A Review of Workplace Tuberculosis Policies in Selected Low- and Middle-Income Countries in Asia-Pacific

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ABSTRACT

Background and Objective. The World Health Organization (WHO) reported that most of the tuberculosis (TB) cases are aged between 15 to 54 years old, the working population. This study described workplace policies on TB in selected low- and middle-income countries (LMIC) in Asia-Pacific.

Methods. Among the LMICs, countries wherein TB is a public health concern were included. Six policies written in English were included in this study and were reviewed based on the components of the TB workplace programs that were extracted from the WHO Guidelines for Workplace TB Control Activities.

Results. The Philippine policy had the most number of components while those of Cambodia and Papua New Guinea had the least. Only the component on implementing environmental controls was common among the policies. Components on respecting patient rights and confidentiality, tailoring of workload to TB patient's state of health, registration of all patients with TB diagnosis, reporting of cases to central NTP office, recording of standard treatment outcome, and inclusion of multidrug-resistant TB (MDR-TB) provisions were missing for the majority of the policy documents.

Conclusion. The workplace TB program policies included in this study can be reviewed and updated accordingly, with the coverage expanding to all workplaces. The policies can also integrate measures on COVID-19 as the pandemic has slowed the progress in TB control. With the similarities in the preventive measures against TB and COVID-19, this can be an avenue to develop integrated policies especially for workplaces.

Keywords: tuberculosis (TB), workplace policies, low- and middle-income countries, tuberculosis program, tuberculosis in the workplace

Paper presentation – 53rd Asia Pacific Academic Consortium for Public Health Conference (APACPH) 2022, September 22, 2022, Marriott Hotel Manila, Pasay City, Philippines.

eISSN 2094-9278 (Online)
Published: March 31, 2025
https://doi.org/10.47895/amp.v59i4.9364

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INTRODUCTION

Tuberculosis (TB) is a communicable disease that has infected an estimated 10.6 million people worldwide, with 1.6 million deaths in 2021 (including 187,000 people with HIV).[1] According to World Health Organization (WHO) Global TB Report in 2020, the TB incidence in the Philippines is at 544 cases per 100,000 population, while the TB incidence of India is at 193 cases per 100,000 population. In Malaysia, the TB incidence rate was 92 cases per 100,000 population.[2]

Despite the worldwide adoption of WHO's End TB strategy by 2035 and the establishment of the United Nations Sustainable Development Goals (SDG), the efforts to end the global TB epidemic have been affected by the COVID-19 pandemic. According to the Global TB Report 2021, the most obvious impact on TB of disruptions caused by the COVID-19 pandemic is a large global drop in the number of people newly diagnosed with TB and reported with 5.8 million in 2020, compared with 7.1 million in 2019.[3]

A decline in TB case notifications is also evident in five of the six WHO regions particularly in South-East Asia and the Western Pacific. The most immediate consequence of the large drop in the number of people newly diagnosed with TB in 2020 is an increase in the number of people who died from TB. The WHO model projects that TB incidence and mortality may worsen in 2021 and beyond.[3]

More than half of the individuals who are infected with TB are those in their economically productive age between 15 to 54 years old.[3] According to a case study in South Africa, the prompt detection and effective treatment in the comprehensive TB control program in the workplace can lead to net cost savings.[4] Sick workforce contributes to an unhealthy economy.[5,6] Thus, proper implementation of policies and guidelines on TB prevention and control in workplaces is important to ensure the health and safety of workers. Policy makers from organizations, agencies, and workplaces can benefit from the findings of this study to strengthen TB policies in the workplace.

Tuberculosis is a threat in the workplace as it can be spread through casual contact. Employees in the workplace are at risk of contracting TB if there is an infected employee due to direct exposure to contaminated air which is spread through the ventilation system or through a single cough from an infected employee which can infect others in the room or office. TB in the workplace poses a major public health risk especially those working in childcare, health care, and hairdressing, as an infected employee who comes in close physical contact with clients results in prolonged exposure to TB and increases the likelihood of contracting the disease.

Employees who contract TB in the workplace impose a substantial burden on employees and companies resulting in high costs for medication, hospitalization especially employees who require additional courses of treatment, loss of work, and significant mortality among employees.[7]

Tuberculosis is both a public health concern and an occupational health concern as workers, especially those aged between 16 and 65 years old who spend majority of their time at work, have a high risk of contracting TB infections.[8]

The relation of TB to occupation can be classified into three categories specifically occupations that have a high risk of TB which include lower-paid and unskilled workers, as well as workers with less favourable socio-economic conditions; occupations with high exposure to pollutants such as mining, quarrying, foundry, and pottery workers predisposed due to silicosis; and occupations which increase the chance of exposure to infectious diseases due to their work environment which include hospital workers, mycobacteriology laboratory workers, and autopsy rooms.[9]

Workers in correctional facilities, emergency shelters, health care, homeless shelters, social assistance shelters, and other congregate settings are not only at a higher risk of developing an active TB disease but it also places a high risk of spreading the disease to the surrounding community. The risk in the communities would also spread elsewhere in the world through migration of infected persons. Therefore, effective tuberculosis control measures in the workplace contribute to prevent the transmission and eventually eliminate the disease at a local and international level.[10]

