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Validation of the Guidelines to Enhance Health Care Workers' Implementation of Effective Tuberculosis Control Measures in Rural Public Hospitals of Vhembe District, South Africa

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ABSTRACT This paper describes the validation processes that were undertaken to test the authenticity and usefulness of the developed guidelines. A qualitative descriptive design using communicative method was adopted. Participants were all four TB control managers stationed at Vhembe Health district offices representing the seven hospitals from where the original data was collected. All the necessary permissions were obtained prior to data collection. Data was collected using one to one discussion. Data was analysed using Techs' open coding method. The participants confirmed that the guideline concepts fit the data; and that they are relevant to TB infection control; and that they represent TB infection control situation at rural public hospitals. Participants believed that the guidelines will be useful only if managers can be trained first. The guidelines proved to be authentic and useful, and therefore should be adopted by employers as the basis for the development of tuberculosis training policy.

INTRODUCTION

Worldwide the risk of becoming infected with Tuberculosis (TB) is increasing in healthcare settings (Center for diseases control [CDC] 2015). Javis (2014) therefore emphasises that effective and appropriate infection control measures that seeks to minimize transmissions of TB in hospitals should be practiced if TB control is to be achieved in South Africa (SA). However, evidence indicate that non-specialised hospitals in SA have no effective TB infection control programmes in place, which suggest that there is an on-going substantial risk of TB transmissions in hospitals (Bramford and Taljaard 2013). The National Department of Health's 2011 discovery that more than half of all XDR-TB infections in SA were acquired in public hospitals (DOH 2011) confirms the presence of this health risk. In addition, Robinson et al. (2007) reported that TB nosocomial infection was a serious cause of morbidity and mortality in children hospitalized for the treatment of TB in Cape Town, SA. Furthermore, Singh et al. (2007) found that lack of TB infection control in institutions was a neglected yet significant factor fuelling the MDR- and XDR-TB outbreaks in KwaZulu-Natal. Similarly, a study conducted by Tshitangano (2014) at seven rural hospitals of Vhembe district discovered that health care workers (HCWs) implement ineffective measures of TB control. The ineffective measures of TB control adopted by HCWs in rural hospitals of Vhembe district are summarised as themes and sub-themes in a Table 1.

Based on Tshitangano (2014) findings, guidelines to enhance health care workers' implementation of effective TB control measures to minimize the risk of contracting TB in public hospitals were developed (Tshitangano et al. 2014). The guidelines explain that health care workers (HCWs) encounter several dynamics during their care of TB patients within the hospital context (see Table 1: theme 4). The dynamics experienced by HCWs include, lack of clear directing TB control guidelines; inadequate TB control training with insufficient content; inappropriate designs of buildings; inadequate material resources; inadequate human resources; inadequate management support; incorrect attitudes towards good TB control measures; and inadequate knowledge of good TB control measures. These dynamics are perceived to influence HCWs' adoption of ineffective TB measures (Table 1: theme 1-4). These dynamics are explained based on their attributes as follows:

Lack of clear directing TB IC guidelines means hospitals lacked TB control plans. A guideline according to the Oxford English Dictionary (2015) "is a statement by which to determine a course of action." Inappropriate designs of buildings on the other hand mean that: windows were not placed on outer walls; waiting areas were not opened to the environment; flip-

Table 1: Summary of the ineffective measures of TB control adopted by HCWs

Themes	*Sub-themes*
Theme 1: Administrative TB Infection Control Measures	1.1 Lack of TB IC plans; 1.2 Ineffective practices of dealing with LTBI; 1.3 Ineffective triage practices; 1.4 Delay in TB suspicion, diagnosis and treatment; 1.5 Ineffective practices of isolating infectious TB patients; and 1.6 Unsafe sputum collection practices.
Theme 2: Environmental TB Infection Control Measures	2.1 Ineffective practices to improve room ventilation;
Theme 3: Personal Respiratory Protective TB Infection Control Measures	3.1 Shortage of masks especially N95 respirators; and 3.2 Ineffective practices regarding use, care and disposal of personal respiratory protective devices.
Theme 4: Dynamics Faced by HCWs in Rural hospitals.	4.1 Lack of clear directing TB IC guidelines; 4.2 Inadequate TB infection control training with insufficient content; 4.3 Inappropriate designs of buildings; 4.4 Inadequate material resources; 4.5 Inadequate human resources; 4.6 Inadequate management support; 4.7 Incorrect attitudes towards good TB control practices; and 4.8 Inadequate knowledge regarding of good TB control practices.

ping type of windows did not allowing maximum air entry to the wards. According to the Oxford English Dictionary (2015) building design refers to the broadly based architectural, engineering and technical applications to the design of buildings.

