

## Stigma as a barrier to the use of occupational health units for tuberculosis services in South Africa

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### SUMMARY

**SETTING:** Tuberculosis (TB) is the leading cause of death in South Africa, and health care workers (HCWs) are disproportionately affected. The resulting absenteeism strains the already overburdened health system. Although hospital occupational health care units (OHUs) are cost-effective and of crucial importance in tackling the TB epidemic, the fear of being stigmatised by other colleagues might lead HCWs to avoid using OHUs.

**OBJECTIVE:** To investigate whether the perception of TB stigma among colleagues has a negative effect on the willingness to use OHUs for TB services.

**DESIGN:** In the Free State Province, South Africa, a representative sample of 804 HCWs from six hospitals were surveyed on workplace stigma as a predictor for the

use of OHUs for TB services. Applying structural equation modelling, we also controlled for exogenous variables.

**RESULTS:** There was a significant negative relationship between the perception of stigmatising attitudes and behaviours among co-workers and the use of OHUs for TB screening ( $\beta -0.21$ ,  $P=0.000$ ), treatment ( $\beta -0.16$ ,  $P=0.001$ ) and isoniazid preventive therapy ( $\beta -0.17$ ,  $P=0.000$ ).

**CONCLUSION:** The negative effect of TB stigma on OHU use among HCWs can impact upon their health and increase hospital costs. This needs to be addressed by interventions combating TB stigma among HCWs in the workplace.

**KEY WORDS:** health care workers; TB; discrimination

THE TUBERCULOSIS (TB) epidemic has deeply affected sub-Saharan Africa, and especially South Africa, where it is the leading cause of death (7.2% of deaths in 2015, and 1.5 million cases of death worldwide).<sup>1,2</sup> Furthermore, according to World Health Organization (WHO) estimates, South Africa has the highest incidence of TB (834 per 100 000 population in 2014) and 18 734 reported cases of rifampicin-resistant or multidrug-resistant (MDR) TB.<sup>3</sup> This puts the health care system under enormous strain, particularly with an acute situation of overcrowded health facilities and understaffing.<sup>4</sup> The risk of contracting TB is over three times higher for health care workers (HCWs) than the general population<sup>5</sup> due to infection control challenges and increased exposure. The risk is also increased by high rates of human immunodeficiency virus (HIV) infection, which further compromises the immune system and increases the risk of acquiring TB.<sup>6</sup> The alarming levels of TB incidence among South African HCWs, including MDR-TB, has led to TB being classified as an occupational health hazard that calls for workplace solutions.<sup>7–10</sup>

Occupational health care units (OHUs) in hospitals are wards that comprise a variety of health services for HCWs, often linked to occupational hazards.<sup>11</sup> Given the severity of TB in health care settings all over sub-Saharan Africa, OHUs are crucially important for the early diagnosis and treatment of HCWs. OHUs are also a cost-effective solution.<sup>6,12,13</sup> In 2011, the International Labour Organization, the Joint United Nations Programme on HIV/AIDS (UNAIDS) and the WHO released joint policy guidelines declaring that all HCWs have the right to TB prevention, testing, care and support in the workplace. The joint policy also highlights the need to tackle stigma and discrimination.<sup>14</sup> However, HCWs can still be unwilling to use OHUs for TB and HIV screening and testing due to a fear of being stigmatised by their colleagues.<sup>4,15,16</sup>

Stigma is defined as devaluing and looking down upon a social trait or characteristic, which can lead to mistreatment and discrimination of the stigmatised individual or group.<sup>17</sup> TB is often associated with socially undesirable traits such as being HIV-positive

**Table 1** Confirmatory factor analysis of Others' external TB Stigma

Others' external TB stigma	Standardised loading	Mean $\pm$ SD
HCW who are suspected of having TB are stigmatised in this hospital	0.756	1.984 $\pm$ 0.734
Some HCWs in this hospital avoid contact with co-workers who they think may have TB	0.814	1.975 $\pm$ 0.720
Some HCWs in this hospital would not want to eat or drink with a co-worker who they think has TB	0.668	2.132 $\pm$ 0.843
Some HCWs in this hospital are stigmatised when others find out that they have gone for TB screening	0.630	2.011 $\pm$ 0.766
I have noticed that some other HCWs in this hospital feel uncomfortable to work near co-workers with TB	0.706	2.105 $\pm$ 0.805
Fit statistics	$\alpha$ 0.840; SRMR 0.033; RMSEA 0.128; CFI 0.957	

TB = tuberculosis; SD = standard deviation; HCW = health care worker; SRMR = standardised root mean square residual; RMSEA = root mean square error of approximation; CFI = comparative fit index.