An elevated risk of work-related TB infection has been found among occupational groups such as healthcare workers, prison personnel, employment counsellors, x-ray technicians, nurses, home support workers, and healthcare aids.[11] The Guidelines for Workplace TB Control Activities was developed in 2003 by WHO and International Labour Organization (ILO) to enhance the contribution of employers and workers in TB prevention and control. It is the first comprehensive approach to workplace TB control. The document was intended for employers, employee organizations, managers, and agencies from countries with high TB incidence, which are mainly low- and middle-income countries (LMICs). For workplace-specific programs, both organizations have identified the expertise and management skills of the private sector that would help implement and augment TB control activities. The guidelines discuss employer involvement in TB control; TB statistics and information; steps to set up, run, monitor, and evaluate workplace TB programs; policy development; finances; and extension of TB programs to the community. Most countries have guidelines in the detection, treatment, management, and control of TB across settings; however, only a few have guidelines specific to workplace TB.[12-14] Assessment of workplace TB policies is vital to identify strengths, gaps, and challenges to facilitate its enhancement to be able to respond to current and emerging needs. There are limited local and global studies on the review of such policies. Hence, this study aimed to describe workplace policies on TB in selected low- and middle-income countries in Asia-Pacific based on the WHO and ILO TB in the Workplace Guidelines to contribute to enhancement of service delivery and control.

METHODS

A qualitative descriptive approach through a desk review was used in this study. Selection of policies involving TB in the workplace were initially done by identifying Western Pacific Region (WPRO) and South East Asian Region (SEARO) countries which belong to the LMIC classification as defined by the World Bank,[15] specifically Low Income, Lower Middle-Income, and Upper Middle-Income. Among the countries identified, they were sorted and filtered in Microsoft Excel (Microsoft 365, Version 2301) based on the TB incidence in 2021 from the World Health Organization database.[16] Countries defined as at least moderate (>10 cases per 100,000 per population per year) based on the WHO categorization of countries per incidence were considered.[16]

Google search engine (Google LLC, Mountain View, CA) was utilized to find the health department or ministries of the countries. Websites of these countries were used to find their respective policies. Counterpart labor departments of each country were also searched for workplace health policies. Policy documents in English that were available for download were screened for eligibility. A policy document is a type of document that provides a description of the content, objectives, and guidelines of a particular policy from a government or non-government organization.[17] The search tool of Adobe Acrobat (Adobe Inc., San Jose, CA) was utilized to find the keywords "workplace", "occupational", or "congregate." Those that included these keywords were considered and further assessed.

Three members of the team screened the full-text eligible policies, each screener evaluated policies and nominated those with workplace TB provisions. The evaluators were blinded to the results of the nomination. The nominations were tallied and policies on TB in the workplace or those with provisions on TB at a workplace setting with at least two nominations were included in this study. The policy was included regardless of the depth of its discussion of workplace TB. In countries with more than one eligible policy, the policy with more specific provisions on workplace TB was included.

Key components of the TB workplace programs were extracted a priori based on the recommendations of the WHO and ILO (2003) Guidelines for Workplace TB Control Activities. Based on the framework used by Jagger et al., a data abstraction tool was developed.[18] The researchers identified seven main components namely, (i) guiding principles for implementing TB control activities at the workplace, (ii) key elements of TB workplace programs, (iii) detection of TB cases in the workplace, (iv) treatment of TB patients, (v) promoting adherence to TB treatment, (vi) special considerations, and (vii) recording cases and treatment outcomes. The components were then further divided into 17 subcomponents whose presence were determined for each policy reviewed. The explicit statement of the WHO and ILO subcomponent in a policy was the basis for considering it at present. This decision is further confirmed by comparing the analyses of at least two members of the group who are blinded to each other's decision. Provisions that encompass any kind of workplace, e.g., healthcare facilities, given that they are explicitly stated in the document, were analyzed as a workplace policy and included in the subcomponent screening. For policies that cover the general population, only those that explicitly state application at a certain workplace were considered. For policies that cover occupational health diseases, only those with provisions exclusively for TB were considered.

The policy document review process was conducted in three phases.

In the initial phase of the policy document review process, the research assistants and experts reviewed the documents independently and provided recommendations on the presence or absence of related policies or provisions. This step served as a preliminary assessment to identify the gaps in the policies.

Following the initial review, the second phase involved grouping each research assistant with an expert. They compared their individual assessments from the first phase. They thoroughly examined the assigned document, and provided additional recommendations regarding the presence or absence of related policies or provisions.

The final phase involved convening the research team to compare and consolidate the assessments for each of the 17 key components to arrive at a consensus.

Overall, this three-phase approach allowed for a comprehensive review of the policy documents, leveraging the expertise and perspectives of the researchers to ensure thoroughness and accuracy in the review process.

The experts implemented a systematic approach to reviewing the policy documents which involved searching keywords to ensure consistency in evaluating the presence or absence of the provisions. This approach involved creating search words that are relevant to the components. Other researchers added comments on each of the policy documents to determine the presence or absence of the provisions.

There was no "partially met" category as the researchers have established that as long as it demonstrates that the component is present even if it is partially present, it can be categorized as "present" during the data extraction.

The researchers did not reach out to relevant ministries in the selected LMICs.