Inadequate material resources mean that: HCWS experienced a shortage of masks, especially N95 respirators; hospitals lacked mechanical ventilation; hospitals lacked of TB isolation wards. According to the Oxford English dictionary (2015) *material resources* are defined as "supplies consumed in the course of fulfilling a task". Inadequate human resources on the other hand means that: hospitals lacked functional TB control committees; hospitals lacked persons designated as TB control officers; hospitals lacked persons assigned the responsibility of identifying and fast tracking TB suspect persons; hospital lacked TB control teams; hospitals lacked persons charged with the responsibility of conducting TB control trainings. The Oxford English dictionary (2015) defines *human resources* as "individuals who make up the workforce of an organization, business sector, or economy".

Inadequate TB control management support means that: hospitals lacked clear TB control guidelines; hospitals had inadequate material resources; hospitals had inadequate human resources; HCWs received inadequate TB control trainings; and the buildings are inappropriately designed for TB control. According to the Oxford English dictionary (2015), management support means finding out from the employees themselves what they need in order to do their job well, and making sure that such is available.

Incorrect attitudes towards good TB control measures means that: HCWs did not go for periodic screenings when they were invited to attend free of charge; movement of TB in-patients were not restricted because HCWs believed it was difficult to control the movement of a patient who can walk; HCWs did not attend TB control training conducted despite invitation. The Oxford English dictionary (2015) defines attitudes as "a settled way of thinking or feeling about something".Inadequate TB control knowledge on the other hand means that: HCWs misquoted dates of TB control policies and programmes; HCWs were not aware of that, which is called "TB control plan"; HCWs did not know which mask to be used by which category of stakeholders and when. The Oxford English dictionary (2015) defines knowledge as "an awareness or familiarity gained by experience of a fact or situation".

The developed guidelines assume that HCWs need the support of management to improve the dynamics experienced during the care

of patients. This is so because Erasmus et al. (2013) perceive management functions to include purchasing, finance, operations, human resource etc. Based on the decisions implemented at hospitals such as that of hanging curtains in TB wards preventing maximum air entry and promoting TB transmissions in hospitals (Tshitangano et al. 2013), the guidelines perceive hospital management as having inadequate TB control knowledge to deal with HCWs' dynamics.

The developed guidelines therefore suggest that managers should be the first to receive Tb training, assuming that if managers receive TB control training based on TB control protocols, managers will be empowered with skills and knowledge to offer HCWs support by improving the dynamics. It is further assumed that when HCWs are receiving the necessary support in terms of staff, materials, structural designs etc., will be motivated to adopt effective TB control practices, which will help minimize the risk of TB transmissions in hospitals.

However, in spite of having met all the criteria of scientific rigor in each stage of the guideline development, the researcher believed that the developed guidelines need validation, which is defined by the Advanced English Dictionary (2015) as "the act of testing the truth of something or the cognitive process of establishing a valid proof". In addition, validation was defined by the Oxford Advanced Learners' Dictionary (2015) as "to state officially that something is useful and of an acceptable standard".

In science, theories are subject to validation and depending on the results thereof, theories are rejected (falsified) or temporary (accepted) (Recker 2013). Thus, this paper aims to describe the validation processes that were undertaken to test the authenticity and usefulness of the develop guidelines and describe the results thereof.

Objectives of the Study

- Asses the authenticity of the guidelines
- Evaluate the usefulness of the guidelines

METHODOLOGY

The Study Design

A qualitative exploratory design using the communicative method (also called member check) was used (Swan 2015).This design was chosen in line with Tonges et al. (2011), who pointed out that communicative validation, refers to corroborating an interpretation or analysis through member check. Similarly, Lee et al. (2014) define communicative validation, as "a methodological step, which involves sharing one's understanding and interpretation of the data with the participants of the main study". The rationale behind the communicative validation was to obtain stakeholder buy-in regarding the acceptance and implementation of the developed guidelines.

The Study Setting

The guideline validation was conducted at Vhembe Health District, TB management offices situated at the old parliament building in Thohoyandou CBD.

Study Population, Sample and Sampling Procedure

The target population was all four TB control managers stationed at Vhembe District offices representing the seven hospitals from where the original data that yielded guidelines were collected. At the most, one TB manager represented more than one hospital for an example; participant 1 represented hospitals C and B; participant 2 represented hospitals A and D; participant 3 represented hospitals E and G; and participant 4 represented hospital F.

Data Collection Tool

The researcher developed a guideline validation interview guide, which guided data collection. The interview guide comprised of unstructured questions that needed participants' evaluation of the authenticity and usefulness of the guidelines.

