Evidence Update

Summary of a Systematic Review

Tuberculosis Series

What is the incidence and prevalence of TB disease and infection in healthcare workers (HCWs) in low-middle income countries (LMICs)?
What is the impact of infection control strategies to prevent this?

TB is an important occupational disease in healthcare workers in LMICs. It is not clear what the most effective infection control strategies are to prevent TB in HCWs in LMICs.

Researchers conducted a review to summarise the evidence on the incidence and prevalence of tuberculosis (TB) and latent TB infection (LTBI) among healthcare workers (HCWs) in low-middle income countries (LMICs). The impact of various preventive strategies that have been implemented was also evaluated. 51 observational studies were identified.

Why is this question important?

In high-income countries, where TB disease is relatively well controlled, the overall incidence of TB disease in native-born HCWs was higher than in the general population (overall incidence of TB disease: 25 per 100,000 per year versus 10 per 100,000 per year, respectively). In LMICs, where TB is highly prevalent, HCWs are at increased risk of TB infection.

Healthy HCWs are an integral part of a functioning health care system, especially in LMICs where the numbers HCWs are often limited. Understanding the true extent of the problem (i.e. how many HCWs are infected with latent TB or have active TB disease) and the risk factors associated with the transmission of TB to HCWs in health care facilities are important steps in the process of finding a solution to this problem.

In high-income countries the implementation of infection control measures has successfully reduced the transmission of TB to HCW in health care facilities. Are these infection control measures effective in preventing TB transmission in LMICs?

What does the research say?

Studies varied according to baseline TB incidence in the population, institutional TB caseloads, differences in diagnostic tests, job descriptions and classifications of HCWs, and preventive measures used at health-care facilities.

On average 54% (range 33% to 79%) of HCWs had latent TB infection (LTBI). In most studies, increased age and duration of employment in the health care facility was associated with higher prevalence of LTBI in HCWs. Eight studies reported a higher prevalence of LTBI in nurses than other HCWs (range 43% to 87%) and one study reported a lower prevalence. Estimates of the annual risk of LTBI ranged from 0.5% to 14.3%. After taking into account the incidence of TB in the general population of each of the studies, the additional incidence of TB disease that was attributable to being a HCW ranged from 25 to 5361 per 100,000 per year. Certain work locations within the healthcare facility (inpatient TB facility, laboratory, internal medicine, and emergency facilities) and occupational categories (radiology technicians, patient attendants, nurses, ward attendants, paramedics, and clinical officers) were associated with a higher risk of acquiring TB.

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Three studies evaluated the impact of multiple infection control strategies on the risk of TB infection or disease in HCWs. One study found that administrative measures had little impact on the development of TB and two studies found significant reductions in TB within 1 year of the introduction of multiple infection control measures.

Are the review findings reliable?

There were a number of methodological weaknesses in this review, which was judged at a high risk of bias. A comprehensive search was conducted, including 4 electronic databases. However, the review was restricted to published English language studies and so there is a risk of language and publication bias. The search was conducted in November 2005 and so this review may no longer be up to date. The inclusion criteria were broad in terms of study design but were not explicitly stated for other criteria such as participants, intervention or outcome. Appropriate steps were taken to minimize bias during study selection but duplicate data extraction was only performed for a subset of studies. Study quality was not formally assessed. The synthesis based on pooling certain outcome data in subgroups of studies appeared appropriate.

Can the research findings be applied to my setting?

This review only included studies conducted in LMICs (based on the World Bank classification of LMICs as those countries with per capita income value of less than US$10 066). Studies were conducted in South America, Africa, Asia, the Middle East, Europe and Eurasia. The studies were conducted in different types of healthcare facility, although most of the information was obtained from secondary and tertiary level facilities.

More information

This summary is based on the following systematic review:
Joshi, R., et al., Tuberculosis among health-care workers in low- and middle-income countries: a systematic review. PLoS Med, 2006. 3(12): p. e494.

What is a systematic review?
A systematic review seeks to answer a well formulated and specific question by identifying, critically appraising, and summarising the results of all relevant studies, published and unpublished, according to pre-stated and transparent methods.

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