All researchers of the study are based in the Philippines, with extensive experience in international collaborative research. Although the researchers did not request input from an expert with knowledge on OH and workplace TB policies in the SEARO and WPRO, those who reviewed the policy documents have a background in TB in the workplace policies and possess relevant expertise in environmental health, infection control, infectious diseases, microbiology, occupational health and safety, as well as public health.

This research has been approved by the University of the Philippines Manila Research Ethics Board (UPMREB) Review Panel 2 (UPMREB 2021-0513-01).

RESULTS

Of the 47 counties that belong to SEARO and WPRO, the researchers identified 29 LMICs. Out of these countries, 27 had at moderate to endemic TB burden status.[16] These policy documents were screened through utilizing their respective health department or ministries as well as the labor department or ministries to find TB policies. The policy documents in English were then downloaded and evaluated for eligibility. This resulted in the screening of 15 full-text policies. The incorporation of TB at the workplace policies or at least provisions on workplace TB for each policy were considered and this led to the inclusion of six full-text policy documents namely, Cambodia, India, Malaysia, Myanmar, Papua New Guinea, and the Philippines (Figure 1).

The National Health Strategy Plan for Tuberculosis Control in the Kingdom of Cambodia was published in 2009 to strengthen their NTP. Cambodia's strategy plan encompasses the general public, with certain workplace TB provisions on congregate settings that includes garment factories.

Eliminating TB in the World of Work by 2025 is a pivotal goal of the Policy Framework to address Tuberculosis, TB related co-morbidities and HIV in the World of Work in India. Published in 2019, it is designed to foster a work environment which reduces the risk for exposure and tuberculosis incidence through early case detection and treatment particularly those with confirmed TB and its comorbidities, including HIV. This policy framework covers all workers and a broad range of workplace sectors. The guidelines also include the importance of the active engagement of different stakeholders in the implementation of workplace policy and guidelines for TB control.

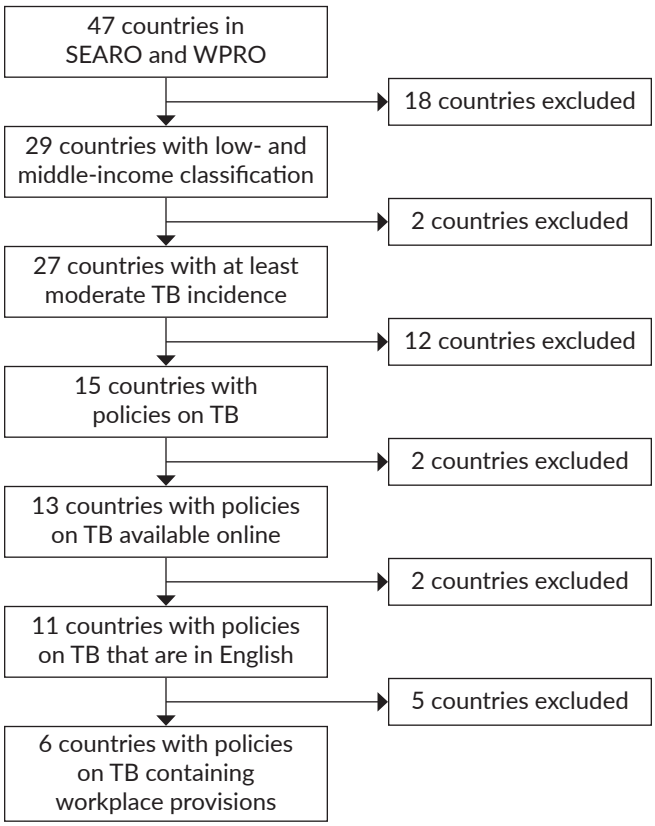

Figure 1. Flowchart for inclusion of policies on workplace TB for review.

The Guidelines on Prevention and Management of Tuberculosis for Health Care Workers in the Ministry of Health Malaysia was published in 2012 with the goal to provide guidelines in the prevention and control of TB among healthcare workers (HCWs). Its provisions on TB, from its prevention to treatment, were comprehensive. However, its scope is limited to HCWs who were part of the Malaysian Ministry of Health.

Myanmar's National Strategic Plan for Tuberculosis 2016-2020 was released in 2016 with the goal to end the TB epidemic in Myanmar by 2035. It serves as the reference document for the implementation of TB control activities in the country and also aims to improve the National Tuberculosis Program. In spite of being a national strategic plan, several provisions on workplace TB have been discussed by the document such as incorporating TB prevention and control in occupational health and safety programs and monitoring high-risk occupations for TB. It also aims to involve corporate sectors and large employers by establishing memoranda of understanding.

Papua New Guinea established in 2016 the Emergency Tuberculosis Operation in Papua New Guinea as a response to the country's TB outbreak. Despite being an emergency operation guidelines, workplace TB provisions were part of the guidelines. They were presented through TB prevention and control in emergency TB health care facilities.

In the Philippines, the Guidelines for the Implementation of Policy and Program on Tuberculosis Prevention and Control in the Workplace was released in 2005 as a department order of the country's Department of Labor and Employment (DOLE). The guidelines mandate all private establishments, workplaces, and worksites to formulate and implement a TB prevention and control policy and program. The document can serve as a guide for the components of the said policy and program.

