Nursing Officer	2	1.5
	Nursing Officer	5	3.7
	Assistant Nursing officer	44	32.6
	Senior Enrolled Nurse	26	19.3
	Enrolled Nurse	58	42.9
	Total	135	100.0
Gender	Female	84	62.2
	Male	51	37.8
	Total	135	100.0
Age	20-24 years,	31	23.0
	25-29 years,	11	8.1
	30-34 years,	19	14.1
	35-39 years,	67	49.6
	40 years and above	7	5.2
	Total	135	100
Duration worked	1-3 years	40	29.6
	4-6 years	51	37.8
	7-10 years	30	22.2
	Above 10 years	14	10.4
	Total	135.0	100.0

Source: Primary Data 2023

It was found that 62.2% of the contributors were females while a proportion of 37.8% were males. This suggests more women were immersed in this research as opposed to their male counterparts. This provided a true reflection of the proportions of the populations in health facilities. There are typically more ladies than males implying that the data provided was representative of the population.

Furthermore, it was found that 23.0% of the informants fell in the age range of 20 to 24 while 8.1% of them were in the age bracket of 25-29 years. However, 49.6% of the respondents were in the bracket 35- 39 years, and the range of 40 years and above made 5.2%. This indicates that most of the individuals who responded were above 30 years of age meaning they were mature enough to comprehend their actions and this assures that the data provided by these can be relied on as valid data.

Table 1 reveals that the respondents used in this study included all cadres of nurses available in the district. The majority (42.9%) of them were enrolled nurses which is always true of nursing staff in health facilities. Assistant nursing officers at 32.6% were the second largest proportion, followed by senior enrolled nurses; 19.3% and nursing officers and senior nursing officers scored the lowest number of participants involved in the study with 3.7% and 1.5% respectively. This implies that a few leadership positions exist in the nursing profession with a rise in the nursing cadre. This makes making the results to be comprehensive.

The results in table 1 expressed that 29.6% of the contributors had a job experience of 1-3 years, while 37.8% of them had work experience of 4-6 years. 22.2% of the nursing staff had a career experience of 7-10 years while 10.4% of the participants had above 10 years of working experience. This signifies that most of them had at least worked for 4-10 years.

Knowledge of Nurses regarding HATB IPC

The first objective of the investigation sought to establish the degree of Nurses' knowledge regarding the MoH

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol. 5 No. 9 (2024): September 2024 Issue
https://doi.org/10.51168/sjhrafrica.v5i9.1298
Original Article

guidelines for controlling and preventing tuberculosis infections when managing TB patients in health settings within Bundibugyo District.

Table 2: Nurses' Knowledge of the Uganda MoH Guideline for TB IPC in Health Units

Variables	Categories	Frequency (n)	Percentage (%)
Tuberculosis is an infectious disease?	Strongly agree	80	59.3
	Agree	42	31.73
	Disagree	12	8.9
	Undecided	1	0.07
	Total	135	100.0
Are you aware of the cause of Tuberculosis?	Yes	120	88.9
	No	15	11.1
	Total	135	100
Is there a high rate of TB patients with diagnoses at your facility?	Yes	114	84.4
	No	21	15.6
	Total	135	100.0
What protective devices are in place andused on the wards?	Gloves, Dust mask, Respirators	116	86
	Others	19	14
	Total	135	100.0
During referral; are there any safeguards in place for clients that are speculated or confirmed?	Yes	106	78.9
	No	29	21.1
	Total	135	100.0
Are there any precautionary concerns about treating or working with TB clients?	Yes	89	65.9
	No	46	34.1
	Total	135	100.0
Have you had any TB training or workshops in the previous 2 years?	Yes	48	35.5
	No	87	64.5
	Total	135	100
Do you possess the necessary knowledge to manage patients with confidence in tuberculosis care, preventive measures, and other related topics?	Yes	108	80
	N0	27	20
	Total	135	100
Are you familiar with the MoH guidelines for TB IPC here?	Yes	81	60
	N0	54	40
	Total	135	100
Are you aware of your hospital's policy about managing TB patients?	Yes	64	47.4
	N0	71	52.6
	Total	135	100

Source: Primary Data 2023

Table 2 demonstrates that while 8.07% of the subjects accounted that they were unsure regarding the etiology of TB, the majority (91.03%, or 59.3% + 31.73%) of them had a clear conscience of the cause. In general, it was discovered the greatest proportion of the engaged population was informed about the etiology of TB. Revealing that the information they gave might be regarded as genuine.

Table 2 provides an overview of additional analysis of the findings on the respondent staff's degree of TB knowledge. Additionally, Table 2 displayed that 88.9% of respondents said they knew the etiology of tuberculosis (TB), and 84.4% said they normally dealt with TB individuals.
In contrast, 86% of them affirmed the presence of protective devices in place; utilized in the management of TB clients.

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol. 5 No. 9 (2024): September 2024 Issue
https://doi.org/10.51168/sjhrafrica.v5i9.1298
Original Article

Merely 78.9% of the subjects acknowledged the existence of preventive measures for individuals verified or merely suspected. This indicates some respondents said there aren't always any safeguards in place. There is little doubt that this puts the medical staff at the hospitals at risk (21.1%). Table 2 also showed that 65.9% of the participants admitted to being cautious when providing care or handling TB patients.

