



Nurses' Knowledge of Tuberculosis, HIV, and Integrated HIV/TB Care Policies in Rural Western Cape, South Africa

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HIV and tuberculosis (TB) co-infection remain the leading causes of mortality in many developing countries. Several policies for their prevention and management exist; however, progress to meet the World Health Organization's indicators is slow. As nurses in rural areas are the main health care professionals responsible for the implementation of policies, questions arose about nursing knowledge regarding TB and HIV policies. A concurrent mixed method research approach was used to investigate this issue in a rural area of the Western Cape in South Africa. After a two-step sampling process, data were collected through 44 questionnaires and 12 interviews. We used descriptive and inferential statistics as well as content analysis methods. We found that most of the nurses had insufficient knowledge on certain aspects of policy guidelines that included medications, intensive case findings, and management of multidrug-resistant TB. It is recommended that training be intensified to improve implementation of policies.

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HIV and tuberculosis (TB) remain the leading causes of morbidity and mortality in many developing countries. Countries in Sub-Saharan Africa are the most affected, with an estimated 25.5 million people living with HIV infection (Avert, 2017), and people living with HIV/TB co-infection account for one in three HIV-related deaths (Joint United Nations Programme on HIV/AIDS, 2017). HIV and TB infections have been recognized as a public health challenge in South Africa, with records indicating that in 2015 an average of 7 million people were living with HIV (Avert, 2017), and the TB incidence rate was estimated to be the second highest in the world, with 781 cases per 100,000 population in 2014 (World Health Organization [WHO], 2015b).

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In South Africa, the Western Cape Province has the lowest prevalence of HIV; however, TB is a major problem, with an estimated incidence rate of 681 per 100,000 population, which is higher than the national average of 520 per 100,000 population (Massyn et al., 2016). The situation is worse in rural areas of the Western Cape, where the incidence rates range from 752 to 880 per 100,000 population as compared to the urban areas, such as Cape Town, with 596 per 100,000 population (Massyn et al., 2016). The complexity of managing these two conditions is worsened by the high probability of comorbidity with each condition making the other worse. Across South Africa, by 2014, the average HIV/TB co-infection rate was 56.7%, with the Western Cape Province reporting a co-infection rate of 38.5% (Massyn et al., 2016).

The growing number of patients with HIV/TB co-infection has contributed to the increased complexity of TB monitoring and evaluation (WHO, 2015a), which has further negatively impacted the directly observed treatment short course, rendering it unsustainable and ineffective (Atun, Weil, Eang, & Mwakyusa, 2010). Additionally, fragmented TB and HIV services under the vertical approach, a lack of adequate human capital, and competing interests of funding agencies have led to polarization of the diseases rather than dealing with them effectively as comorbidities (Uwimana, Jackson, Hausler, & Zarowsky, 2012).

TB and HIV services integration has thus emerged as an important strategy to respond to this dual infection (Nansera, Bajunirwe, Kabakyenga, Asiimwe, & Mayanja-Kizza, 2010). This has meant, however, that policies directed toward each program need to be harmonized to facilitate sought-after integration and efficient management of patients living with HIV/TB co-infection. Consequently, integration of services and related policies were endorsed by many low- and middle-income countries, including South Africa, where the National Strategic Plan on HIV, sexually transmitted infections (STI), and TB recommended that all patients with HIV be screened for TB infection and all patients living with TB be tested for HIV (South African National AIDS Council, 2011; 2017). The National Strategic Plan further emphasizes that diagnosis and management of STIs are core components in the prevention and

effective management of HIV, thus, the success of integrated HIV and TB services. Hence all patients with HIV are screened for STIs at every visit and managed accordingly. Efficient integrated services were also deemed necessary to ensure that the 90-90-90 strategy was implemented, and the End TB targets were met (WHO, 2015b). However, HIV and TB policies remain poorly implemented nationally, with most of the districts, particularly the rural districts of the Western Cape, not meeting national targets on the percentage of patients with TB knowing their HIV status (Chehab, Vilakazi-Nhlpo, Viranken, Peter, & Klausner, 2013; Massyn et al., 2016).