Pilot Study

During the pilot study, a colleague assisted the author to collect data from one participant who is working in one of the hospital that render TB services in the district who did not participate in the main study. The participant attested to the clarity of the interview guide. The findings from these two data collectors were compared and no difference was observed in the findings. Modifications on interview guide were

made based on the inputs of the supervisor and the pilot study participant (De Vos et al. 2005).

Ethical Considerations

The researcher used the ethical clearance obtained from UNIVEN (project no: SHS/10/PDC/02) as well as the approval letter from the provincial department of health (project no: 4/2/2) to enter the district. Personal individual contacts were made to convince participants to participate in this validation study. Participants were given a chance to consent their willingness to participate verbally and by signing a consent form. Participants were told that the findings of the study will be published in accredited journals. Their rights to be protected from harm were observed.

Data Collection Method and Process

The data collection method used in this guideline validation was unstructured interviews. The researcher printed the code book containing the concepts and the assumptions of the developed guidelines, which were presented to each participant. The aim was to direct the data collection and analysis in order to align such to the purposes of the validation. Though the researcher planned to have seven unstructured interviews (one at each of the seven hospitals), data saturation was reached after four interviews were conducted on behalf of all the district's seven hospitals that participated in this study, namely Donald Frazer (hospital C), Malamulele (hospital A), Loius trichardt (hospital G); Musina (hospital E); Elim (hospital F); Siloam (hospital D) and Tshilidzini (hospital B). The data collected were recorded as field notes.

Data Analysis

Validation data was analyzed using Tech's (1994) open coding method described by Creswell (2009). This method of analysis comes under the umbrella of qualitative interpretive analysis, which involves reading through the data repeatedly; engaging in activities of breaking down and building up again in novel ways thus, elaborating and interpreting data (Terre Blanche et al. 2006).

Measures to Ensure Trustworthiness of the Study Findings

Trustworthiness was ensured through the use of Lincoln and Guba's (1985) criteria, outlined in Creswell (2009) namely credibility, transferability, confirm ability and dependability. Credibility was ensured through prolonged engagement with the participants, which lasted from 1.5-2 hours. Transferability was ensured through the provision of a complete description of the research method and interpretation of the research findings in the study report. A neutral colleague from the same university examined the running account of the process of inquiry as well as the findings and recommendations; and attested that the findings are supported by data; and that the study is internally coherent (Babbie 2010).

RESULTS AND DISCUSSION

The study findings were presented in the form of themes developed on the basis of the purpose of the paper namely authenticity and usefulness. Data pertaining to each theme are presented qualitatively supported by excerpts of what participants said.

The Authenticity of the Guidelines

Authenticity is defined by the Oxford advanced learners dictionary (2015) as "the quality of being genuine or true". According to the Advanced English dictionary (2015) authenticity is the undisputed credibility. In order to test the authenticity of the guidelines, validation participants were requested to give comments as to whether the data fit the concepts identified in the guidelines.

According to the findings from data analysis, all four participants felt that the identified guideline concepts (Table 1) fit the data; are relevant to TB control and they represent what is happening in hospitals. However, two of the participants stated that though the concepts represented what is happening at their hospitals, three did not.

According to participant 1 representing hospitals B and C,

"The concepts fit to the data and are relevant to TB infection control and they represent what is happening in hospitals except concepts

three and five." Participant 2 representing hospital A and D confirmed this claim and said, *"Concepts fit to the data, are relevant to TB infection control and represent what is happening in hospitals."*

Additional confirmation was made by participant 3 representing hospital E and G, who said,

"The concepts fit the data and are relevant to TB control. They are representing exactly what is happening at hospital." Similarly, participant 4 representing hospital F said, *"The concepts fit the data and they are relevant to TB infection control, though some of the data do not represent what is happening at my hospital at the moment, especially concept one. Generally the issue of TB infection control measures to be followed on daily basis is not happening as expected, possibly due to lack of knowledge and information."*

Based on these responses, the researcher perceived that the identified guideline concepts represented what is happening in rural hospitals of Vhembe District; and is not products of the researcher's imagination.

Chinn and Jacobs (1987) named concepts representing what is happening in reality "situational factors". Situational factors are defined by the Advanced English dictionary (2013) as factors that contribute to a set of different conditions to which an individual acts or reacts to. According to the National Strategic plan of South Africa 2012-2016 (DOH 2015), TB infection control practice situational factors include, inadequate coordination of the public, private and non-government sector responses to TB; the lack of robust monitoring and evaluation of the TB National Strategic Plan; the failure to ensure a truly multi-sectorial and integrated response to TB; a weak focus on human rights and justice regarding TB infection control and the lack of a comprehensive and integrated approach to TB prevention (DOH 2015).