Just 35.5% of them reported having attended a TB workshop or training in the previous two years, with 64.5% of them indicating they had not. This indicates that most of them were susceptible to contracting TB since they were not up to date on the latest information and practices on managing TB patients. Furthermore, a fifth of the nursing staff reported having zero access to information on TB-related topics, even though 80% admitted having ample access to information about preventative measures, TB care, and other related topics. As a consequence of lacking the specifics that would empower them to be protected against TB, 20% of health professionals are still at risk of contracting the disease. Ultimately, Table 2's revelations also indicated that however, 60% of respondents pronounced being informed about the national tuberculosis recommendations, and 40% said they did not.

52.6% of the census population stated being unaware of their health facility's policy for handling tuberculosis patients, whereas just 47.4% of the contributors said they were aware of it. Face-to-face interviews yielded results that showed certain facilities do training whereas others do not. Respondent DT said:

"I am knowledgeable about tuberculosis and how it is managed. For example, in the OPD, if a patient is suspected of having tuberculosis, we isolate them in the cough corner and use cough monitors to obtain a sample. After a positive test, counseling is completed, treatment is initiated for severe cases, and the patient is hospitalized…"

"…. If the condition is complicated, I send the patient to Buhinga Regional Referral Hospital, where TB patients have a specific isolation unit, for further care. On a scale of 0-10, I believe the execution of the TB IPC national guideline in this facility is at 6.5, because of the deficits in training and independent TB isolation units"

In another interview, respondent BS said;

"…I spent some time reading the TB guidelines that are accessible at the TB Clinic, the OPD, and other locations. A few CMEs have also been a helpful source of information on TB IPC. Here, suspected patients receive a face mask that isolates them in the TB waiting area, and a sample is taken for analysis and a sample is collected for testing for inpatients."

"… The non-existent TB-isolated wards and resources make the TB-IPC guidelines to be below 10 on a scale of 0-10, which means around a maximum of 7. I also provide emotional support to family members who must help TB patients if the test results are positive and treatment is initiated. Patients dread being screened for HIV and tuberculosis because they believe it will be revealed to the public…"

In another interview, respondent NJ expressed challenges they encountered while carrying out training and providing psychosocial support to family members and how this impacted the adoption of the Guidelines. He said;

"…We have an issue with false information and bad cultural ideas. For instance, the Bundibugyo people here think that TB is hereditary and that someone can catch it through witchcraft. These have a significant impact on patients' understanding of tuberculosis, and they make it challenging for medical professionals to interact with patients' relatives."

"This limits the level at which patients and families practice TB guidelines offered to them by health workers. We need more CME training to be prepared to offer patients and their families psychological support services without feeling overwhelmed by the task. As an example, relatives are uncooperative because they think that TB is primarily linked to HIV and do not want others to assume they have TB in their lineage."

Overall, it was discovered that the nurses attempt their hardest despite a variety of obstacles that affect their fulfilling the Guidelines with a reasonable knowledge of the malady (TB) and how to treat it. Practices by Nurses about TB-IPC.

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol. 5 No. 9 (2024): September 2024 Issue
https://doi.org/10.51168/sjhrafrica.v5i9.1298
Original Article

Table 3: Nurses' Practices in the Ward / Health Facility

Variables	Categories	Frequency (n)	Percentage (%)
How often should non-staff be restricted from laboratory entry	Sometimes	35	26.0
	Always	100	74.0
	Total	135	100
How often must the cleanliness of thefloors, walls, ceilings, and benches bemaintained?	Sometimes	25	18.5
	Always	110	81.5
	Total	135	100
How often must aerosol-tight buckets in the health facility beutilized?	Sometimes	27	20.0
	Always	108	80.0
	Total	135	100.0
How often should contact of sputum be avoided and handling ofsputum be done with care?	Sometimes	38	28.1
	Always	97	71.9
	Total	135	100
How often should the design of laboratory safety cabinets meet therequired standards for safety?	Sometimes	53	39.3
	Always	82	60.7
	Total	135	100
How often should TB patient Isolation be done in the HealthFacility?	Sometimes	63	46.7
	Always	72	53.3
	Total	135	100
How often should nose covering byhealth workers be strictly observed when working with TB clients?	Sometimes	39	28.9
	Always	96	71.1
	Total	135	100

Source: Primary Data 2023

From Table 3 it is revealed that 74% of the nursing staff asserted that there should always be laboratory entry restrictions whereas 26.0% said it should only be there sometimes.

Another, 81.5% indicated that cleanliness of floors, walls, ceilings, and benches should always be maintained and ventilation be well observed within the health facilities. A proportion equivalent to 80% of the subjects indicated that aerosol-tight buckets in the health facility should always be available and the rest (20%) indicated that the aerosol buckets should sometimes be available.

While 28.1% of respondents said that handling samples should occasionally be done carefully, another 71.9% of respondents said that it should always be done with care. However, a majority of respondents, or 60.7%, stated that safety cabinet designs should always adhere to the criteria, while 39.3% stated that this should only occasionally be the case. Of the participants, 53.3% said that patient isolation in cases of tuberculosis should always be carried out at a medical facility, while 46.75 felt it should only be done sometimes. 71.1% of the nurses said nose covering should be observed all the time while dealing with TB patients and the rest said it should be done sometimes.

Use of Personal Protection Equipment in Wards/Health Facilities

Table 4 shows the usage of PPE by nurses.