In South Africa, the role of nurses as the main implementers of policies has been more pronounced in rural areas where there are limited numbers of physicians. In the Western Cape, rural areas are the main areas where poor outcomes on TB are reported and significantly high incident rates of TB are recorded (Massyn et al., 2016). Therefore, the need to strengthen health systems and improve service delivery to patients with HIV/TB co-infection is very important. Understanding the knowledge that nurses in the rural areas have in relation to TB and HIV policies would contribute significantly to developing strategies aimed at ensuring proper implementation of these policies.

The South African Nursing Council (2017) has defined nurses in three categories: (a) enrolled nursing assistants, who complete a 1-year certificate program; (b) enrolled nurses, who complete a 2-year diploma program; and (c) registered nurses, who complete a 4-year diploma or degree program with discipline specialization such as midwifery. All categories are trained to play a role in the care of patients infected with TB and/or HIV; initiation of treatment is mainly the role of the registered nurse. Additionally, the Department of Health is mandated to give continuous training to all categories of nurses on all policy guidelines related to TB and HIV. This is even more important in rural areas because of the rampant shortage of registered nurses, which often leaves the two other categories to take total responsibility in the care of patients living with HIV and TB. Our objective was to analyze the knowledge of nurses in a rural area of the Western Cape about the TB and HIV policies they were expected to implement.

Methods

Study Design

A convergent, concurrent mixed method design was used. In this design, equal priority was given to quantitative and qualitative research approaches, as the purpose was to broadly explore the phenomenon and expand findings from quantitative data with those from qualitative data (Creswell & Plano Clark, 2011). It was important to capture the unique contributions of the respondents with qualitative and quantitative approaches because, in rural health facilities, the workforce is often small. Therefore, the use of both approaches allowed confirmation and cross-validation of the findings (Gray, Grove, & Sutherland, 2017).

Study Setting

In South Africa, the health care system adopted a primary health care approach, delivered through a district health system, facilitating decentralization and mobilization of resources (Jobson, 2015). The study setting was a rural area in the Overberg District of the Western Cape Province of South Africa, made up predominantly of wine farms, with the 2016 census estimating a district population of about 286,786 people (Western Cape Government, 2016). The study site consisted of eight small rural towns 50 to 140 km away from the Cape Town metro area. Eight fixed health facilities served the bigger towns, which included four community health centers, three day clinics, and one secondary hospital with a day hospital where patients with TB and HIV complications are referred for further management. The smallest communities were serviced by mobile clinics. Community profiles consisted of mainly unskilled seasonal workers with a high prevalence of substance abuse (Massyn et al., 2015).

Study Population and Sample

All categories of nurses, as defined by the South African Nursing Council (2017) and working in the selected health facilities, were included. A two-step sampling process was followed. For Stage 1, purposive sampling was used to select the participating

health facilities. A nested sampling technique was applied for Stage 2 of the sampling process. An all-inclusive sampling technique was applied for the quantitative part of the study, while purposive sampling was applied for the qualitative part of the study. This process allowed selection of participants from all categories of nurses and nursing assistants. As a result, four community health centers and one day hospital (of the eight available health facilities) were purposively selected based on the number of (a) patients with TB and HIV, and (b) TB and HIV activities undertaken in the facility. The selected facilities had the highest numbers of patients with TB and HIV, and they offered comprehensive services such as HIV/TB integrated care, family planning, and child health services.

Ethics clearance was obtained from the University of the Western Cape ethics committee and the Western Cape Provincial Department of Health research committee; all ethical principles were adhered to.

Quantitative Study

All nurses and nursing assistants ($n = 60$) who had been working in the selected health facilities for at least 3 months were recruited to participate in the study based on the assumption that 3 months of exposure to the work environment was required to be oriented to the policies in question. The response rate for the study was 74%, and 44 nurses and nursing assistants participated.