In the six eligible countries, two of the documents reviewed were strategic plans, while four of them were policies. Out of the four policy guidelines, two of them (Malaysia and Papua New Guinea) were specific for healthcare facilities, while those for India and the Philippines were for employees in general.

In the last ten years, there have been three new policy guidelines and a strategic plan (India, 2019; Papua New Guinea, 2016; and Myanmar, 2016) and three older policy documents (Malaysia, 2012; Cambodia, 2009; and the Philippines, 2005). Table 1 compares each country's policy and scope.

Out of the 17 key components, 11 were part of the majority–at least four out of the six countries–of the policies reviewed. These include essential aspects of TB prevention to diagnosis, high-risk occupations, the development and implementation of clear management policies, and the provision of benefits to TB patients and their families.

On the other hand, six out of the 17 were least included by the majority of the countries. These were respect for patient rights and confidentiality, tailor workload to TB patient's state of health, register all patients with TB diagnosis, report cases to central NTP office, record standard treatment outcome, and multidrug-resistant TB (MDR-TB).

Among the six countries, Philippines covered most of the recommended key components (13/17), while Cambodia and Papua New Guinea included the least of these components (6/17).

Patient Protection

Patient protection covers respect for patients' rights and confidentiality, the provision of social welfare benefits to TB patients and their families, and tailoring workload to patients' state of health.

Confidentiality and non-discrimination were not consistently mentioned in all policies. Majority of the countries (4 out of 6), except Myanmar and Papua New Guinea, have separate policies on confidentiality for medical practitioners and HCWs.

With regard to confidentiality, those without legislation on patient confidentiality, namely Myanmar and Papua New Guinea, have not included such provisions in their policies. On the other hand, the rest of the countries have separate policies and legislation for medical practitioners and HCWs.[20-23]

Table 1. Profile of Countries by TB Incidence and Workplace Tuberculosis Policy Documents

Country (Code)	TB Incidence[19]	Policy Title	Issuing Agency	Year of Publication	Objectives	Scope
Cambodia (KMH)	288	National Health Strategy Plan for Tuberculosis Control in the Kingdom of Cambodia	National Center for Tuberculosis and Leprosy Control, Ministry of Health	2009	To define the priority strategic activities during the next five years based on the National Health Policies and Strategies for TB Control.	Select companies and factories classified under congregate setting
India (IND)	210	Policy Framework to Address Tuberculosis, TB-related Co-morbidities and HIV in the World of Work in India	Ministry of Labour and Employment	2019	To provide an operational framework for all stakeholders in the World of Work to end TB by 2025 through facilitation of a conducive environment to prevent infections, detect cases early, and provide access to free treatment and its adherence, not only to TB but also its comorbidities such as HIV.	All workers under all forms or arrangements, and all workplaces covering formal and informal sectors
Malaysia (MYS)	97	Guidelines on Prevention and Management of Tuberculosis for Health Care Workers in Ministry of Health Malaysia	Occupational Health Unit, Disease Control Division, Ministry of Health	2012	To provide a guideline in the prevention and control of TB infections among HCWs.	Healthcare workers in the Ministry of Health in Malaysia
Myanmar (MMR)	360	National Strategic Plan for Tuberculosis 2016-2020	National Tuberculosis Programme, Ministry of Health and Sports	2016	To accelerate decline in the prevalence of drug-sensitive and drug-resistant TB. To fully integrate TB prevention and care in Universal Health Coverage. To enhance the prevention of TB, particularly for high-risk populations.	Workplaces
Papua New Guinea (PNG)	424	Emergency Tuberculosis Operation in Papua New Guinea	Government of Papua New Guinea	2016	To establish general guidelines for potential environmental and social impacts of the Drug-Resistant Tuberculosis Emergency Operation in Papua New Guinea.	Healthcare facilities and emergency facilities in identified areas with DR- and DS-TB in Papua New Guinea
Philippines (PHL)	650	Guidelines for the Implementation of Policy and Program on Tuberculosis (TB) Prevention and Control in the Workplace	Department of Labor and Employment	2005	To formulate workplace policy and program on TB prevention and control.	All establishments, workplaces, and worksites in the private sector

In terms of the provision of social welfare benefits to TB patients and their families, only India, Malaysia, Myanmar, and the Philippines have included these policies.

Tailoring of the workload/tasks of patients to their state of health was only mentioned in India and the Philippines, while Cambodia, Myanmar, Malaysia, and Papua New Guinea did not indicate helping TB patients tailor their workload/tasks to the employees' conditions.

Promotion of Safe Working Environment

Stigma is suggested to be addressed through education campaigns in the workplaces to lead to positive health seeking behaviors.[24] Almost all (5 out of 6) countries included provisions to address the stigma surrounding TB in their respective countries. Among the strategies included were awareness activities and education campaigns that mostly involve influential members of the community such as community and religious leaders congruent with the StopTB Strategies.[25] Moreover, counseling, which may improve TB patient outcomes, was included in the Malaysian guidelines.[26] The policy of India included advocating for activities against the stigma in accessing TB services; however, it did not explicitly utilize education as a strategy.