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol. 5 No. 9 (2024): September 2024 Issue
https://doi.org/10.51168/sjhrafrica.v5i9.1298
Original Article

Table 4: Use of Personal Protection Equipment in Wards/Health Facilities

Variables	Categories	Frequency (n)	Percentage (%)
Particulate respirator	Never Used	35	25.9
	Sometimes Used	70	51.9
	Always Used	30	22.2
	Total	135	100
Perforate respirator	Never Used	29	21.5
	Sometimes Used	87	64.4
	Always Used	19	14.1
	Total	135	100
Dust/Fume/Mist Masks	Never Used	39	28.9
	Sometimes Used	45	33.3
	Always Used	51	37.8
	Total	135	100
Full facepiece negative-pressure respirator	Never Used	93	68.9
	Sometimes Used	40	29.6
	Always Used	2	1.5
	Total	135	100
Powered air-purifying respirators	Never Used	118	87.4
	Sometimes Used	16	11.9
	Always Used	1	0.7
	Total	135	100
Positive-pressure airline respirators	Never Used	115	85.2
	Sometimes Used	15	11.1
	Always Used	5	3.7
	Total	138	100
Supplied air respirator with a hood	Never Used	109	80.7
	Sometimes Used	19	14.1
	Always Used	7	5.2
	Total	135	100

Source: Primary Data 2023

Table 4 data shows the usage of personal protective equipment (PPE) among nurses. Only 25.9% always used particulate respirators, while 51.9% sometimes used them, and 22.2% never used them. Similarly, 21.5% never used perforated respirators, 64.4% sometimes used them, and 14.1% always used them. Dust/Fume/Mist Masks were used by 28.9% (never), 33% (sometimes), and 37.8% (always). Most nurses never used Full facepiece negative-pressure respirators (68.9%), Powered air-purifying respirators (87.4%), Positive-pressure airline respirators (85.2%), or supplied air respirators with hoods (80.7%). This indicates a significant lack of PPE use, leaving healthcare workers vulnerable to TB infection. Results of data collected via face-to-face interviews also aligned with these findings. For example, participant MK said;

"…I have learned a great deal about personal safety from the few training sessions that the district health commutes at the district and CMEs have arranged. I have access to enough knowledge from the Uganda TB guidelines integrated with the HIV handout on TB care, preventive measures, and other TB-related topics to treat patients with confidence…"

"…I have access to enough information from the Uganda TB guidelines integrated with the HIV handout on TB, preventive measures, and other TB-related topics to treat patients with confidence. I now understand and assess

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol. 5 No. 9 (2024): September 2024 Issue
https://doi.org/10.51168/sjhrafrica.v5i9.1298
Original Article

patients for tuberculosis (TB) and its symptoms, but sometimes few resources limit my ability to implement all the national recommendations for TB IPC. In this facility, I score the implementation of the MoH Guidelines for TB IPC at 6.5 on a scale of 0-10 …"

Administrative Practices / Measures

Table 5: presents the participant's views on the administrative practices/measures in the health facilities under study

Variables	Categories	Frequency (n)	Percentage (%)
How often is appropriate collection of sputum emphasized?	Sometimes	30	22.2
	Not at all	11	8.1
	Always	94	69.6
	Total	135	100
How often is the screening of suspicious TB patients done in thewaiting Area?	Sometimes	24	17.8
	Not at all	12	8.9
	Always	99	73.3
	Total	135	100
How often is prioritizing TB suspects for prompt service encouraged?	Sometimes	17	12.6
	Not at all	14	10.4
	Always	104	77
	Total	135	100
How often is screening TB Patients for HIV done?	Sometimes	29	21.5
	Not at all	0	0
	Always	106	78.5
	Total	135	100
How often is TB-IPC education provided in this facility?	Sometimes	48	35.6
	Not at all	0	0
	Always	87	64.4
	Total	135	100
How often is action taken if a patient with TB is admitted?	Sometimes	81	60
	Not at all	20	14.8
	Always	34	25.2
	Total	135	100
How often is action taken differently when there is only suspicion of TB?	Sometimes	36	26.7
	Not at all	89	66
	Always	10	7.3
	Total	135	100

Source: Primary Data 2023

Regarding administrative procedures or measures, Table 5's outcomes reveal show that the biggest proportion of nurses stated that proper sputum collection is always prioritized (69.6%), that screening of suspicious TB clients in the tarrying area is always carried out (73.3%), that prioritizing TB suspects for prompt treatment is always encouraged (77%), that screening TB patients for HIV is always carried out (78.5%), and that TB IPC education is always offered in their clinical setting (64.4%). This indicates that significant managerial duties have been performed to guarantee that medical staff members at the institutions are not exposed to tuberculosis.

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol. 5 No. 9 (2024): September 2024 Issue
https://doi.org/10.51168/sjhrafrica.v5i9.1298
Original Article

Environmental control measures

The perspectives of the subjects about the environmental control measures used by the medical facilities in the Bundibugyo District are displayed in Table 6.