A survey was conducted, and data were collected using a self-administered questionnaire. The questionnaire consisted of a demographic section and a knowledge section and was developed based on a national policy available to all categories of nurses and nursing assistants. The knowledge section focused on self-perception of knowledge levels regarding HIV and TB, knowledge regarding the model of care for HIV and TB used in facilities, and knowledge of policy guidelines for HIV and TB, separately and integrated. Based on whether the respondents had received training on the different components that made up the national strategic plan for HIV and TB, participants were asked to take a self-rated knowledge test of TB and HIV and integrated HIV/TB policies using true/false and multiple-choice questions. Knowledge levels were defined as: *excellent*

(>75%), *sufficient* (51%-75%), *moderate* (26%-50%), or *poor* (<26 %). Data were coded and entered into Statistical Package for the Social Sciences (SPSS version 21; IBM, Armonk, NY) and analyzed using descriptive and inferential statistics.

Qualitative Study

Purposive sampling was conducted to select trained and untrained nurses who had participated in the quantitative study to ensure meaningful data convergence. The total number of participants were finally determined by data saturation, and this was reached after 12 interviews (Burns & Grove, 2005). Data were collected using individual semi-structured interviews (De Vos, Delpont, Fouche, & Strydom, 2011). An interview guide was used to explore the participants' perceived knowledge on TB and HIV policies. Questions such as *How do you perceive your knowledge regarding the TB and HIV policies and why?* were posed. The interviews were conducted by the research team in English, and field notes, including nonverbal cues, were collected. The interviewers in the study were registered nurse educators who were part of the research team and had experience in conducting research interviews. A voice recorder was used with the consent of the participants, which ensured that no data were lost or missed. Field notes and transcripts were repeatedly read, and repeated ideas and patterns were collated and translated into meanings and themes. Data were analyzed in teams that met twice for consensus on themes, categories, and subcategories.

Qualitative and Quantitative Data Convergence

After separate analysis of the two studies, themes from the qualitative data that expatiated the quantitative data were explored to make broader interpretations. In addition, themes that were not related to any quantitative data were explored with the intent to report unique findings. Quantitative and qualitative data were converged during the interpretation stage, and final conclusions were made.

Rigor of the Study

In the quantitative study, data reliability and validity were ensured by conducting a pilot study and the

use of experts in the field to check for content and face validity. The knowledge questions were checked for internal consistency reliability by calculating a Cronbach's alpha, with >0.8 being deemed acceptable.

In the qualitative study, trustworthiness of the data was ensured by adhering to strategies to ensure credibility, dependability, and transferability. These were achieved through prolonged engagement with the participants, where a significant amount of time was spent during the preparation stage to undertake the study and data collection. Use of member checking for data was generated through teamwork, and the use of multiple methods of data collection also added credibility to the findings. An audit trail of the study was completed, with thick descriptions of the processes and procedures that were followed.

Results

Demographic Characteristics

Forty-four of a possible 60 participants (74%) completed the questionnaire. As per registration with the South African Nursing Council, of the 44 respondents, 59% ($n = 26$) were registered nurses, 20.5% ($n = 9$) were enrolled nurses, and 18.2% ($n = 8$) were enrolled nursing assistants. One respondent was a single qualified midwife. As per South African Nursing Council requirements, enrolled nursing assistants had completed a certificate course and enrolled nurses had completed a diploma course that included basic diagnosis and care of patients with TB and HIV. Of the 26 registered nurses, 54% ($n = 14$) had a diploma qualification, 38% ($n = 10$) had a degree, and 8% ($n = 2$) had a postgraduate qualification. As with the enrolled nurses and nursing assistants, registered nurses were trained in basic diagnosis and care of patients with TB and HIV as well as on the extended role of initiating treatment. At the time of the study, 36.4% ($n = 16$) of the 44 respondents were working at fixed clinics, 38.6% ($n = 17$) were working at community health centers, and 22.7% ($n = 10$) were working in the day hospital. One participant did not indicate a work place. Respondents' ages fell into the following age groups: 45 to 54 years ($n = 17$, 39%), 35 to 44 years

($n = 11$, 25%), 25 to 34 years ($n = 9$, 21%), and 7 (16%) were older than 55 years. Of the 44 respondents, 12 were also interviewed, and at that point, data saturation was reached.