The development and implementation of clear management policies is an essential principle for TB control.[24] Administrative controls have been identified at the top of the hierarchy of TB infection prevention and control methods.[27] One country (Philippines) mandated all private companies to establish their own workplace TB policies through legislation. The Philippines' policy also assigned a monitoring body to enforce and monitor the workplaces and their program implementation. India's policy offers a wider scope that covers all workers and all workplaces including the informal economy. The rest have limited scope, including healthcare settings under each country's ministries of health and certain high-risk groups. Next to administrative controls, the United States CDC identified environmental controls in TB prevention and control.[28] The goal of environmental controls is to reduce the concentration of the infective droplet nuclei.[24] As well as the provision of adequate ventilation and avoiding crowding may help decrease the risk of contracting TB.[29] All countries (6 out of 6) have provisions on the aforementioned environmental controls. Since the Malaysian guidelines were directed to healthcare settings, it provided more information on environmental controls, specifically on primary and secondary controls and their maintenance. Similarly, Papua New Guinea focuses on the safe working environment which explains its emphasis on infection prevention and control particularly administrative, environmental, and personnel protection controls.

TB Detection in the Workplace

Detection of TB in the workplace includes identifying TB suspects and proper diagnosis among TB suspects. Cambodia's national health strategic plan does not have a policy covering TB detection in the workplace. The other five countries include policies on identification of TB suspects. India's policy framework involves the early identification of workers and their families through voluntary periodic screening. Papua New Guinea's guidelines involve triaging to find symptomatic TB patients. In the Philippines' guidelines released in 2005, case finding is through direct sputum smear examination. Malaysia's guidelines focus on the early identification and diagnosis of HCWs through acid-fast bacilli (AFB) smears. Myanmar's plan includes identifying and treating all forms of TB, among all ages and including drug-resistant and drug-sensitive. In Myanmar's plan, it indicated expanding the MDR-TB diagnostic capacity including pediatric diagnosis, decentralizing the availability of GeneXpert testing down to the district level, as well as systematizing contact tracing for all household contacts of MDR-TB patients. When it comes to TB diagnosis in the workplace, only Malaysia, Myanmar, and the Philippines have policies covering it.

TB Treatment and Management

The WHO-recommended DOTS strategy provides directions for TB treatment and management.[24] In the policy framework of India, it indicated that it would ensure that the TB control program would be in line with the national policies and guidelines, but it did not clearly indicate that it would be specifically in line with the WHO-recommended DOTS strategy. The guidelines of Malaysia emphasize more on the detection and treatment of health care workers and is based on the recommendations on the CDC Guidelines for Preventing the Transmission of Mycobacterium tuberculosis In Health-Care Settings 2005, WHO Guidelines for the Prevention of Tuberculosis 1999, Guidelines for the Prevention of Tuberculosis in Health Care Facilities in Resource-limited Settings 1999, Tuberculosis in Infection Control in the Era of Expanding HIV Care and Treatment, CDC USA WHO US President's Emergency Plan for AIDS Relief International Union Against Tuberculosis and Lungs Diseases, and Consensus of a group of medical personnel's from various specialties, including respiratory medicine. In the Myanmar Plan, treatment regimens and diagnostic services and tests were based on the latest WHO recommendations. In the Philippine guidelines, all establishments shall adopt the DOTS in the management of workers with TB and their dependents. Given the general approach of the policy of Cambodia and Papua New Guinea, their respective policies did not mention the standard TB treatment guidelines for workplaces. The rest of the four countries include specific TB treatment and management policies for the workplace.

Reporting of Cases and Treatment Outcomes

Majority of the countries included in this review do not include policies on reporting of cases and treatment outcomes. Only Malaysia and the Philippines' policies mentioned this; however, the latter's policy does not include recording of

Table 2. Comparison of the Presence of Components of Workplace TB Control Activities

WHO and ILO (2003)	Cambodia	India	Malaysia	Myanmar	Philippines	Papua New Guinea	Total
Patient protection							
1. Respect for patient rights and confidentiality		■			■		2
2. Provision of social welfare benefits to TB patients and their families		■	■	■	■		4
3. Tailor workload to TB patient's state of health		■			■		2
Safe workplace environment							
4. Use of education campaigns to reduce stigma	■		■	■	■	■	5
5. Develop and implement clear management policies	■	■	■	■	■		5
6. Implement environmental controls	■	■	■	■	■	■	6
7. In line with NTP guidelines	■	■		■	■	■	5
TB detection in the workplace							
8. Identifying TB suspects (e.g., those with TB-like symptoms)		■	■	■	■	■	5
9. Diagnosis among TB suspects			■	■	■		3
TB treatment and management							
10. Standard TB treatment of TB patients		■	■	■	■		4
11. In line with WHO-recommended DOTS strategy	■		■	■	■		4
Recording and Reporting							
12. Register all patients with TB diagnosis			■		■		2
13. Report cases to central NTP office			■		■		2
14. Record standard treatment outcome			■				1
Special considerations							
15. HIV incorporation in TB control policies, HIV and TB co-infection		■		■		■	3
16. Multidrug-resistant TB (MDR-TB)		■		■			2
17. High-risk occupations	■		■	■		■	4
Total	6/17	10/17	12/17	12/17	13/17	6/17	

**Grey fill: present*

standard treatment outcomes. In the Philippine guidelines, all diagnosed cases of TB will be reported to DOLE. This will be part of the TB Registry of the Department of Health. In the Malaysia guidelines, it indicated that the reports should be submitted to the Occupational and Environmental Health Officer, State Health Department every month.

