Operational research on implementation of tuberculosis guidelines in Mozambique

Brouwer, Miranda

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9. Summary
The translation of research evidence into health care practice poses considerable challenges. The research evidence often comes in the form of guidelines. The process of developing these guidelines consists of several steps: composition of the development group, the development itself including the format in which to present the guideline, dissemination, implementation, and the evaluation of the guidelines. The overall objective of this thesis, titled ‘Operation research on implementation of tuberculosis guidelines in Mozambique’, is to assess what factors contribute to successful or unsuccessful implementation of guidelines, and how guideline implementation and evaluation contribute to health care decision-making through case studies on tuberculosis control guidelines mainly conducted in Mozambique. Mozambique is among the high TB burden countries where globally developed guidelines guide TB control efforts.

In chapter 1 we describe the guideline development process in detail, formulate the research questions, and we introduce the research setting.

The applicability of the guideline on antiretroviral therapy (ART) initiation in HIV-infected TB patients was challenging in Mozambique, because the moment of initiation depended on CD4+ cell count value. Equipment to assess CD4+ cell count was not widely available in health care facilities providing ART services and this could lead to a missed opportunity to initiate ART. In chapter 2 we describe the effect of ART and TB treatment on the CD4+ cell count assessment. We found that the effect on the CD4+ cell count was mainly due to ART. A CD4+ cell count assessment up to 12 weeks after the initiation of TB treatment remained below the cut-off for ART initiation of 350 cells/mm³. Therefore the delay in getting the first CD4+ cell count would not result in missing the opportunity to initiate ART.

Globally there is a strong pressure on TB programmes to initiate ART in HIV-infected TB patients, but reported data show a low coverage. TB programmes provide the data on ART-use by HIV-infected TB patients, however often the HIV services provide the ART. Chapter 3 evaluates whether the TB register provides a good information source for the data on ART-use. We also evaluated the timing of ART initiation to assess whether ART-use could have been reported with the TB case finding data. We compared data on ART-use from the TB register with data on ART-use from the individual HIV patient record of the HIV services. Of 628 patients included, 504 (81%) were tested and of these, 356 (71%) were HIV-infected. Of the co-infected patients, 81% registered with the HIV services in the same facility. The TB register was correct on ART-use in 73% of co-infected cases and complete in 74%. Information on ART-use could have been reported with the TB case finding reports in 56% of co-infected patients. The TB register is reasonably correct and complete on ART-use. However, the HIV patient record seems a much better source to provide this information. Reporting on ART-use at the end of the quarter in which TB treatment starts provides the programme with timely but incomplete information. A more complete but less timely picture is available after a year.

In chapter 4 we describe a practical benchmarking tool to assess potential under-diagnosis of smear-negative and extrapulmonary TB. In an ecological study, we plotted percentages of smear-positive pulmonary TB amongst newly diagnosed TB patients in African region countries and provinces in Mozambique against the countries’ and provinces’ HIV prevalence. We visually inspected the plots to determine potential under-diagnosis of smear-negative and extrapulmonary TB in three facilities in Manica Province. In these facilities, we found 67% smear-positivity among new TB cases in an area with HIV prevalence of more than 10%. All African region countries with an HIV prevalence of more than 10% had a smear-positivity lower than 50%. Most Mozambican provinces with a high HIV prevalence had a smear-positivity rate of below 51%. Our findings show that benchmarking can be used to assist in identifying potential under-diagnosis of smear-negative and extrapulmonary TB. The findings also suggest that under-diagnosis of these forms of TB probably exists in the study population.
In Chapter 5 we explore through focus group discussions with four categories of health care workers - auxiliary workers, medical (doctors and clinical officers), nurses and TB program staff - how they perceive their occupational TB risk, the measures they take to reduce this risk and what challenges they encounter implementing these measures. We found that health care workers are aware of their occupational TB risk and use various measures to reduce their risk of infection. They report several challenges using these measures, such as shortage of material, lack of clear guidelines, insufficient motivation, and inadequate training. Robust training with motivational approaches, clear guidelines alongside supervision and support for health care workers could improve implementation of TB infection prevention and control measures.

Chapter 6 describes the level of implementation of TB infection prevention and control guidelines in 29 health care facilities in Mozambique. This cross-sectional study included TB clinics, laboratories, out-patient departments, and medical and TB wards. The study assessed selected managerial, administrative and environmental measures, and the availability and use of necessary equipment for personal respiratory protection. Not all facilities had guidelines for diagnosis and treatment of (presumptive) TB patients.

Ninety-one per cent of the staff instructed patients on how to produce sputum, but only 4% actually observed this. Using a pragmatic “20% rule”, 52% of the rooms assessed had adequate ventilation. Potentially, this could be increased to 76% by opening all openings in the room. Three-quarters of the health care workers had N95 respirators but only 36% knew how to use them correctly. Implementation of TB infection prevention and control measures showed great variation within and between health care facilities. Relatively simple measures to improve TB infection prevention and control include the availability of guidelines, opening doors and windows to improve ventilation, as well as training and support on correct N95 respirator use. However, relatively simple measures also have challenges in implementation and require attention for and evaluation of the implementation process.

A specific component of the TB infection prevention and control guideline concerns the assessment of ventilation. Because no instructions are available on how to measure air velocity, we describe in Chapter 7 how we conducted air velocity measurements in Ugandan health facilities. The study evaluated whether the position and moment at which air velocity is measured using a vaneometer is relevant to assess ventilation in air changes per hour, and the influence of ambient temperature and the weather. In an experimental design in six facilities in Uganda we measured air velocity at nine separate moments on five positions in each opening of the rooms using a vaneometer. A total of 189 measurements showed no significant influence of ambient temperature and a small but significant influence when the sun was shining. The position and the moment of the measurement did not influence the air velocity. Ventilation was adequate in 177/189 (94%) of the measurements in Uganda. This study served as a validation for the single air velocity measurement taken in Mozambique where we found 101/119 (86%) of the assessed rooms ventilated adequately. This suggests that a single measurement of air velocity is adequate to assess ventilation using a vaneometer. These findings provide input for clear guidelines on how to assess ventilation with such a device.

We conclude in Chapter 8 that through evaluation of guideline implementation using routine data we can identify critical factors that contribute to successful or unsuccessful guideline implementation. These factors include availability of guidelines and material, the consistency, the role of the patients, and health care workers’ motivation to change their practice based on guidelines. Addressing these factors will lead to improved implementation. This improved implementation will probably lead to improved outcome of care.