

Short Communication

Moving towards collaborative care in combating the burgeoning burden of tuberculosis and diabetes: key findings from a pharmaceutical care study

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Abstract

Diabetes mellitus is one of the most common comorbidities in tuberculosis patients with prevalence as high as 15-30% in Malaysia. The convergence of these two diseases is linked to poorer tuberculosis treatment outcomes, increased chances of relapse and recurrence within two years, increased risk of multi drug resistant-tuberculosis, reactivation of latent tuberculosis infection and higher risk of death during tuberculosis treatment. It is imperative to have a collaborative effort from all stakeholders including pharmacists in order to establish a coordinated response to both diseases. This paper reports key findings of a mixed-method pharmaceutical care study that tackled many medication-related problems in patients with both tuberculosis and diabetes. Despite the need to address the barriers and challenges encountered during the provision of pharmaceutical care, pharmacists played an important role in promoting diabetes management in a tuberculosis clinic, and the integration of pharmacists within a multidisciplinary health care team was indeed feasible.

Keywords: Tuberculosis, Diabetes Mellitus, Pharmacist, Pharmaceutical care, Mixed-method Research, Malaysia

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Background

The global burden of tuberculosis (TB) and diabetes mellitus (DM) epidemic is a major public health concern. The management of TB becomes complex when a patient presents with DM as co-morbidity (1,2). DM has been known to be a risk factor for TB infection and higher mortality rates were seen in patients with TB and DM compared to TB only patients (3). Furthermore, DM causes poor TB treatment outcome by causing treatment failure, relapse, recurrence within 2 years upon completing TB treatment and diminished 2-month and 6-month culture conversion rates (1,2). It was also found that TB and DM patients take longer to respond to treatment and are more likely to develop multi-drug resistant TB.

In line with the World Health Organisation's (WHO) End TB Strategy, Malaysia planned to eliminate TB by year 2035 (4). There has been a continuous increase in the number of new TB cases reported in Malaysia with 14,908 cases in 1999 to 25,739 cases in 2016 (5). A systematic review revealed that there is a high burden of DM among TB patients at global level (6). For example, the global prevalence of DM in TB patients ranges from 5%-50% (7), whilst some studies in Malaysia reported prevalence of 15-30 (8,9). Following numerous studies that have unraveled the negative aspects due to the emergence of TB and DM, the WHO and the International Union Against Tuberculosis and Lung Disease developed a provisional collaborative framework whose primary purpose is to guide national programmes, researchers, and especially those directly involved in the care, prevention, and control of TB and DM to establish a coordinated response to both diseases (10). The staggering number of reported cases of TB and DM worldwide require collaborative effort from all stakeholders including pharmacists. However, little is known on how TB patients with DM are being managed in

Malaysia and how these patients cope with their medication.

The treatment of either DM or TB requires a patient to take many medicines which has been known to impact medicine adherence (11,12). The directly observed treatment (DOT) for TB that was introduced in 1990s as a means of combating non-adherence has been shown to be a good strategy to enforce adherence to TB treatment, but pharmacists were underutilized when it comes to the management of TB. However, many pharmacists run diabetes medication therapy adherence clinic (MTAC) in many public hospitals to assist with medicine adherence. Although, DOT and MTACs were good strategies in promoting adherence to TB and DM treatment respectively, there was a lack of clinical guideline on the co-management of TB and DM patients. In addition, little is known about the overall pharmaceutical care needs of patients with TB and DM. Efforts to develop an intervention that is tailored to patients with TB and DM requires an understanding of particular barriers and facilitators in the health care system as well as to understand how best to deliver them in the context of patients' complex lives. Whilst there have been several qualitative investigations on experiences of TB patients and DM patients, most of them focused on the consequences of a single disease state and less is known on the challenges of dealing with both diseases concurrently. As such, there was a need to investigate patients' and health care professionals' experiences in managing TB and DM to understand the pharmaceutical care issues of these patients prior to the development of a pharmaceutical care service.

The first three phases (preclinical, phase 1 and phase 2) of the UK Medical Research Council framework for the development of complex interventions to improve health was applied to develop a pharmaceutical care service for patients with both TB and DM in a tertiary hospital in Malaysia

(11,12). This paper aims to summarise the key findings from phase 1 and phase 2 that looked at the feasibility of providing a pharmaceutical care service. The study received ethical approval from the Medical Research and Ethics Committee (MREC), Ministry of Health, Malaysia (NMRR-09-463-4064 & NMRR-08-10-1165).

Summary of key findings

A qualitative enquiry (phase 1) via semi-structured interviews and a focus-group discussion was carried out to explore the pharmaceutical care needs of TB and DM patients (12). The phase 1 study provided a snapshot of twenty patients' and ten health care professionals' experiences in managing TB and DM. In addition, it also explored the health care professionals' perspectives on pharmacist-led medication therapy adherence clinics (MTACs) and the potential role of pharmacists in the management of TB and DM.

Concerns about medication and issues related to the management of TB and DM were the two main themes that emerged (12). Concerns about medication include the negative consequences of medicine taking (adverse effects of medication, burden of multiple medication, drug interactions and medication confusion) and the perceived positive effect of medication which were expressed in terms of necessity and efficacy of medication. Issues related to the management of TB and DM patients include longer duration of TB treatment in DM patients, delayed initiation of TB and DM treatment, poor record keeping, communication barriers between patients and physicians, the ambiguity of DM management in TB patients, DOT and the burden of attending multiple clinics, and self-management and incorporation of traditional remedies.