Table 6: Perspectives of Respondents on Environmental Control Measures

Variables	Categories	Frequency (n)	Percentage (%)
I always ensure that the windows and doors of the wards are open	No	20	14.8
	Yes	115	85.2
	Total	135	100
This health facility makes use of mechanical air-moving equipment that propagates air in a building	No	95	70.3
	Yes	40	29.6
	Total	135	100
In this health facility, the waiting area for TB patients is open to the environment	No	45	33.3
	Yes	90	66.7
	Total	135	100
There are fans in all diagnostic rooms (Laboratory, radiology) in this health facility	No	102	75.6
	Yes	33	24.4
	Total	138	100
There are mechanical exhaust systems that pump clean air from outside into the unit and then remove the contaminated air from it to the outside	No	109	80.7
	Yes	28	19.3
	Total	135	100
There are closed recirculation filtration systems, which take room air, filter it to remove infectious TB germs, and then bring it back into the room	No	108	80
	Yes	27	20
	Total	135	100
We use ultraviolet germicidal irradiation (UVGI) to break down microorganisms in high-risk areas like wards and laboratories	No	96	71.1
	Yes	39	28.9
	Total	135	100
Isolation of Sufferers and use of separate TB wards is done in this facility	No	90	66.7
	Yes	45	33.3
	Total	135	100

Source: Primary Data 2023

Perceived Barriers Influencing TB-IPC

The respondents' opinions reveal gaps in environmental control in health units. While 85.2% agreed on keeping wards' entryways and windows open, and 66.7% noted TB patients' waiting rooms open to outside air, most disagreed on other measures. Specifically, 75.6% cited a lack of fans, 80.7% noted missing mechanical exhaust systems, 80% pointed out absent recirculation filtration systems, 71.1% observed non-use of UVGI, and 66.7% mentioned no separate TB wards. These gaps suggest insufficient protection for medical staff from tuberculosis infection.

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol. 5 No. 9 (2024): September 2024 Issue
https://doi.org/10.51168/sjhrafrica.v5i9.1298
Original Article

Table 7: Perceived Barriers Influencing IPC of TB

Variables	Categories	Frequency (n)	Percentage (%)
The wards of this medical facility are overflowing with TB-infected patients.	No	29	21.5
	Yes	106	78.5
	Total	135	100
In this health facility wards are poorly ventilated	No	46	34.1
	Yes	89	65.9
	Total	135	100
Patients infected with TB are poorlyscreened in this facility	No	73	54.1
	Yes	62	45.9
	Total	135	100
There are no surgical masks fornurses	No	37	26
	Yes	98	74
	Total	135	100
The facility does not haveN95 respirators	No	46	34.1
	Yes	89	65.9
	Total	135	100
Absent curtains around thepatient's beds	No	20	14.8
	Yes	115	85.2
	Total	135	100
Isolation of Patients is not possible in this Health facility	No	18	13.3
	Yes	117	86.7
	Total	135	100
There are no spacemen contains for TB patients to collect their sputum after coughing	No	34	25.2
	Yes	101	74.8
	Total	138	100
We do not have gloves for use while handling patients infected with TB	No	118	88
	Yes	17	12
	Total	135	100
The wards are poorly aerated	No	42	31.1
	Yes	93	68.9
	Total	135	100

Source: Primary Data 2023

Table 7 illustrates nurses' views on obstacles to using TB IPC guidelines. Key findings include 78.5% noting overcrowded TB patient wards, 65.9% citing inadequate ventilation, and 45.9% believing TB patients were not adequately screened. Additionally, 74% reported a lack of surgical masks, 85.2% noted no bed-enclosing curtains, and 86.7% mentioned the infeasibility of isolating TB patients. Furthermore, 88% suggested a potential glove shortage, 65.9% reported a lack of N95 respirators, and 74.8% noted no sputum collection facilities, highlighting significant barriers in TB prevention and control. This merges with one-on-one interviews where interviewee KL said;

"…We face several obstacles in our work as healthcare providers when it comes to providing for tuberculosis patients these in several ways limit the facility's level of implementing the state guidelines for TB IPC. Insufficient PPE is a key problem. The front-line healthcare providers, nurses, frequently lack the safety equipment they need to assist tuberculosis patients. This compromises our ability to maximumly implement the national guidelines for TB. For that reason, in this facility, the enforcement of TB IPC is at 5.5 on a scale of 0-10.

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol. 5 No. 9 (2024): September 2024 Issue
https://doi.org/10.51168/sjhrafrica.v5i9.1298
Original Article

DISCUSSION OF OBSERVATIONS

This cross-sectional study was conducted to establish the uptake and utilization of national TB guidelines among health workers. In our study, we revealed that more female nurses took part in the study compared to their male counterparts. This provided a true revelation of the proportions of the study population within the health facilities; there is often the proportion of females supersedes males implying that the data provided mirrors the study population well. A greater portion of them were above 30 years of age meaning they were mature enough to fathom their actions and this reflects_ that the data provided by them can be relied on as valid data. The results also indicated that the larger segment of the respondents had worked for 4 – 10 years; having had a long exposure to a work environment dealing with TB patients. These revelations align well with those of a paper entitled "Nurses' Safety in Caring for Tuberculosis Patients at a Teaching Hospital in South West Nigeria", whose results showed that a bulk of the participants were females within the age range of 31-40 years (Fadare et al., 2020) . Furthermore, a study by Chisompola et al., (2020) said that "prolonged contact with TB patients on wards has been demonstrated to play a vital duty in the implementation of TB guidelines to prevent job-related dispersion of TB amongst nurses in Zambia". They concluded that "to curb the transmission of TB amongst HCWs several measures will require implementation such as; administrative support, IPC training, and annual TB and HIV screening for all HCWs" (Chisompola et al., 2020).