Quantitative Results

Participants were asked to quantitatively rate how they perceived their knowledge regarding guidelines directed at TB and HIV management and care. Half of the participants ($n = 22$, 50%) perceived their knowledge as poor; 23% ($n = 10$) indicated a moderate level of knowledge; 23% ($n = 10$) reported having a sufficient level of knowledge; while only 5% ($n = 2$) perceived themselves to have an excellent level of knowledge. However, when they were asked about their knowledge pertaining to integrated management of patients with HIV/TB comorbidity, 30.8% ($n = 14$) and 46.1% ($n = 20$) reported having sufficient and excellent knowledge, respectively, with 15.4% ($n = 7$) reporting moderate, and 7.7% ($n = 3$) reporting poor knowledge levels.

Knowledge regarding model of TB and HIV care. When participants were asked about the model of care that they used in their work environment, 43% ($n = 19$) could not identify the type of HIV and TB care model applied in their facilities; 30% ($n = 13$) indicated that the integrated model was applied; while 28% ($n = 12$) and 7% ($n = 3$) indicated the application of partial integrated and vertical models, respectively. This lack of knowledge was further confirmed by the fact that only 25% ($n = 11$) perceived themselves to have sufficient knowledge and skills to provide TB and HIV integrated care, while 50% ($n = 22$) were sure they did not feel equipped, and another 25% ($n = 11$) were unsure of their knowledge.

Knowledge regarding TB policy guidelines. Of the 44 participants, only 18 reported that they had received training on TB policy guidelines. This group's knowledge was tested, and the average score was 68%, with a minimum of 50% and maximum of 97%. Intensive case finding and multidrug-resistant tuberculosis and extensively drug-resistant tuberculosis management were the aspects where the respondents reported having the least knowledge, with 57% and 67% reporting moderate knowledge in those as-

pects, respectively; while up to 39% reported moderate knowledge of TB notification. Health promotion and infection control related to TB were the aspects that more participants were comfortable with, as only 12% and 14%, respectively, reported having moderate knowledge. When the respondents were asked to choose different aims of TB treatment, notably, almost all respondents (90.9%) agreed that TB treatment aims to cure TB, while 38.6% reported the aim was to prevent HIV transmission. [Figure 1](#) depicts the knowledge of nurses on specific aspects of TB.

On another question, about 75% of participants correctly identified the process to confirm TB diagnosis, whereas 6.8% reported that a third sputum must be collected, and 4.2% reported that they were unsure about the process. Regarding storage of TB sputum, most of the participants (62%) reported that sputum should be stored at room temperature, 25% stated that it should be put in the refrigerator, another 3% stated that it should be in the freezer, while 7% stated it should be put in a cooler bag. About 3% of the participants indicated that they were unsure about sputum storage. The respondents were asked to classify patients according to different treatment indicators, and 61.4% could correctly classify the TB defaulter case (61.4%), while a few could correctly classify the relapse cases (27.3%).

Knowledge regarding HIV policy guidelines. Of the 44 participants, 34 indicated that they had training on HIV. The average score for HIV knowledge was 43.6%, ranging from 5% to 95%. [Figure 2](#) depicts participant levels of knowledge pertaining to specific HIV aspects, which included knowledge about antiretroviral therapy (ART), health promotion, and WHO staging. ART for adults had the highest number of participants with poor knowledge (44%), followed by ART in children with 38%, nurse-initiated management of ART with 35%, and prevention of mother-to-child transmission with 32% of participants reporting poor knowledge. HIV health promotion, HIV counseling, and the Advise Consent Test Support approach and voluntary counseling and testing had the highest numbers reporting sufficient knowledge at 61%, 69%, and 68%, respectively.

