

Tuberculosis infection control practices: Barriers and facilitating factors

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Abstract

According to Papua New Guinea's National Health Plan, 2011-2020, tuberculosis (TB) remains one of the top ten causes for treatment recorded in hospital and health centre admissions records and is the second highest cause of morbidity and mortality in PNG. Further, PNG has a high incidence of TB and human immunodeficiency virus (HIV) co-infection. This article presents a review of literature undertaken as part of a research project on PNG's TB infection control practices. Details of the findings of the study will be presented in another article. The literature review explores issues associated with TB control measures, health workforce, finances, basic medical equipment and supplies, and health infrastructure and facilities in a global context. The findings highlight a need for research in PNG for improving the implementation of infection control measures for tuberculosis.

Keywords: tuberculosis infection control, developing countries, health care workers, barriers, facilitators, motivators, district and rural hospitals, nurses, qualitative study, Papua New Guinea

Introduction

Tuberculosis (TB) is a major health issue in Papua New Guinea (Government of PNG, 2010, p.12) and this article seeks to explore what is known about TB infection control measures. According to the *National Health Plan 2011-2020*, TB remains one of the top ten leading cases for treatment recorded in hospital and health centre admissions and is the second highest cause of morbidity and mortality in PNG. Additionally, PNG has a high incidence of TB and human immunodeficiency virus (HIV) co-infection. In recent years there has been the emergence of multidrug-resistant TB (MDR-TB) and extensively drug-resistant TB (XDR-TB) (Diefenbach-Elstob, 2014; Ley, Riley, & Beck, 2014; Macfarlane & Alpers, 2009; McBryde, 2012). This suggests that PNG may not have the ability to control the disease if future TB patients are immune to these drugs.

According to a 2015 World Health Organization (WHO) report, approximately 9.5 million people worldwide were affected with TB in 2014, with twelve percent of the TB cases being HIV positive. Studies have also found that the majority of people infected with TB live in developing countries or low-income and middle-income regions where public health systems are typically weak and poorly resourced (Nunn, Reid, & Cock, 2007; WHO, 2009 & 2012). Despite successive initiatives designed to reduce the transmission of TB, it continues to

claim millions of lives around the world. In 2009, the WHO recommend several types of infection control measures to be implemented in the healthcare facilities and in settings where people congregate such as prison and households with TB patients.

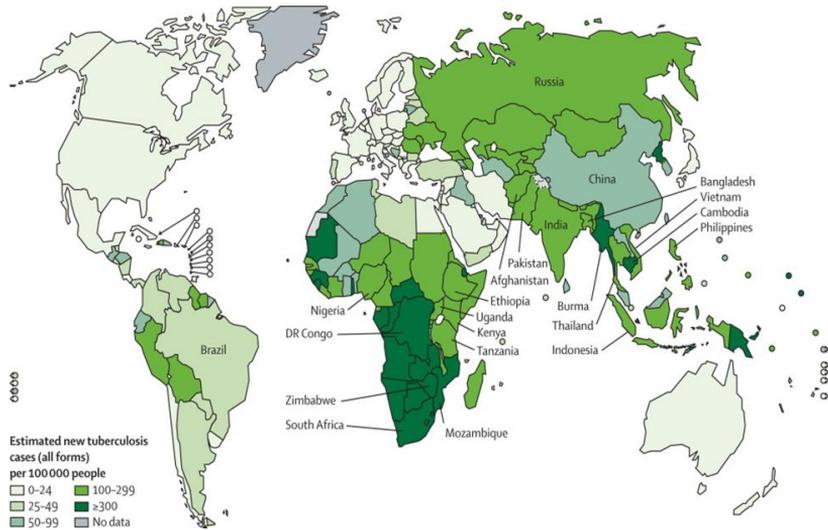


Figure 1: World map showing where majority of people infected with TB live Source: <http://www.thelancet.com/article/S0>

While the literature attempts to identify some challenges and factors influencing TB infection control measures, there is a gap in evidence concerning the implementation of infection control precautions in the field in grassroots health facilities. What restraints are relevant to optimal implementation of TB control? How can these restraints be addressed to implement TB infection control measures adequately in PNG health facilities? What are the implications of tuberculosis infection control studies?

TB control measures

According to WHO (2009), TB control measures form a hierarchy:

1. administrative controls that deal with systems to ensure prompt recognition, investigation and treatment of suspected and confirmed case
2. environmental controls that involve isolating patients suspected or confirmed to have TB in appropriately ventilated rooms
3. personal protective equipment including the use of respirators to control the spread of pathogens among health care workers, patients and visitors in healthcare settings.