The Nurses' knowledge of TB-IPC Directives

91.0% (59.3% + 31.7%) of the nurses were judged to possess sufficient basic TB knowledge, as observed by how they answered the basic TB knowledge questions. However, a majority of them 64.5% had reported not participating in any TB training in the previous 2 years, also 40% of the partakers pronounced they did not know the National TB Guidelines for TB IPC within health facilities, this gives a comprehension of why the figure of nurses who said they knew the policy for dealing with TB patients within their health units was less than 50% of the participants- 47.4%. This in turn made the measure of adoption of the national standards for TB IPC occur just above average on a scale of 0-10 for most facilities, following the outputs of the qualitative data analysis. The findings underscored the worth of targeted educational programs, regular training, and improved communication strategies to enhance the knowledge and awareness of healthcare professionals regarding the national Tuberculosis IPC recommendations, thereby lessening the probability of TB spreading within healthcare settings. The discoveries of this investigation are related to another by (Ramlan et al., (2020) who noted that the percentages of respondents having good TBIC awareness and embracement were 70.6% and 51.6% respectively (Ramlan et al., 2020).

These revelations are compatible with those of a publication by Buregyeya et al., (2016) conducted in Uganda which registered that twenty-four percent of healthcare workers (HCWs) answered all basic TB knowledge questions correctly, with 62% deemed to have adequate basic TB knowledge. Regarding TB infection control (TBIC), 69% were judged to have adequate TBIC knowledge, with high awareness (98%) of TB transmission through droplet nuclei but limited understanding (34%) that masks don't fully protect against TB transmission, (Buregyeya et al., 2016). Furthermore, the observations of this research link up with Alene et al., (2019), whose study involved doctors and nurses: revealed the mean knowledge score was seven out of 10; 149 (39.5%) of respondents scored seven or more which was considered as good knowledge. MDR-TB knowledge of medical staff was said to be noticeably linked up with possessing a postgraduate degree (adjusted odds ratio (AOR)=5.78; 95% CI 2.33 to 14.33), taking infection prevention training (AOR=1.79; 95% CI 1.00, to 3.17) and having a history of tuberculosis (TB) (AOR=1.85; 95% CI 1.12, to 3.03), (Alene et al., 2019).

The discoveries of this assessment disagree with those of a publication by Nazneen et al., (2021) titled "Implementation rank of the Bangladeshi TB-IPC standards in hospitals" where the researcher performed 59 main-informant consultations among HCWs to appreciate the standing of and obstacles hampering the implementation of the TB IPC guidelines. Most of the professionals were uninformed of the countrywide TB IPC directives, (Nazneen et al., 2021). This is dissimilar from the findings of this assessment whose results indicate that 60% of the candidates knew the National TB guidelines for TB IPC. Another study by Yusuf et al., (2021) that used recent research; "knowledge, attitudes, and Practice Toward TB among Campus Students" Also revealed unique discoveries those of this study as far as the awareness of TBIPC was concerned, discovered that students in 8 /12 studies had poor knowledge levels, and students in 2/6 studies had a negative attitude (Yusuf et al., 2021)

The practice of TB IPC among nurses

The study highlights a significant relationship between certain healthcare practices, such as handling samples and patient isolation, and nurses' knowledge of TB prevention, emphasizing the impact of these practices on the overall implementation of TB IPC guidelines. The research identifies critical gaps in PPE utilization among healthcare workers, indicating potential vulnerabilities to TB infection.

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol. 5 No. 9 (2024): September 2024 Issue
https://doi.org/10.51168/sjhrafrica.v5i9.1298
Original Article

These have caused the overall implementation of TB IPC guidelines to just be above average on a scale of 0-10 instead of being at 10. Strong positive correlations fall between specific types of respirators and mask usage and TB contagiousness, emphasizing the importance of targeted interventions and education to enhance adherence to recommended protective measures. The study underscores the significant impact of environmental factors on tuberculosis (TB) contagiousness, emphasizing the importance of isolating patients in separate TB rooms or wards to control the spread within healthcare settings. Additionally, the observed correlation between waiting rooms for suspected TB patients and knowledge of TB highlights the role of environmental factors in influencing awareness and understanding among healthcare staff. This out-turn concurs with a Malaysian publication by Ramlan et al., (2020) titled "Knowledge and Practice on TBIC by Government First-line Health Staff in a Division within Malaysia" where the practice of TBIC among the respondents was inadequate despite good knowledge. Training that emphasizes hands-on skills needs to be strengthened to ensure proper knowledge as well as practice on TBIC, (Ramlan et al., 2020). Another study by Islam et al., (2022) disclosed that healthcare workers acknowledged the TB risk and were willing to implement the TB IPC measures but identified key barriers impacting implementation. Gaps were identified in Policy (no TB policy or guidelines in the hospital), health systems (healthcare workers were unaware of the guidelines, lack of TB IPC program, training and education, absence of healthcare-associated TB infection surveillance, low priority of TB IPC, no TB IPC monitoring and feedback, high patient load and bed occupancy, and limited supply of IPC resources) and behavioral factors, (Islam et al., 2022).

