



Gender dimensions of TB susceptibility, detection, and outcomes

Background

Around two billion people worldwide are estimated to have active or latent tuberculosis (TB), with one million to two million TB-attributable deaths estimated to occur annually (WHO 2011). Current estimates suggest that 9.4 million people acquire TB annually, with more than a third of cases (3.6 million) going undetected (WHO 2011). Though undergoing something of a worldwide resurgence, TB is most prevalent in the Global South¹, where it is increasing acquiring drug resistant forms, representing a serious public health threat. One notable aspect of TB prevalence worldwide is its general propensity² for disproportionate occurrence (or reported occurrence) in men. The most recent available figures for high TB prevalence countries report an average male:female ratio of new smear-positive cases of 1.85:1 (for the years 1998 to 2008), which tends to increase with age (WHO 2009). This tendency has been widely and repeatedly identified (for a review, see Rhines 2013), and a variety of explanations have been forwarded.

The explanations for differential prevalence rates of recorded TB infection in men and women tend to fall into one of two camps (both of which implicate the operation of sex-based (biological) and gender-based (social) differences). One camp suggests that it is indicative of genuine differences in infection rates, attributable to:

- Sex based differences in epidemiological susceptibility to infection and / or in rate of progression from latent to active forms
- Gender based differences in exposure to infection and transmission dynamics

The other suggests that it is (primarily or in substantial part) an artefact of reporting, with relatively higher rates of unrecorded infections in women skewing reported prevalence rates. This is thought to be attributable to:

- Gender based differences in availability and / or accessibility of healthcare
- Gender based stigma attached to infection in women (detering women from seeking diagnosis)
- Sex based differences in the accuracy of diagnostic tests
- Gender based differences in the accuracy of diagnostic tests

Support for the former position tends to be based on international country comparisons which demonstrate that higher rates of notified TB for men persist independently of country level variations in women's broad social status (Borgdorff, Nagelkerke et al. 2000, Rhines 2013). Further support is provided by research indicating that male:female ratios are broadly similar for notified and undiagnosed cases (Borgdorff, Nagelkerke et al. 2000, Hamid Salim, Declercq et al. 2004).

There are, however, exceptions to the general pattern of high male:female prevalence ratios. In many cases, the exceptions are countries with small populations and/or a low absolute incidence of TB (WHO 2009). There is also some evidence that the general pattern of high male:female TB prevalence ratios is reversed (with diagnosis rates greater for women than men) where country-wide HIV prevalence rates are

¹ 80% of new cases annually are estimated to occur in 22 "high-burden" (high TB prevalence) countries (WHO 2009)

² There are exceptions to this trend, discussed further below.

in excess of 1% and where HIV prevalence rates are higher for women than men (UNAIDS 2010). More difficult to explain are the outlier cases of Afghanistan, Iran, and Pakistan which are regarded as “high-burden” (high TB prevalence) countries, where HIV prevalence is relatively low (Rehman, Rasoul et al. 2007, Fallahzadeh, Morowatisharifabad et al. 2009, Khan and Khan 2010), but where reported male:female ratios of TB prevalence average, respectively, 0.47:1, 1.03:1, and 1.05:1 (WHO 2009). India, with an average male:female TB prevalence ratio of 2.28:1 provides an interesting comparison with neighbouring Pakistan (*Ibid*). Recent, more nuanced work on Pakistan has disclosed that, for the period 2001 to 2010, the proportion of notified TB was approximately twice as high for women in the western provinces compared to national averages for Pakistan (Dogar, Shah et al. 2012). This points to an important, and to date neglected, area of research on the gender dynamics of TB infection (and detection) rates and outcomes.

Support for the latter position tends to rest on smaller scale single country intensive studies which identify a higher proportion of undetected infections in women than in men. In parts of Asia adherence to various social institutions supporting women’s seclusion place limits on timely healthcare access, preventing diagnosis (Atre, Kudale et al. 2011, Karim, Johansson et al. 2011, Basu Khan 2012). It has also been suggested that seclusion practices may reduce women’s risks of contracting TB, relative to men, given their more limited opportunities for social interactions (Hudelson 1996). A number of studies have found that there is greater social stigma attached to TB infection for women than for men with women more likely than men to experience rejection from their spouses, natal kin, and wider community, discouraging them from seeking diagnosis (Hudelson 1996, Johansson, Long et al. 2000, Atre, Kudale et al. 2011, Karim, Johansson et al. 2011, Basu Khan 2012). While these studies have focused primarily on Asian countries, there is also evidence of gender differentiated stigma and attendant ostracising and isolating outcomes in parts of Africa (Eastwood and Hill 2004).