(implying immoral behaviour), poverty, dirtiness and weakness.<sup>18</sup> It has been suggested that unwillingness to disclose or display their illness to other hospital staff impedes HCWs from using the OHU for HIV and TB testing and treatment.<sup>14</sup> The lack of treatment can worsen their condition, which in turn increases the risk of passing on the infection, and can lead to absenteeism in already understaffed health care facilities.<sup>14,15</sup>

The association between TB stigma among HCWs directed towards other colleagues and willingness to use OHUs for TB services has not been explored. To respond to this gap in research, the aim of the present study was to investigate whether the perception of stigma among HCWs has a negative effect on the willingness to use the TB services in OHUs, while controlling for other relevant predictors.

## METHODS AND MATERIALS

The data used in this analysis are from the baseline survey from the study entitled 'Towards a health-enabling working environment: developing and testing interventions to decrease HIV and TB stigma among health care workers in the Free State, South Africa' [DOH-27-1115-5204], an ongoing cluster-randomised controlled trial which aims to assess the prevalence and predictors of internal and external HIV and TB stigma among HCWs in the Free State Province of South Africa, and to reduce these stigmas through an intervention. Furthermore, it aims to make HCWs aware of their rights and responsibilities regarding workplace confidentiality in the hospital.

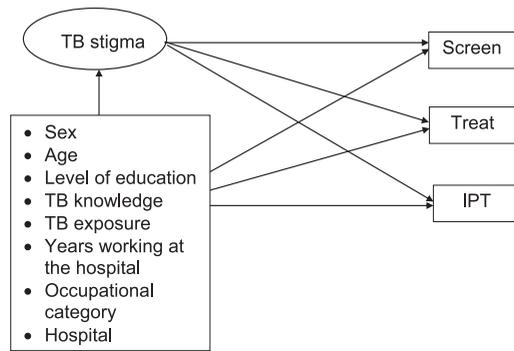
The study was approved by the Ethics Committee, Faculty of Health Science, University of the Free State, Bloemfontein, South Africa [ECUFS 55/2015]. The Free State Province is suitable for this kind of study, as according to South African Department of Health patient records TB incidence (2014) is higher than the national average, at 637.6/100 000.<sup>19</sup>

The original data come from eight randomly selected public hospitals in the Free State, stratified by pairs of intervention/control site by number of staff and regions. For the study, six hospitals were included, as two lacked an OHU. From the six study hospitals, 804 HCWs were randomly selected to represent equal proportions from different health departments. In addition to medical staff (nurses and physicians), administrative, managerial and support staff (e.g., cleaners, security, receptionists and pharmacists) were also included in the study, as they are officially classified as HCWs in South Africa.<sup>14</sup> Names were drawn from lists of employees for each department, and if someone declined to participate or was not reachable, another respondent was drawn from the list until the number of respondents required to give sufficient power to the study was reached.

A questionnaire was developed in consultation with stigma experts and other stakeholders, and was piloted with focus groups involving HCWs from all professions and departments.<sup>20</sup> During data collection, the study was described to respondents; if they agreed to participate, written consent was obtained. The participants independently answered the questionnaires, which were distributed by specially trained researchers and field workers. The questionnaires were in Afrikaans, Sesotho or English. Where literacy was low, the fieldworkers read the questions aloud, but they were answered independently. After finishing a questionnaire, the respondent handed it to the researcher in a sealed envelope to ensure confidentiality.