These measures have been found to minimize the transmission of TB in health facilities and the WHO recommends that all health facilities, prisons and households caring for TB patients or persons suspected of having TB implement these measures to prevent the transmission of TB among health care

workers, inmates, other workers and communities. However, empirical evidence shows that there is an insufficient application of recommended actions in many health care facilities in developing countries.

Health workforce

The aim of national and global health plans is to reduce the burden of disease and improve people's health status. The primary barriers to achieving this goal include prolonged shortage, misdistribution, and understaffing of health centres in many developing countries. According to Sissolak, Marais, and Mehtar (2011), understaffing at health facilities considerably affects the successful implementation of TB infection control measures including cough etiquette, separation, and screening. They claim that there is an incomplete application of TB control measures at the hospital outpatient departments and TB wards. Naidoo, Seevnarain and Nordstrom (2012) support this claim that the shortage of employees influences TB control programs in the majority of the health facilities in Africa. They argue that service users including employees, patients, and visitors were at greater risk of contracting TB.

Sissolak, et al. (2011) stress that there are still significant questions surrounding staffing level and TB risk. They argue that staff turnover and migration contribute to the chronic shortage of staff at health facilities. The health centre is often not responsible for jobs and recruiting new health workers. Over many years, regional and provincial level administrations are responsible for employing staff and this takes time (Aziz, 2008). Should the trend continue then, it is projected that the quality of health services could deteriorate. Recruitment and retention strategies, focusing on strengthening the health workforce are essential.

TB infection control practices entail numerous inter-related tasks. By their very nature, these jobs add extra responsibilities to the insufficient staffing levels at the health centres. Woith, Volchenkov, and Larson (2010), contended that TB infection control measures including screening patients with a cough, conducting health education, and sputum examinations are additional tasks for already overstretched staff. Sissolak, et al. (2012) argue that three quarters (75%) of health care facilities encounter difficulties with program implementation. Circumstances suggest that among the many factors identified, multiple tasks associated with TB control program and understaffing are significant.

In contrast, Woith et al. (2012) claim that some health centers had efficient workplace practices despite having limited staff. This improvement occurs as a result of government initiatives to strengthen health workforce in the country's health system (Atkins, Lewin, Ringsgerg, et al., 2011). One method of addressing this issue is to redistribute tasks to health workers with limited training or task-shifting. Health managers and policy makers make efficient use of limited available human resources and thus increase and strengthen coverage of critical health interventions (Glenton, Colvin, Carlsen, et al., 2013). Redesigning clinicians' jobs so that current workers share equal

responsibilities, is intended to address job overload. Strengthening human resources and improving job specifications are important for facilitating effective implementation of TB infection control measures at the health care facilities.

Finances

Over the decades, healthcare managers have sought to make health systems more effective. Financial management is a central element of this organisational effectiveness. However, issues surrounding the lack of finance in the health system are of great concern to many countries. As Duckett and Wilcox (2011) noted, the inability to fund the cost of other inputs including staffing, equipment, information technologies and supplies have a significant influence on health care delivery, and hence financing is critical to obtaining these other inputs. Popesko, Tuckova, and Kada. (2010) and Buregyeya, Nuwaha, Verver, et al. (2013) support this finding and maintain that in Africa, rural hospitals failure to secure sufficient funds contributes to the incomplete application of TB infection control measures. They argue that financial shortfall has several implications for TB control programs including procurement and management of TB infection control measures such as face masks, and adequate ventilation systems in TB wards.

Furthermore, Zelnick, Gibbs, Loveday, et al. (2013) found that failure at the provincial level to disburse funds on time affects health facilities in the districts. They report that cash flow issues at the management level were among the most significant barriers to purchasing medical equipment. In contrast, Atkins, et al. (2011) found that health facilities managers' failure to monitor cash flow also contributes to the lack of funds in health services. Knowledge of accounting and financial management systems are critical elements to obtaining other inputs. The theories of effective financial management do play an essential role in the health system and are central to the notion of organisational effectiveness.

Medical products, vaccines and technology

There is a growing concern about the shortage of basic medical equipment and supplies in developing nations worldwide. Many similar studies point to the need for adequate equipment and supplies as central to the effective implementation of TB infection control measures program. Woith, et al. (2012) argue that an inconsistent focus on individual level personal protection equipment, specifically N95 particulate masks, increases the risk of TB transmission. Sissolak, et al. (2011) and Brouwer, Coelho, Mosse, et al. (2014) support this finding that shortage of materials and unavailability of equipment including N95 particulate masks, boots, and gloves was a major concern for TB control programs. Brouwer et al. (2014) suggest that a consistent supply and distribution strategy is an important part of medical supply management.