All the situational factors identified by the National Strategic Plan of South Africa 2012-2016 (DOH 2015) collectively amount to management support, identified as a one of the concepts of the guidelines, which attested to the relationship between theoretical variables and practice variable (Chinn and Jacobs 1987). The developed guidelines regard management support as an element, which drives the adoption of effective TB infection control practices believed to minimise the risk of contracting TB in hospitals. Therefore, the guidelines were deemed authentic and able to meet the fit criteria of well-developed guidelines. The fit criteria state that if the guidelines are faithful to the daily reality, they must fit the substantive area of study (Da Silva de Souza et al. 2011).

Usefulness of the Guidelines

Usefulness is defined by the Oxford Advanced Learners' Dictionary (2015) as "that which can help one to do or achieve what one wants". In order to judge whether the guidelines were useful, validation participants were asked to compare the theoretical goals of the guidelines against the practice goals of the South African TB control standards. It was made clear to participants that the developed guidelines aims to enhance health care workers' adoption of effective measures that are known to minimises the risks of contracting TB in hospitals; assisting the district to reduce the number of new TB infections by detecting 70 percent of new infections and ensuring 85 percent cure rate.

The TB infection control practice goals of the Vhembe District were arranged in terms of 20-year vision, broad goals and key strategic objectives in the National Strategic Plan 2012-2016 (DOH 2015). According to the DOH (2015), the 20-year TB vision for South Africa aim to attain zero new TB infections; zero new infections due to vertical transmission; zero preventable deaths associated with TB; and zero discrimination associated TB. In line with this 20-year vision, the National Strategic Plan state broad goals namely, reducing the number of new TB infections and deaths from TB by 50 percent; and reducing self-reported stigma related to TB by at least 50 percent. In addition, key strategic objectives, which include, addressing social and structural barriers to TB prevention and care; and preventing new TB infections are stated (DOH 2015).

The validation participants were thereafter asked to comment on the probability of the guidelines to help the district achieve the above-stated TB infection control goals. All participants believed that the guidelines will help the district achieve TB control goals only if the managers are trained first.

Participant 4 from hospital F said, *"I think the main challenge is lack of supervision and involvement or commitment shown by management on TB infection control. This is resulting in nurses who are trained and when they come back they don't apply or practice what they were trained on workshop."* Confirmation of this claim was made by participant 2 from hospital A and D, who said, *"The guidelines will be very useful especially where they suggest that the managers are supposed to know the subject first so that they are able to disseminate it to subordinates."* Additional confirmation was made by participant 4 from hospital F, who said, *"The guidelines will be useful but it was going to be more useful when managers are trained first and then they be the ones to take an initiative to supervise and make sure that the guidelines and policies are adhered to."*

Further test of usefulness was performed, where the theoretical guidelines were compared with the research evidence and both were found to be informed by National and International legislative framework namely, the WHO (2009) policy on TB Infection control prescribes measures of minimising TB transmissions in health care facilities, congregate settings and households; the South African National TB control programme practical guidelines (DOH 2004); the management of drug-resistant TB (DOH 2012); national TB management guidelines (DOH 2009); guidelines for Tuberculosis preventive therapy among HIV infected individuals in South Africa (DOH 2010); the national infection prevention and control policy for TB, MDR-TB and XDR-TB part 1 and 2 (DOH 2007); multi-drug resistant tuberculosis – policy framework on decentralised and deinstitutionalised management for South Africa (DOH 2011); the 2012-2016 National TB strategic Plan (DOH 2012); and TB infection control guideline (DOH 2010).

Furthermore, both the guidelines and research evidence were categorised into administrative TB infection control measures; environmental TB infection control measures; and personal respiratory protective TB infection control measures (WHO 2009). Based on these findings, the researcher concluded that the guidelines are useful and can assist the Vhembe District to achieve its TB infection control objectives.

CONCLUSION

The guideline to enhance health care workers' implementation of effective TB control measures that minimises the risk of contracting TB in Public hospitals were found to be authentic since they represented TB control situation in rural hospitals and not a product of the researcher's imagination. In addition, the developed guidelines proved to be useful since its goals and that of the South African TB control were found to be compatible, which means that these guidelines might enable hospitals to achieve TB control goals of the country. However, participants emphasized that the usefulness of the developed guidelines will depend on managers' receiving TB training first.

RECOMMENDATIONS

The guidelines to enhance HCWs' implementation of effective TB control measures that minimise the risk of contracting TB in hospitals should be adopted by the Department of Health as a basis for developing tuberculosis control training policy. In addition, various health programme managers should adopt these guidelines in order to enhance the adoption of the required practices at local hospitals level, district level, provincial level and national levels.

NOTES

In order to understand the content of this paper, the paper titled "guidelines to enhance health care worker's implementation of effective TB control measures that minimizes the risks of contracting TB in public hospitals" should be read first.

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