Knowledge regarding integrated HIV/TB policy guidelines. Of the 44 participants, only 13 reported

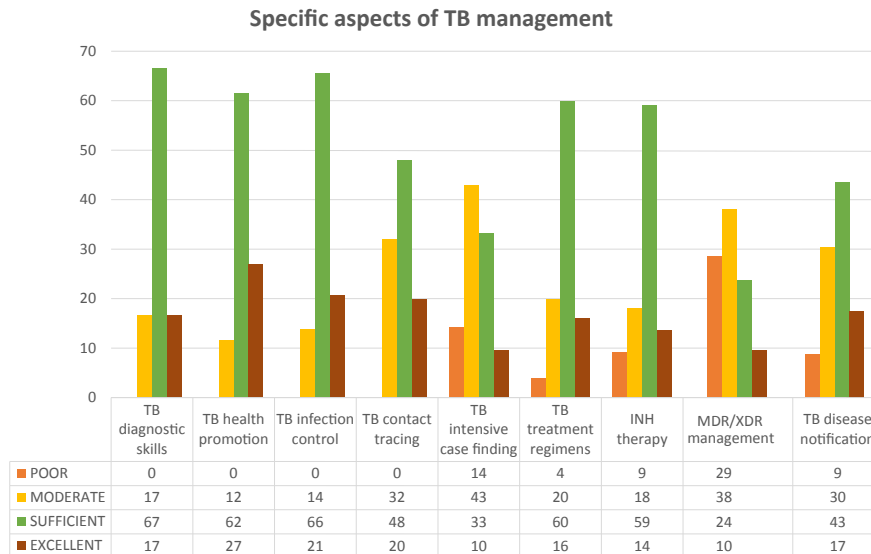


Figure 1. Knowledge of nurses related to specific aspects of TB. *Note.* TB = tuberculosis; INH = Isoniazid; MDR = multidrug-resistant tuberculosis; XDR = extensively drug-resistant tuberculosis.

knowledge on integrated management of HIV and TB. The average score was recorded at 71%, ranging from 37.5% to 96.88%. Of the respondents, 30.8% reported having sufficient (70%-79%) and excellent (80%+) knowledge, with 15.4% recording moderate (60%-69%) and fair (50%-59%) knowledge levels for both, and up to 7.7% recording a poor (less than 50%) knowledge level.

Participants reported the least level of knowledge related to integrated nurse-initiated management of ART. Most of the participants reported that the HIV/TB policies were available, at 86% ($n = 43$) and 85.7% ($n = 42$), respectively. However, only 11.4% ($n = 5$) reported being involved in the developmental process for HIV/TB policies. Figure 2 depicts knowledge of the activities undertaken when managing a patient with HIV/TB co-infection.

Reasons for lack of knowledge. Most (94%) of the respondents reported that policies were unclear and difficult to understand, and the period for training was short. Eighty-two percent indicated that their shortfall could be attributed to lack of training, while 59% reported lack of support from management. Lack of guidance was the least mentioned as a reason for lack of knowledge at 41%.

Qualitative Results

The qualitative results were categorized in relation to the three key focus areas that were part of the quantitative questionnaire. Those included knowledge about TB, HIV, and the integrated management of HIV/TB comorbidity. The first category, knowledge regarding TB management and the related policy guidelines, resulted in the emergence of two themes: content knowledge and process knowledge. The second category, knowledge regarding management of HIV and the related policy guidelines, also resulted in the emergence of two themes: health promotion as a knowledge driver and environment as a determinant of knowledge acquisition. The third category, knowledge regarding the integrated management of HIV/TB and its related policy guidelines, resulted in three themes: low confidence in perceived knowledge levels, awareness versus availability of policies, and contributors to low knowledge acquisition.