Healthcare professionals believed that pharmacist-led MTAC programmes allowed the provision of pharmaceutical care, enhanced pharmacist-patient communication and encouraged

pharmacist-physician interactions. Besides, healthcare professionals also recommended pharmacists to play an important role in educating and counselling patients and that the MTAC model could be expanded to include management of patients with TB and DM (13).

Therefore, based on the phase 1 findings, the identified pharmaceutical care needs of TB and DM patients include the need to monitor adverse effects of medication, help patients manage multiple medicines and address patients' concerns about medication. Other pharmaceutical care aspects include the need to motivate and promote adherence to treatment, advocate the importance of early treatment seeking behaviour, conduct a thorough medication review and improve documentation of patients' medical and medication history, create opportunities to communicate with patients, find ways to integrate the management of TB and DM, and enquire about self-management and the use of traditional remedies. These findings were incorporated into the design of the phase 2 study (12).

Phase 2 study employed mixed-method approach through action research to assess the feasibility of providing a pharmaceutical care service for patients with TB and DM in the same hospital (8). Action research is a form of research that describes, interprets, and explains social situations while executing a change intervention aimed at improvement and involvement (14). In this study, both quantitative and qualitative data were taken, and a variety of 'real-life' experiences were also captured.

The phase 2 study revealed that the prevalence of DM in TB patients was 15% (8). In spite of the need to address logistic barriers and the need for more collaborative practices between pharmacists and physicians, the provision of the pharmaceutical care service for TB and DM patients was a feasible conclusion. Pharmacists played an important role in managing DM in TB patients by: raising the

awareness that DM is a risk factor for TB; emphasising the importance of adherence to DM medication as well as to dietary recommendations; advocating the importance of regular monitoring of blood sugar level; addressing patients' concerns about their medication; and referring patients to physicians and recommending treatment modifications (12). Nevertheless, there were other issues which could be regarded as barriers to pharmaceutical care management such as communication barriers; delays in initiating DM treatment in newly-diagnosed DM patients; infrequent monitoring of blood glucose level; absence of certain clinical and laboratory data; and nurses' reluctance to conduct finger-prick blood glucose monitoring if it was not a physician's order at the chest clinic (12).

It has been reported that there is a need for research in four key priority areas in TB and DM management which include: 1) the need to screen DM in TB patients and vice versa, 2) the impact of DM on TB treatment outcome, 3) the implementation of the TB Directly-Observed Treatment, short course (DOTS) strategy for managing and monitoring DM, and 4) the development of diagnostic and monitoring test including HbA1C for DM patients (15). Interestingly, the findings of our study were in agreement with recommendations whereby, firstly, there is a need for thorough screening of DM in TB patients as the prevalence of DM in TB patients could have been underestimated in this study due to lack of standard screening mechanisms. Secondly, poorly controlled DM and non-adherence to DM medications may have a detrimental effect to TB treatment outcome although it has to be further investigated in a longitudinal study. Thirdly, it is possible to implement the TB DOTS strategy to incorporate DM monitoring through finger-prick monitoring test at the chest clinic, although lack of support from the other health care professionals with regards to finger-prick monitoring was observed in this study. This indicates the lack of

awareness on the importance of monitoring DM at the chest clinic. Fourthly, there was either lack of monitoring of HbA1c at the chest clinic or lack of amalgamation of this data into TB patients' medical records if the HbA1c test had been carried out at the DM clinic. Therefore, it is important to improve communication between TB and DM care providers with regards to access to monitoring data.

Based on a myriad of pharmaceutical issues identified and intervened, this study has established evidence that pharmacists have a role to play in integrating the management of TB and DM. Although this study targeted TB patients with comorbid DM, it was found that other non-DM comorbid conditions also required individualised pharmaceutical care management. Based on this finding, it can be argued that pharmacist's service is not only relevant to TB and DM patients per se but could be extended to all TB patients. As such, it is recommended that pharmacists should become one of the participating health professionals for the National TB programme.

It was observed that there was an association between non-adherence to DM medication and suboptimal blood glucose control. As it is important to maintain tight glycaemic control while on TB treatment, there is a need for policies to support co-management of TB and DM. At the moment, TB and DM patients receive treatment from various care providers and there is a lack of coordination and communication between TB and DM care providers. It is suggested that health care professionals at the chest clinic integrate the management of TB and DM by utilising the opportunity of meeting patients during DOT to provide DM education. It will be ideal if DM medications can be dispensed at the same time in order to reduce the need to attend multiple clinics. Innovative approaches such as using shared electronic medical records or any other means of communication should also be considered.

Conclusion

Despite the need to address the barriers encountered during the provision of pharmaceutical care, this study demonstrated that integrating pharmacists into a multidisciplinary health care team is indeed a feasible option. In short, the experience gained and the key findings from this study shaped the foundation for current projects to involve pharmacists in designing a collaborative care model for TB and DM in other hospitals as well as developing educational tools to increase the awareness among the public and the health care providers. The findings of this study are parallel with the recommendations by the World Health Organization and the International Union against Tuberculosis and Lung Disease (10).

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Conflicts of interests

The authors declared that there were no conflicts of interest.

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