Special Considerations

WHO and ILO (2003) identified several special considerations for TB infection and control. First of which is HIV incorporation in TB control policies, HIV and TB co-infection. The risk of developing TB among people living with HIV is up to 18 times higher than the general population.[30] Only 3 out of the 6 countries addressed HIV incorporation and TB co-infections. Two (Papua New Guinea and Myanmar) of which identified TB-HIV co-infections as important in TB control. While the other (India) not only acknowledged the importance of TB and HIV co-infection, but also included the joint implementation of programs addressing TB and HIV in their workplaces. This is in line with the End TB strategy that advocates for collaborative TB and HIV activities.[19]

Majority (4 out of 6) of the policies identified high-risk occupations. Guidelines from Malaysia focused on the healthcare setting and HCWs belonging to the MOH. They were catered to the HCWs of the MOH as a response to the increasing TB incidence which may be work-related.[31]

Table 2 shows the presence or absence of the components of TB in the workplace based on WHO and ILO across all the three included policies.

DISCUSSION

The Asian region continues to have the highest burden of TB and latent TB infection in the world.[32] The inadequate TB prevention and control in work environments may contribute to the increased TB incidence, prevalence, and mortality rate in Asian countries.[33] Asian countries, especially

those with a high burden of TB should implement effective TB control and prevention programs. The findings indicate that out of the 27 LMICs, only six had TB prevention and control guidelines with provisions covering the workplace. Despite wide recognition of workplaces as at-risk settings for TB transmission and the publication of the WHO and ILO guidelines in 2003, there is an apparent limited uptake of expanding TB prevention and control in workplaces. Thus, there is a need for renewed discussions on implementing TB prevention and control in the national setting given its impact on workers' welfare and productivity. As much of the spread of TB occurs in crowded areas such as work settings, this increases the risk of employees acquiring TB infection as a result of workplace exposure.[10] This has negative consequences on both employees and employers in terms of decreased productivity, morale, and engagement.[34]

Strong linear associations between the lost economic productivity and excess of TB cases were observed in 15 countries.[35] In Uganda, an estimated 80% of wage earners incurred productivity losses with time off work spanning up to a period of 9.5 months within their productive years.[36] TB-related deaths impact macroeconomic outputs of countries due to the decline in the investment of human and physical capital formation as well as loss of labor and productivity.[37] Given the increased emphasis of infection prevention and control in workplaces following the COVID-19 pandemic, countries may consider expanding guidelines issued for COVID-19 to cover TB. As COVID-19 and TB both have overlapping symptoms, an effective strategy would be the use of operational guidelines and effective contact tracing in terms of prevention and control.[38] The public health measures taken to stop COVID-19 transmission also impact TB prevention and control.[39] The adoption and reinforcement of infection prevention and control (IPC) guidelines to reduce the spread of COVID-19 will also promote the control and prevention of TB.[38]

This is the first study to describe workplace policies based on the WHO and ILO TB in the Workplace Guidelines on TB in selected low and middle-income countries in Asia Pacific. The proponents were unable to find similar policy reviews to which the study results can be compared to.

Patient Protection

Confidentiality and non-discrimination are not consistently mentioned in all policies. The Philippines, India, and Malaysia have separate policies on confidentiality for medical practitioners and healthcare workers (HCWs).[21-23] However, it would also be beneficial to explicitly mention confidentiality and non-discrimination in workplace TB policies. The need for such is consequential due to negative perception towards people with TB in the three countries, which has been shown to serve as a barrier in TB health-seeking behavior.[40-43] To ensure the management of patient information and records, Papua New Guinea has a policy which states that only the approved health care personnel have access to the patient's confidential records and an e-health system would be utilized to guarantee that it is in accordance with the country's laws and global best practice. In Cambodia, the National TB Control Program in line with the International Standard of Tuberculosis Care provides patient support and care through free TB diagnosis and treatment, and subsidies for service providers for the public.

As part of protecting patients, the provision of social welfare benefits to diagnosed TB patients and family, such as maintaining salary during treatment period in order to motivate the patient to continue treatment. Socioeconomic support has been associated with beneficial effects on TB treatment, making it an essential component to ensure the success of TB treatment, especially for workers.[44] Government agencies responsible for workplace TB compensation were specified in the guidelines of the Philippines, while the guidelines of India recommended workplaces to provide compensation for workplace TB cases. Workplace TB benefits in the Philippines are integrated through various government policies.[45,46] This not only protects patients but may also motivate patients to continue treatment. In Myanmar, a standardized patient support package which provides financial assistance to patients on a monthly basis was implemented by the MOHS and its partners.

To support the recovery of TB patients, WHO and ILO guidelines (2003) suggested tailoring TB patients' workload to their state of health. Given the high levels of workload and job stressors which health and social service workers experience, tailoring their workload was found to improve their mental and physical health, as well as work ability and performance.[47] A study showed that employees who received tailored digital interventions resulted in faster return to work from their long-term sick leave.[48] Tailored digital interventions provided in the workplace improved mental and physical health, and work productivity among employees.[48] Effective workload management is important as it impacts employee productivity, mental health, physical wellbeing, and work engagement of employees in the workplace.[49] One study found that employees who were given flexibility to adjust their workload and working hours are able to recover between shifts and decrease potential sick leave.[50] Studies have shown that having a shortage of employees due to sick leave result in a higher workload for the employees at work thus affecting the quality of care provided and impacts employee's health.[51] All three countries considered tailoring workload to their employees' conditions but only Malaysia specified the duration of leave. Papua New Guinea, Cambodia, and Myanmar did not indicate tailoring workload to employees' conditions.