There is also some evidence to suggest that women’s infections go undetected as a result of diminished standard of care. A study in Uganda found women with suspected TB were significantly less likely than men to be referred for sputum smear examination, to complete sputum smear examination if referred, and to receive comprehensive evaluation and care if diagnosed (Nsubuga, Johnson et al. 2002). Similar findings have been reported by studies in Asia (Thorson and Diwan 2001). Several studies from Vietnam have reported that women with pulmonary TB are diagnosed an average of two weeks later than men due to delays from the health care provider (for a review, see Thorson and Diwan 2001). Research conducted with focus groups in Vietnam (Johansson, Long et al. 2000) found gender differences in the reasons men and women gave for delays in seeking diagnosis. For women, the threat of social stigma and resulting isolation dominated explanations, whereas for men, the cost of diagnosis and treatment proved decisive. Where women sought healthcare, it tended to be via private services and self-medication in the first instance. Men tend to neglect symptoms for longer but to seek treatment at further away but better resourced public health services without taking intermediary measures (Johansson, Long et al. 2000, Khan, Khan et al. 2012). Research has also identified gender differences in rates of compliance with treatment, which vary by country context (Borgdorff, Nagelkerke et al. 2000, Rhines 2013).

A second seam in this literature identifies under-reporting in women with inaccurate diagnostic testing, with some evidence from Japan suggesting that the tuberculin skin test is less sensitive to infection in women than in men (Diwan and Thorson 1999). Under-detection in women has also been found to occur with the sputum smear test. A study in Pakistan found that a lower rate of positive sputum smear tests in women than men was mainly a function of poor-quality specimen submission. In this particular study, positive diagnoses in women increased substantially, while remaining unchanged in men, following provision of brief instructions for performing the test (Khan, Dar et al. 2007).

Recommendations for Future Research

This brief review points to the many gaps in existing knowledge regarding gender differences in TB infection rates, susceptibility, detection, and outcomes. Research on gender differences in TB incidence and notification is a relatively new area, with few studies published prior to 2000. In the years since, research in

this area has grown, but has tended to rely on large-scale cross-sectional (and, more rarely, longitudinal) country-level and international comparison surveys, and has focussed on descriptive analysis of sex and / or gender-based differences in TB incidence, case detection, treatment compliance, and health-seeking behaviour (Diwan and Thorson 1999, Borgdorff, Nagelkerke et al. 2000, Nsubuga, Johnson et al. 2002, Balasubramaniam 2004, Hamid Salim, Declercq et al. 2004, Karim, Islam et al. 2007, Allotey and Gyapong 2008, Ahmed, Chadha et al. 2009, WHO 2009, WHO 2011, Khan, Khan et al. 2012). This research has demonstrated that men and women vary in their susceptibility to TB, in their access to timely and effective treatment, and in their compliance with treatment protocols. Recently studies have begun to analyse regional differences in these processes and outcomes within a single country and have found significant variations (Dogar, Shah et al. 2012), complicating epidemiological accounts which point to the persistence of high male:female ratios of TB incidence across country level variations in women's broad social status in support of their claims.

Ethnographic methods have rarely been utilised to research gendered dimensions of TB (works by Eastwood and Hill 2004, Onifade, Bayer et al. 2010, Karim, Johansson et al. 2011, Basu Khan 2012 are notable exceptions), but have potential to add to knowledge regarding the operation and intersection of social roles, relations, and mechanisms implicated in disease susceptibility and outcomes. While statistical analysis of large-scale survey data can usefully identify broad tendencies and variations (spatially and over time) in male:female ratios of notifiable (and undetected) TB, ethnographic and other forms of field-based research can complement these findings by drawing out the social processes and mechanisms attached to these patterns.

It is important to note that evidence in support of a (genuinely) higher prevalence of TB among men than women does not invalidate evidence of under-detection in women, and vice versa. Research needs to be attentive to the potential for gender to impact disease susceptibility, detection, and outcomes (both in terms of health and social status) for both men and women. Detailed ethnographic study's can also enable explanations to go beyond methodologically individualistic accounts of disease outcomes which associate suffering and stigma with disease status, without considering the social roles, relations, and conditions that ground those outcomes. Recent work by feminist scholars (Lynam, Loock et al. 2008, Anderson, Khan et al. 2011) has sought to identify the ways in which intersecting socio-political and historical processes marginalise people and create vulnerabilities, with profound impacts on health and access to (appropriate) healthcare. This has led to increasing recognition that stigma and discriminatory practices and processes related to health status need to be studied and analysed in the context of wider inequities within a social configuration, as grounded in and reproducing existing broader prejudices (Maluwa, Aggleton et al. 2002, Basu Khan 2012).

This implies a need for mixed-methods and trans-disciplinary research, combining carefully designed survey data collection and analysis with detailed ethnographic studies (involving informal discussions, participant observation, focus groups, and interviews) to enable explanatory accounts of patterns observed in survey data. Analysis of trends and tendencies over time and in different locations will be of particular value. The varied, and sometimes contradictory, findings reported to date suggest that different components and mechanisms perform different roles in different social configurations, meaning it may be unwise to overly generalise findings.

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