The perceived barriers to the implementation of HATB IPC Guidelines among nurses

The study's findings reveal critical challenges in TB deterrence and control efforts within healthcare settings that limit the efficient implementation of the MoH TB IPC standards for TB within health facilities. Separate TB wards or isolation units are absent which puts healthcare providers like nurses and other non- TB patients vulnerable to TB, especially with the existence of overcrowded wards with inadequate ventilation as revealed in the insights of this study. Similarly, the study revealed gaps in early detection and insufficient access to protective equipment raise concerns about healthcare worker safety. The identified relationship between knowledge and protective measures emphasizes the importance of education in bolstering effective TB prevention strategies. The revelations of this exploration link with those of a similar study by Islam et al., (2021) who remarked that the subsequent conversion of the TB IPC procedures into action has been limited and impaired in some settings. Poor infrastructure, inadequate space for isolation, lack of TB IPC training, limited supply of PPE, the discomfort of using N95 respirators, and a high number of TB patients were some of the elements impacting the execution of TB IPC guidelines (Islam et al., 2021). These findings are also in agreement with a study by Christof et al., (2020), whose publication revealed that one of the biggest obstacles to shielding healthcare personnel from tuberculosis infection is the lack of availability of PPE, such as masks, gloves, and gowns. They continued to state that effective IPC is further complicated by ward congestions, poor training, budget limitations, and the stigma attached to tuberculosis (Christof et al., 2020). This is in agreement with a study by Houghton et al., (2020) entitled "Barriers and Facilitators to HCW's Adherence with IPC Directives for Respiratory Infectious Diseases.

A rapid qualitative evidence synthesis" revealed that overcrowded facilities increase the risk of tuberculosis transmission, underscoring the value of adequate ventilation and space. For the TB IPC to be applied completely, several problems must be resolved, (Houghton et al., 2020). Another publication that had related findings to this assessment was the study by (Matuka et al., 2021), who conducted a study aimed at detecting airborne Mycobacterium tuberculosis (MTB) at nine public health units in three provinces of South Africa and exposing the likelihood of airborne transmission by (Matuka et al., 2021). They discovered the determinants for airborne MTB included province, lack of UVGI, and ineffective ventilation among others. Their discoveries can be utilized to inform management and staff to improve the TB IPC programs, (Matuka et al., 2021).

GENERALIZABILITY

The investigation was performed in only one district in Uganda among many, therefore the findings may not give a clear picture of the entire country.

CONCLUSIONS

Knowledge of Nurses Regarding TB Infection Prevention and Control

The level of implementation of the national guidelines for TB IPC guidelines is generally lower than expected (10/10 on a scale of 0 to 10) and falls between 5.5 to 8, regardless of the nurses' knowledge of the country's guidelines for TBIPC within health facilities being very high on the basic aspects like cause, diagnosis, protection, and concerns when treating TB patients. The participants had lower

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol. 5 No. 9 (2024): September 2024 Issue
https://doi.org/10.51168/sjhrafrica.v5i9.1298
Original Article

knowledge of the Uganda National Guidelines for TB IPC within health facilities as compared to the basic aspects indicated above. Their knowledge about the policy regarding TB IPC in their health facilities is below average (47.4%). There are a few trainings about the Guidelines for TB-IPC conducted across the health units in Bundibugyo district.

Practices adopted by Nurses regarding TB IPC

The execution activities adopted by nurses concerning TB-IPC when managing TB patients in health units include working with open windows and doors, isolating TB-suspected cases in waiting areas open to the environment, screening TB patients for HIV, cleanliness, use of an aerosol-tight bucket, handling samples with care, with the exception for weaknesses in patient isolation and nose covering that is not strictly observed. These underscore the tier of the implementation of the nationwide guidelines for TB IPC.

The Perceived Barriers Influencing Prevention and Control of TB Infection

The perceived barriers that influence the TB-IPC measures in the facilities include; TB stigma among both health workers and family members, false beliefs, lack of good infrastructure (poor ventilation/aeration of the wards, lack of TB isolation units) overcrowding of patients on the wards, lack of specimen containers, shortage of some individual safety gear like surgical masks, N95 respirators, curtains around patient beds.

RECOMMENDATIONS

The District Health Department

Enhance Training Programs: Expand and execute regular training programs for medical attendants on the Uganda Statewide Guidelines for TB-IPC. Focus on bridging the knowledge deficits regarding the policy on TB IPC within health facilities.

Promote Awareness: Initiate awareness campaigns within health facilities to inform practitioners about the importance of conformity to TB-IPC policies.

Address the low awareness of the policy on TB-IPC within the health facilities.

Improve Infrastructure: Invest in infrastructure improvements, such as better ventilation and the formation of TB isolation units, to overcome barriers identified in the study.

Health Services Administration

Monitoring and Evaluation: Implement a robust monitoring and evaluation system to examine the adherence of health facilities to the MoH Guidelines for TB IPC. Regularly assess the effectiveness of the routines currently in place.

Resource Allocation: Allocate resources to facilitate the application of recommended practices, including providing necessary training materials, specimen containers, and personal protective equipment.

Address Weaknesses in Practices: Address the observed weaknesses in safety cabinet design, patient isolation, and nose covering through targeted interventions and reminders.

To the Health Ministry of Uganda

Policy Review and Implementation: Revise the existing national policies on TB IPC, based on these discoveries, and make necessary updates to address identified gaps. Implement strategies to guarantee a comprehensive understanding and conformity to the revised policy across all health facilities.