Safe Workplace Environment

A safe working environment along with IC measures and workplace occupational health programs is critically important to reduce workplace exposure to TB especially in the health care setting.[52] Reducing the stigma through

education campaigns in the workplaces lead to positive health seeking behaviors.[24] All six countries incorporated education and training to their guidelines. Counseling, which may improve TB patient outcomes, was included in the Malaysian guidelines.[26] Community awareness activities through a Radio Doctor program and community associations in line with the information guides provided by the National Tuberculosis Plan to reduce stigma and provide information on TB has been created in Papua New Guinea.

The development and implementation of clear management policies is an essential principle for TB control. The US Centers for Disease Control and Prevention (CDC) identified administrative controls as one of the main controls for TB infection, which also include environmental controls.[27] Hence, administrative controls through workplace TB policy are recommended. Several measures such as administrative, environmental, and facility controls as well as the use of personal protective equipment (PPE) are necessary to reduce the risk of spreading TB.[37] The Philippine workplace policy is mandatory for all private workplaces in the country. The Malaysian guidelines that cover institutions under the MOH. India's guideline covers workers under all forms or arrangements, and both formal and informal workplaces. For environmental controls, the guidelines of Malaysia specified primary and secondary environmental controls and their maintenance. Cambodia's guidelines are to be implemented in the entire country though their healthcare delivery system. Myanmar's plans and systems for TB care and prevention align with the Universal Health Coverage. For Papua New Guinea, it specified administrative controls, environmental controls, personnel protection controls, and highlighted improving ventilation to decrease the risk of infection. The implementation of environmental controls such as the installation of ventilation systems minimizes the risk of TB transmission among major populations.[53] All six countries have environmental controls in place as part of TB IPC.

A study found that TB disproportionately affects the poorest and most vulnerable populations such as those in mining occupations who are constantly exposed to silica dust in the workplace.[54] Studies have linked silica dust exposure in the workplace with increased risk of TB which necessitates a safe workplace environment to prevent exposure and reduce the incidence of lung cancer, TB, and other diseases.[54]

TB Detection in the Workplace

Actively screening TB suspects may improve case detection rates and control of TB to reduce further propagation and infection among other members of the community.[55] Interventions for the early identification of TB are crucial to enhance patient care, provide the needed treatment, improve health outcomes, and reduce the transmission of TB especially for high-risk populations.[56] The early diagnosis combined with the effective treatment of TB is key to controlling and preventing further risk of TB transmission within populations.[57] Malaysia specified early identification and diagnosis of patients with suspected TB to reduce the exposure of HCWs. Policies of case finding and diagnosis are indicated in the India and Philippine policy guidelines. Accelerating the appropriate diagnosis of TB, and identifying and treating all forms of TB are among the interventions of Myanmar. An analysis of the current TB challenges in meeting the goals of the End TB Strategy identified early detection and effective management of TB as needing improvement in order to reduce the mortality and prevent transmission of the disease.[58]

TB Treatment and Management

TB treatment is an essential factor to control the spread of TB especially in high-burden countries.[59] Adherence to the treatment is necessary to prevent progression to active disease.[60] Cambodia, Malaysia, Myanmar, and the Philippines adopted the WHO-recommended DOTS strategy in their policy guidelines, whereas India briefly mentioned DOTS but did not indicate whether the DOTS strategy is part of their guidelines. The WHO-recommended DOTS strategy is an approach wherein a healthcare worker or a trained volunteer observe TB patients swallow each dose of their medicine.[61] The WHO-recommended DOTS strategy for TB control allows for the accurate, standardized diagnosis and treatment by curing infectious patients and preventing the spread of TB from the source which protects children and communities.[62]

Recording and Reporting

The accurate reporting of TB treatment outcomes and identifying associated factors is a fundamental part of the End TB Strategy.[63] The Philippines' policy guidelines, specifies the recording and reporting of all diagnosed TB cases; however, no specific information as to whether cases are to be reported to the central NTP office or not. In the policy guidelines of Papua New Guinea and India, no information was provided on the registration of TB patients, recording of the standard outcome, and reporting of the results to the central NTP office. Papua New Guinea did not focus on reporting cases to the central NTP office as it only aims to protect employees. Myanmar, similar to Cambodia, mentions strengthening the recording and reporting system to ensure case notifications to NTP. Only Malaysia and Philippines had recording and reporting requirements with Malaysia focusing on HCWs, and the Philippines covering all private workplaces.