Knowledge regarding TB management. At the beginning of the interviews, it was clear that the respondents perceived their knowledge of TB guidelines as higher than their knowledge of HIV guidelines. However, when the focus was placed on

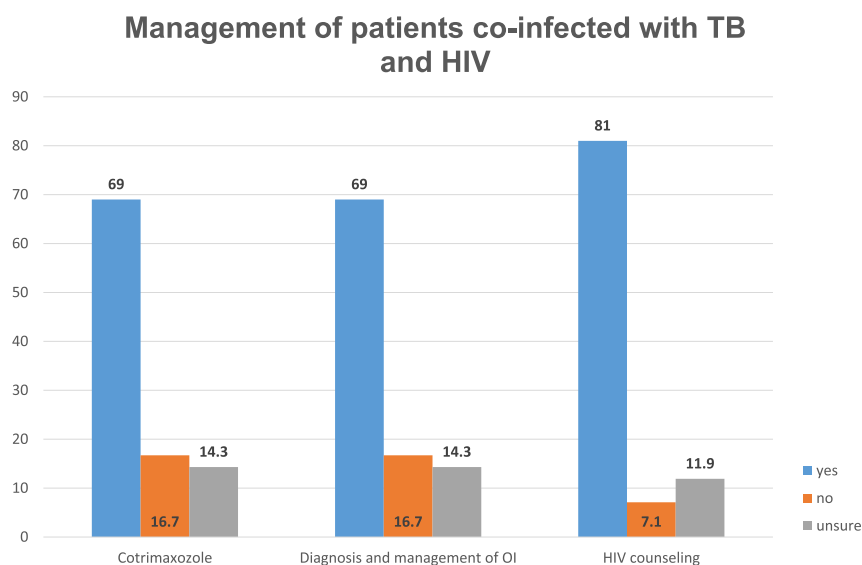


Figure 2. Knowledge of nurses related to integrative management of TB and HIV. Note. TB = tuberculosis; OI = opportunistic infections.

knowledge regarding TB management, respondents reported differences with regard to knowledge on “how to do” as opposed to “what it means.” For example, when they were requested to explain the process followed when encountering a patient with suspected TB, most respondents could clearly outline the process; only a few were unable to do so. However, when prompted to explain the reasons why the process was followed, most missed some aspects of the process during the explanation, which indicated that not all was known. One respondent said, “We inform the participants that they cannot be treated for TB if their HIV status is unknown.” Another example that showed knowledge of process and not content was depicted by a participant who said:

To enable us to send the sputum specimen to the lab we need to establish first the patient’s HIV status because they really want it (the lab). This is in relation to the test they’re going to do on the sputum, so they need to know what the patient’s HIV status is. These go hand in hand; therefore, we would do the HIV testing and the TB test at the same time. If a patient knows his HIV status, we would still need to establish that because we can’t go on hearsay.

Knowledge regarding HIV management. Participants reported that they were more comfortable with health promotion messages related to HIV than with the pharmaceutical aspects of HIV management. Higher confidence in knowledge about counseling was demonstrated, but self-perceived knowledge related to medication was reported. The environment where the respondents worked was reported to influence whether an individual would gain adequate knowledge about HIV. The results showed that, mainly, participants working in the maternity unit were more confident and knowledgeable about HIV management for both adults and infants, portrayed enthusiasm about their working environment and the opportunities available to them, and reported that protocols were clearly displayed and easy to use due to the algorithms that gave guidance to deliver the services. It was also noted that even participants who had not attended formal training were confident of their performances and were looking forward to sealing their knowledge with training as soon as the opportunity arose. A participant said:

In the maternity ward, we have clear protocols that are displayed on the walls and even though we haven’t all underwent training, we are aware of the processes that need to be followed. Our

trained colleagues give us in-service training and assist us when we need help. We are looking forward to training for all of us working in this ward.