Centralized Training Programs: Establish centralized training programs on TB IPC at the national level, ensuring that all healthcare institutions, incorporating those in remote areas, have access to regular and quality training.

Research and Development: Allocate resources for ongoing research to continually assess and improve TB IPC measures.

Recommendation for Further Research

An In-Depth Study on TB Stigma: Conduct a more in-depth study on TB stigma among health workers and family members to identify specific factors contributing to stigma and develop targeted interventions.

Evaluation of Training Impact: Undertake a study to evaluate the effect of training programs on nurses' knowledge and practices in line with TB IPC.

Patient and Health Worker Perspectives: Explore the perspectives of both TB clients and health workers regarding barriers to IPC to develop more holistic strategies.

Longitudinal Studies: Conduct longitudinal studies to track the long-term effectiveness of implemented interventions and identify areas for sustained improvement.

Comparative Analysis: Compare TB IPC practices in Bundibugyo district with other districts to identify best practices and areas for improvement on a broader scale.

By implementing these recommendations, the district health department, health services administration, and the Ugandan Health Ministry can work collaboratively to strengthen TB IPC precautions in clinical settings, ultimately contributing to improved public health outcomes.

ACKNOWLEDGMENT

We thank all nurses in Bundibugyo for participating in the study.

SOURCE OF FUNDINGS

No funding related to this study

BIOGRAPHY OF AUTHORS

Byanga Ivan is a student at the Clarke International University School of Public Health. https://orcid.org/0009-0007-9098-3627
Samuel Kabwigu is a Senior lecturer and Chair of Clarke International University REC.

REFERENCES

1. Adebimpe, W., Folayan, W., Shittu, A., Adebimpe, M., & Ibirongbe, D. (2019). IPC practices among health-care workers in tuberculosis clinics in Ondo State, Nigeria. *Libyan Journal of Medical Sciences*, *3*(2). https://doi.org/10.4103/ljms.ljms_64_18
2. Alene, K. A., Adane, A. A., Yifiru, S., Bitew, B. D., Adane, A., & Koye, D. N. (2019). Knowledge and practice of health workers about IPC of multidrug-resistant TB in referral hospitals, Ethiopia: A cross-sectional study. *BMJ Open*, *9*(2). https://doi.org/10.1136/bmjopen-2018-022948
3. Ario, A. R., Bulage, L., Wibabara, Y., Muwereza, P., Eurien, D., Kabwama, S. N., Kwesiga, B., Kadobera, D., Turyahabwe, S., Musinguzi, J. B., Wanyenze, R. K., Nasirumbi, P. M., Lukoye, D., Harris, J. R., Mills, L. A., & Nelson, L. J. (2022). Uganda Public Health Fellowship Program's Contributions to the National HIV and TB Programs, 2015-2020. *Global Health Science and Practice*, *10*(2). https://doi.org/10.9745/GHSP-D-21-00574
4. Bozzani, F. M., McCreesh, N., Diaconu, K., Govender, I., White, R. G., Kielmann, K., Grant, A. D., & Vassall, A. (2023). Cost-effectiveness of TB IPC interventions in South African clinics: A model-based economic evaluation informed by complexity science methods. *BMJ Global Health*, *8*(2). https://doi.org/10.1136/bmjgh-2022-010306
5. Buregyeya, E., Kasasa, S., & Mitchell, E. M. H. (2016). Tuberculosis IC knowledge and attitudes among health workers in Uganda: A cross-sectional study. *BMC Infectious Diseases*, *16*(1). https://doi.org/10.1186/s12879-016-1740-7
6. Chisompola, N. K., Kamanga, K. M., & Matafwali, P. V. (2020). Risk Factors for Occupational Transmission of TB among HCWs in Zambia. *International Journal of TROPICAL DISEASE & Health*. https://doi.org/10.9734/ijtdh/2020/v41i1130335
7. Christof, C., Nußbaumer-Streit, B., & Gartlehner, G. (2020). WHO Guidelines on Tuberculosis IPC | WHO-Leitlinie: Prävention und Kontrolle von Tuberkulose-Infektionen. *Gesundheitswesen*, *82*(11).
8. Fadare, R. I., Akpor, O. A., Ifechukwude, I. G., Richard D, A., & Bello, C. B. (2020). Nurses' Safety in Caring for Tuberculosis Patients at a Teaching Hospital in South West Nigeria. *Journal of Environmental and Public Health*, *2020*. https://doi.org/10.1155/2020/3402527
9. Fetters, M. D., & Tajima, C. (2022). Joint Displays of Integrated Data Collection in Mixed Methods Research. *International Journal of Qualitative Methods*, *21*. https://doi.org/10.1177/16094069221104564
10. Grace, W. K. (2005). Participatory planning - Challenges for optimal community involvement. *Maximizing the Benefits from Water and Environmental Sanitation: Proceedings of the 31st WEDC Conference*.
11. Houghton, C., Meskell, P., Delaney, H., Smalle, M., Glenton, C., Booth, A., Chan, X. H. S., Devane, D., & Biesty, L. M. (2020). Obstacles and Enablers to HCW's adherence with IPC guidelines for respiratory infectious diseases: A rapid qualitative evidence synthesis. In *Cochrane Database of Systematic Reviews* (Vol. 4). https://doi.org/10.1002/14651858.CD013582
12. Islam, M. S., Chughtai, A. A., Banu, S., & Seale, H. (2021). Context matters: Examination of the factors impacting the implementation of TB IPC guidelines in health settings in 7 high TB burden countries. *Journal of Infection and Public Health*, *14*(5). https://doi.org/10.1016/j.jiph.2021.01.014
13. Islam, M. S., Chughtai, A. A., & Seale, H. (2020). Reflecting on the updates to the WHO 2019 Tuberculosis IC Guidelines through the lens of a low-income/high TB burden country. In *Journal of Infection and Public Health* (Vol. 13, Issue 8). https://doi.org/10.1016/j.jiph.2020.02.039
14. Islam, M. S., Tarannum, S., Banu, S., Chowdhury, K. I. A., Nazneen, A., Chughtai, A. A., & Seale,