Special Considerations

WHO and ILO (2003) identified several special considerations for the following groups of population. Among these are HIV/AIDS and TB co-infection and Multidrug-Resistant TB (MDR-TB), both of which were not mentioned in the India policy framework, Myanmar plan, and Papua New Guinea policy guidelines. High-risk occupations that were part of the special considerations were not mentioned in the workplace guidelines of the Philippines and India,

while guidelines from Malaysia focused on the healthcare setting and HCWs belonging to the MOH. The Malaysian guidelines were catered to the HCWs of the MOH due to the increasing TB incidence which may be work-related.[31] Cambodia's strategy plan encompasses dealing with TB/HIV, multidrug-resistant TB (MDR-TB). Myanmar highlights the urgent need to incorporate TB IC in Occupational Health and Safety programs including the surveillance of active TB disease among workers at high-risk/high-volume work settings. Papua New Guinea also incorporates HIV care and treatment combined with regular TB screening. Despite only 3.6% of incident cases and 18% of those previously treated for TB in 2021 tested positive for multidrug resistance TB (MDR-TB), it continues to be a threat since only 6 out of 10 cases achieve treatment success.[64] Only two (India and Myanmar) have provisions to address MDR-TB. The policy of Myanmar highlighted a community-based approach to MDR-TB through advocacy, communication, and social mobilization. This directly addresses findings of Htun et al. regarding the lack of awareness and the lack of health education on MDR-TB as one of the causes of MDR-TB diagnosis and treatment delays in Myanmar.[65]

The study results are aligned with those of similar researches particularly on addressing the negative perception towards people with TB; providing adequate socioeconomic support for treatment; ensuring that workload is adjusted to each worker; responding to the specific needs of vulnerable populations; increasing capacity for early diagnosis; effective treatment and accurate reporting; and educating the community.

Strengths and Limitations

The limitations of the study include the non-inclusion exclusion of newer policies, language and availability bias, and lack of multi-country representation of authors.

New policies outside the study period (June 2023 to September 2023) were excluded. New policies could significantly impact the landscape of the topic under investigation, and their exclusion may limit the study's relevance and timeliness. Restricting inclusion criteria to policy documents written in the English language and to those which are available online may have resulted in limiting the information used for the study.

The discrepancies in the assessments were addressed by conducting a three-phase review with the last phase using an iterative process.

Multi-country representation may affect the study's breadth of perspective and cultural sensitivity. Collaborating with authors from diverse geographical backgrounds can enrich the research process by incorporating varied viewpoints and experiences, potentially enhancing the study's applicability to different contexts. Despite these limitations, the researchers' experience in international collaborative research could mitigate some of these challenges. The authors' expertise in occupational health and tuberculosis policies allow for the critical evaluation of the policy documents due to their familiarity in the subject matter which strengthens the study's credibility.

The individual assessments made by each researcher help mitigate potential biases and increase the reliability of the findings by incorporating diverse perspectives. The convening of these groups to resolve any differences in assessments further enhances the validity and consistency of the study.

The inclusion of both plan and policy documents broadens the scope of the study, providing a comprehensive analysis of the provisions. Adopting a low threshold for compliance of the provisions, where partially met components are still considered compliant allow for a more effective evaluation of the policies.

CONCLUSION

This study highlighted the importance of integrating TB prevention and control in workplace policies. The six reviewed documents incorporated most of the TB workplace program components recommended by the WHO and ILO.

In terms of the presence of components of Workplace TB Control Activities, there are variations in the provisions across countries. Each country designed their policies to make them suitable to their respective settings.

The study results support that, in accordance with the WHO and ILO guidelines, TB in the workplace guidelines is highly recommended, in particular in countries with high TB burden, which are mainly LMICs. Implementation of TB control policies in the workplace will be beneficial for both HCWs and regular workers to be protected from infection risks and to maintain the health of the workforce.

Recommendations

The WHO and ILO Guidelines for workplace TB control activities (2003) have not been updated in almost two decades. Updating the workplace TB guidelines is necessary, especially that workplace policies have been shown to address issues of discrimination in promotion, pay, and benefits in workplace HIV programs.[66]

It is important to update the provisions related to conduct of risk assessments for establishing TB controls, workplaces as sites of treatment and care, systematic screening for at-risk current and former workers (those with silica exposure), and update on diagnosis and management, including MDR-TB.[27,39,67-69] COVID-19 prevention and control that are applicable to TB should also be incorporated in the workplace policies. Moreover, it is necessary that the updates are aligned with the latest TB control guidelines such as the use of molecular diagnostic methods.

Gaps in the reviewed policies include the limited scope of the policies, and the lack of inclusion of special considerations, such as MDR-TB and co-morbidities need to be addressed. This study aimed to describe workplace TB guidelines in LMICs with high TB burden through a desk review. Policy

analysis is recommended to obtain a better understanding of the strengths and weaknesses in implementing the policy documents included in this study. Policy implementation may be evaluated by employing targeted data collection methods such as surveys, key informant interviews, and focus group discussions with stakeholders as respondents. Future research should aim to include a multi-country representation of authors.

Acknowledgments

The authors would like to acknowledge Johnson & Johnson Philippines for providing financial support for the study. This study was conceptualized based on the TB in the Workplace Project funded by Johnson & Johnson Philippines. The authors would also like to thank the Philippine Department of Labor and Employment and the Department of Health for providing the national policies and guidelines related to TB in the Workplace.

Statement of Authorship

All authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure

All authors declared no conflicts of interest.

Funding Source

This work was supported by Johnson & Johnson (Philippines), Inc.

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