Knowledge regarding integrated management of HIV/TB. Respondents could differentiate between the different models of care because they could say that the services were separated, partially integrated, or integrated, but some participants reported vertical services as integrated services, mainly because they were in the same facility regardless of the different days that the services were offered. Of those who could not make a differentiation, low confidence in what they knew was reported. A respondent said, "For the staff that is not working at either the antiretroviral or the TB section, it's a bit difficult to integrate because you're not in touch with these things every day."

The other theme that emerged highlighted that respondents had an awareness about the availability of the policies in the facilities but indicated that access was a challenge. The participants reported that most of the policies were placed in specific offices or they were voluminous, which then dissuaded them from reading or using the policies efficiently. A participant said, "In my opinion policy documents are not visible. It is not something that you see. It is not against the wall or bullets that we have or any specific training that anybody has." Another mentioned that, "No, it's in a book ... if I'm unsure—I usually rather phone."

The third theme that emerged was based on integrated services and why it was seen as a challenge to nurses. Respondents reported that time was a key factor that impeded their ability to acquire relevant and adequate knowledge about integration of TB and HIV care. Workload was also reported as a contributor to lack of knowledge about policies or guidelines, as there was no time for reading or being thoroughly taught. The following depicted the sentiments of the participants:

Sometimes when you look at the number of patients that comes through and the number of staff that is on duty, for example, last week I was alone on duty and had to run through 40 patients. Then there is no time to go get the guideline and check on a specific condition. There is neglect to go through the guidelines. Only when there is enough staff, then you have time to sit with your patients and then you can take your

guideline to make sure that you have followed the correct process.

It is noteworthy that most of the participants indicated they would rather have the integrated than the vertical model of care. This was mainly driven by sympathy for the time the patients had to spend in the facility, moving from place to place to access different services.

It is kind of frustrating for me working here and I have to be here until 4. Now I don't know how the patient feels that they had to come in the morning and now it's 2 o'clock and they are done with the chronic side, but still need to go somewhere else for family planning. So, it is something really frustrating for me to deal with.

Another participant emphasized the concern:

If they integrate the services, then we are near. I am just here, and they are just here. So, we can do it all in one. The patient doesn't have to move from one point to another point. Everything can be done in one room; everything can be done today and at one point.

Discussion

Converged Results

In the rural areas of South Africa, it is imperative that nurses and nursing assistants have the knowledge they need to discharge their duties effectively and efficiently. It is even more important when implementing TB and HIV policies, as these have a significant impact on patient health outcomes and reduction of the spread of both diseases, which has presented severe challenges to the health system. Insufficient knowledge in nurses and nursing assistants can have devastating results, consequently, poor treatment access by patients. Similar problems were raised in studies from other countries in Africa as well as from countries such as China and India (Chen, Han, & Holzemer, 2004; Earl & Penney, 2003; Kermode, Holmes, Langkham, Thomas, & Gifford, 2005).

Nurses in this rural area of South Africa perceived themselves as having insufficient knowledge of TB and HIV policy components to positively influence the process of implementation. This assumption was confirmed by their low self-rating, with only 5%

perceiving themselves to have excellent knowledge on TB and HIV management and care and 50% perceiving themselves to have poor knowledge. Although some nurses were confident about their knowledge of processes to be followed when screening their patients, insufficient understanding of the guideline content influenced their decision-making process negatively. This was a case when sputum was not collected because the nurse thought that an HIV test was a prerequisite. The consequences of this action could be detrimental to an infected patient due to missed opportunity for early diagnoses, and to his/her contacts due to the potential spread of the TB bacilli. The same trends were reported in a Cameroonian study where important information about HIV was not known, thus fueling misconceptions about the disease and its management (Mbanya et al., 2001).