H. (2022). Preparedness of tertiary care hospitals to implement the national TB IPC guidelines in Bangladesh: A qualitative exploration. *PLoS ONE*, *17*(2 February). https://doi.org/10.1371/journal.pone.0263115

15. Makabayi-Mugabe, R., Musaazi, J., Zawedde-Muyanja, S., Kizito, E., Namwanje, H., Aleu, P., Charlet, D., Freitas Lopez, D. B., Brightman, H., Turyahabwe, S., & Nkolo, A. (2022). Developing a patient-centered community-based model for management of multi-drug resistant tuberculosis in Uganda: a discrete choice experiment. *BMC Health Services Research*, *22*(1). https://doi.org/10.1186/s12913-021-07365-5
16. Matuka, D. O., Duba, T., Ngcobo, Z., Made, F., Muleba, L., Nthoke, T., & Singh, T. S. (2021). Occupational risk of airborne mycobacterium tuberculosis exposure: A situational analysis in a three-tier public healthcare system in South Africa. *International Journal of Environmental Research and Public Health*, *18*(19). https://doi.org/10.3390/ijerph181910130
17. MoH. (2015). The Republic of Uganda the Uganda National TB Prevalence Survey, 2014-2015 Survey Report 1. *Report*.
18. Muthoni Wangari, J., Mwangi, E., & Auma Arodi, W. (2023). Role of Attitude in Influencing Compliance with Tuberculosis IPC Guidelines among Healthcare Workers. *American Journal of Public Health Research*, *11*(3). https://doi.org/10.12691/ajphr-11-3-4
19. Muttamba, W., Bbuye, M., Baluku, J. B., Kyaligonza, S., Nalunjogi, J., Kimuli, I., & Kirenga, B. (2021). Perceptions of adolescents and health workers towards adolescents' TB diagnosis in central Uganda: A cross-sectional qualitative study. *Risk Management and Healthcare Policy*, *14*. https://doi.org/10.2147/RMHP.S340112
20. Nazneen, A., Tarannum, S., Chowdhury, K. I. A., Islam, M. T., Hasibul Islam, S. M., Ahmed, S., Banu, S., & Islam, M. S. (2021). Implementation status of national TB infection control guidelines in Bangladeshi hospitals. *PLoS ONE*, *16*(2 February). https://doi.org/10.1371/journal.pone.0246923
21. Ramlan, W., Zainuddin, H., & Kamarudin, R. (2020). Knowledge And Practice on TB IC Among Government Primary Healthcare Workers in Malaysia. *International Journal of Public Health & Clinical Sciences (IJPHCS)*, *7*(4).
22. Semitala, F. C., Katwesigye, R., Kalibbala, D., Mbuliro, M., Lalitha, R., Owachi, D., Atine, E., Nassazi, J., Turyahabwe, S., & Sekadde, M. (2023). Integration of COVID-19 and TB screening in Kampala, Uganda: healthcare provider perspectives. *Implementation Science Communications*, *4*(1). https://doi.org/10.1186/s43058-023-00391-w
23. South Korea, S. (2022). 2021 Population and Housing Census Study Documentation. In *KOSTAT*.
24. Wallner, C., Dahlmann, V., Montemurro, P., Kümmel, S., Reinisch, M., Drysch, M., Schmidt, S. V., Reinkemeier, F., Huber, J., Wagner, J. M., Sogorski, A., Dadras, M., von Glinski, M., Lehnhardt, M., & Behr, B. (2022). The Search for the Ideal Female Breast: A Nationally Representative United-States-Census Study. *Aesthetic Plastic Surgery*, *46*(4). https://doi.org/10.1007/s00266-021-02753-y
25. World Health Organization, (WHO). (2020). Consolidated Guidelines on Tuberculosis Treatment. In *Who*.
26. Yusuf, L., Puspitasari, I. M., & Sinuraya, R. K. (2021). Recent studies on knowledge, attitude, and practice toward TB among university students. *Journal of Applied Pharmaceutical Science*, *11*(8). https://doi.org/10.7324/JAPS.2021.110823

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol. 5 No. 9 (2024): September 2024 Issue
https://doi.org/10.51168/sjhrafrica.v5i9.1298
Original Article

PUBLISHER DETAILS

SJC PUBLISHERS COMPANY LIMITED

Catergory: Non Government & Non profit Organisation
Contact: +256 775 434 261 (WhatsApp)
Email: info@sjpublisher.org or studentsjournal2020@gmail.com
Website: https://sjpublisher.org
Location: Scholar's Summit Nakigalala, P. O. Box 701432,Entebbe Uganda, East Africa