However, several recent studies have also found that health workers often do not use some medical supplies leading to wastage. Brouwer et al. (2014)

stressed that some health workers do not use the surgical masks despite their availability in the wards. Several other authors agree that health care workers frequently have insufficient knowledge to use masks and respirators correctly (Woith, et al., 2010; Woith, et al., 2012; Zelnick, et al., 2013).

Health infrastructure and facilities

Planning and investment in healthcare systems and infrastructure are necessary for sustainable health services. Ley, Riley and Beck (2014) stressed that improper arrangement and organisation of core medical services deter easy access and delay proper diagnosis and treatment. The authors found that the location of patient consultation rooms and basic radiology services affect easy access to these services. This observation supports the notion of process effectiveness put forward as a central strategy in health management (Popesko, Tuckova, & Kadak, 2011). The authors assert that conceptual knowledge about the organisational structure of health systems was a vehicle for effective decision making.

Hussein et al. (2012) claimed that a lack of on-going preventive maintenance is a common cause of break-downs which often take months to repair. Even though some parts of the health systems are weak, other parts are excellent. Confirming this argument, Ley et al. (2014) maintain that TB cure rates dramatically improved when patients easily access X-ray and laboratory services. Health services that are affordable and readily available improve utilisation. Redesigning a healthcare system that is resilient can provide health services that meet the needs of its population, ever after major disasters or national events.

Evidence shows that poor management and planning of structures and facilities in healthcare settings is a significant barrier to effective implementation of health programs (Murray, 2014; Woith et al., 2012; Zelnick et al., 2013). Sissolak et al. (2012) reported that a dirty TB ward in a health facility restricts nursing staff from performing their duties. They argue that there is an inadequate response from the hospital administration to refurbish the infrastructure, thereby, demotivating the nurses to attend to their duties. Similar studies by Woith et al. (2012) reported that x-ray and laboratory facilities were faulty for a couple of weeks without any maintenance. Consequently, employees sent suspected TB cases to other health centres or home. The authors argue that this situation discourages patients and erodes trust in the medical systems, and patients turn to traditional healers to seek treatment, while others never return to a hospital for medical attention. The risk of TB transmission among the communities and family members is high if patients with active TB are not on treatment (Aziz, 2008; Woith et al., 2012).

Poor management systems may hinder an organizations capacity to attain its objectives. According to De Costa et al. (2014), health facilities with poor infrastructure had little coverage of TB infection control measures. They claim that separation of TB patients from other patients is difficult due lack of space in health centres. Harries et al. (2009) support the notion that adequate

infrastructure at the health centres enhances the likelihood of successful TB control. They assert that medical workers were unable to implement triaging, cough etiquette, separation, and isolation of suspected and confirmed cases due to lack of spacing in the outpatients and wards (Harries, Kwanjana, Hargreaves, Gorkom, & Salaniponi, 200; Harries, Jensen, Zachariah, Rusen, & Enarson, 2009). They stress that employees cannot separate suspected TB patients from other patients due to limited space in wards. Like many other countries, population increases exert pressures on the existing facilities. In a health centre in sub-Saharan Africa, the laboratory had a shortage of essential equipment and forced the laboratory worker to remain at home, and, therefore, created a barrier to timely diagnosis and treatment of suspected cases (Claassens, Schalkwyk, & Borgdorff, 2013; Harries, et al., 2009).

Conclusion

This literature review outlines some of the studies and findings of TB research into infection control measures. Many researchers have investigated health worker experiences of barriers and facilitators to TB infection control. Others examined nurses' perspectives of the challenges with the implementations of TB infection control mostly in developing countries. This literature review shows that some researchers conducted studies on the barriers and facilitators to effective applications of TB infection control measures in rural health facilities in Africa. In the PNG health care system, district hospitals are the major health service provider and referral centre for rural health services. Nurses are the backbone of rural health services and constitute the bulk of the work force (Bock, Jensen, Miller, et al., 2007). Although nurses play a central role in tuberculosis infection control in PNG, there is a lack of empirical literature on nurses' experiences of TB infection control measures at healthcare facilities and evidence that their use of infection control precautions are not optimal.

The majority of the overseas studies focus on challenges facing health care workers implementing TB infection control measures at health facilities. Woith et al. (2012) study of barriers and facilitators affecting TB infection control practices of Russian health care workers affirm that numerous interconnected factors influence the implementation of TB infection control measures at the healthcare settings. In conclusion, the literature review suggests that majority of the health facilities globally apply TB infection control measures inappropriately owing to multi-faceted and interconnected factors. Given the severity of the TB problem in PNG, there is a clear need for more research this field.

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