Many nurses could not identify the model of care they used in practice. However, almost one-third of the participants indicated that they used the integrated model of care, almost an equivalent number indicated partial integrated practice, and less than 10% indicated they still used a vertical model of care to treat and manage patients with HIV/TB co-infection. This was a challenge, as the true picture could not be defined because some of the participants were unable to differentiate between the different models of TB and HIV care in the interviews. In some cases where both TB and HIV services were rendered at the same facility irrespective of the different days on which the services were offered, the participants referred to this practice as an integrative and not vertical model of care. This was a challenge to the implementation process as it contravened the recommended principles of “supermarket services” (Sibiya & Gwele, 2013) that underpinned the defined integrative services in the strategic plan for STIs, HIV, and TB, 2012-2016 (South African National AIDS Council, 2011). However, it was highlighted in the interviews that the integrated model was the preferred and accepted model of care, as it was friendlier toward patients, especially those who were HIV/TB co-infected, similar to what has been noted by Uyei, Coetzee, Macinko, and Guttmacher (2011). The integrated model allowed patients to receive treatment and care at one service point and was, thus, cost effective to both patients and the health service. As noted by Hyle, Naidoo, Su, El-Sadr, and Freedberg (2014), integration of TB and HIV services can reduce resource uti-

lization through reliance on shared resources for each type of service. The benefits to patients were measured in terms of fewer visits to health facilities and reduced time spent at the health facilities. Benefits to health systems were measured by reduced waiting time, fewer missed opportunities caused by patients who left health services when referred to a different department, or patients who never come back because a needed service was provided on a different day (Keugoung et al., 2014). The slow implementation of integrated activities related to the provision of TB and HIV care has been noted (Uyei et al., 2011), and our study confirmed the reality that, despite the government’s adoption of the integrated model of care since 2011 and the position of HIV/TB coordinators mandated to facilitate the integration of HIV/TB programs, the two programs often ran in a parallel fashion without coordination.

Limitations

Our study was completed in a rural area where one of the challenges was the number of nursing providers. This resulted in a small sample size despite all accessible providers being recruited. However, the rigor of the design provided important baseline data for rural health in general. Our study may lack power to report statistically reliable findings and cannot be generalized; however, findings from the descriptive analyses had significant clinical practice implications and could trigger a larger study in rural health and the implementation of policies in that area. Another limitation to the study was the combination of all categories of nurses regardless of education and scope of practice. All categories of nurses have some role in the implementation of TB and HIV care, however, and data were collected from all categories to have a more comprehensive idea of the current situation.

Conclusion

We found that nurses, particularly those in rural areas, lacked knowledge to manage HIV/TB co-infection and had received limited or no training on TB and HIV integrated care. In addition, weak health systems, insufficient skilled human resources, and lack of management support and attitudes were some of the barriers affecting the implementation of

an integrated HIV/TB policy. This phenomenon seemed to be common not only in South Africa and African countries, but also in countries such as China and India. Lessons learned from a successful syndromic management model of care after extensive staff training and a developed support system would have great potential for successful implementation of an integrated HIV/TB policy to support a large number of co-infected patients. Without adequately addressing the issue of knowledge for the management of HIV/TB co-infection, particularly knowledge about medications, there will be limited success in the integrated management of HIV/TB. Thus, TB and HIV programs will have to work together to benefit as much as possible from integrated care. Intervention strategies are required to improve the knowledge of nurses about the efficient implementation of an HIV/TB integrated policy. Nurses in rural areas should not be left behind because this could lead to poor treatment access and patient migration to urban centers where superior care is perceived, but where access can be more difficult for rural residents.

Key Considerations

- Nurses in rural areas face challenges related to knowledge acquisition.
- Poorly trained nurses can cause serious consequences for patients with tuberculosis (TB)/ HIV comorbidity.
- Frequent policy changes are problematic for already-stretched staff and systems with staff shortages.
- Rural health and nursing care should be part of greater discussions in the areas of HIV, TB, and HIV/TB comorbidity around the globe.

Disclosures

The authors report no real or perceived vested interests that relate to this article that could be construed as a conflict of interest.

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