### Measurements

The questionnaire included questions measuring external TB stigma: the witnessing of stigmatising attitudes or behaviour on the part of HCWs directed toward colleagues. As stigma is considered a sensitive topic, participants were asked whether they had witnessed stigmatising behaviour among other HCWs in their workplace. The scale had been



**Figure** Structural equation model of Others' TB stigma on the willingness to use the OHU for TB services. TB = tuberculosis; IPT = isoniazid preventive therapy; OHU = occupational health care unit.

previously validated on pilot data for the same study,<sup>20</sup> but was validated on baseline data for this analysis. The scale (Others' External Stigma) was constructed on the basis of five statements (Table 1) with four-point Likert scale response alternatives: 1 = strongly disagree, 2 = disagree, 3 = agree and 4 = strongly agree.

The use of the OHU for TB services was measured with three questions: 'Would you use the occupational health unit (sick bay) for each of these TB services?': 1) TB screening, 2) anti-tuberculosis treatment and 3) isoniazid preventive therapy (IPT; used to prevent TB in HIV-positive people). Response alternatives were Yes or No. As these three outcome variables were too highly correlated with each other to benefit the model as a latent construct, we decided to test the effects on them separately, but still in the same structural equation model (Figure).

In the model, we also controlled for demographic factors that could influence the willingness to use the OHU, such as age, sex, seniority (years working at the hospital) and level of education. The latter was classified under six categories: no education, primary, secondary, matriculation (last year in high school), diploma and degree. We further controlled for whether or not respondents were exposed to TB patients at work ('In the department/s where you currently work, are you exposed to patients with TB?'), which were coded as follows: 1 = no, 2 = not sure, and 3 = yes. Occupational categories were also controlled for with three dummy variables: medical staff (physicians, nurses and allied health workers), administrative/managerial staff or support staff.

We also controlled for TB knowledge, with 10 questions and one point for each correct answer. Finally, as the participants were drawn from six different hospitals, we controlled for hospital effects. The hospital with the most participants was used as the reference category and was thus excluded from the model (Figure).

### Data analysis

All analyses were performed using Mplus (Muthén & Muthén, Los Angeles, CA, USA).<sup>21</sup> Before running the structural equation model, we controlled the internal construct validity for the stigma scale using a confirmatory factor analysis (CFA). After controlling for sufficient factor loadings (estimate  $>0.50$  usually indicates sufficient loading),<sup>22</sup> we assessed the model-fit using three different measurements, with their respective cut-off points indicating good model-fit: the comparative fit index (CFI  $>0.95$ ), the standardised root mean square residual (SRMR  $<0.08$ ) and the root mean square error of approximation (RMSEA  $<0.06$ ).<sup>23</sup> According to Hu and Bentler, two of three fit indices should indicate good fit for an acceptable model.<sup>23</sup>

To analyse the paths between our construct of stigma and willingness to use the OHU for TB services, we applied structural equation modelling using the WLSMV estimate command, the most robust estimate for models that include latent variables with dichotomous outcomes.<sup>21</sup> The command estimates probit regression coefficients, where positive values mean that the probability of the event on the categorical dependent variable (e.g., the event category 1 for a 0/1 variable, which is 'OHU use' in this case) increases when the predictor value increases. A negative estimate thus means that the probability for the event decreases.

## RESULTS

Sample characteristics (Table 2) show that the majority of the HCWs were female (72.5%) and Black (88.1%), with a mean age of 43.7 years. The most frequent level of education was matriculation (34.8%), and the mean number of years to have worked in the hospital was 11.8. The mean TB knowledge total score was 7.2 points out of 10. Three quarters (74.8%) of the participants were said to have been exposed to TB through their work, and just over half (51.4%) of the sample consisted of medical staff, in comparison to administrative/management (13.1%) and support staff (35.6%). The mean value on a stigma question (1–4) was 2.0 (see Table 1 for standard deviations): 50.5% of the respondents indicated workplace stigma on at least one of the five statements (Table 2).

The CFA of the Other HCWs External TB Stigma scale indicated good internal construct validity with a good model fit (Table 1). The fit statistics describing the measurement model indicated an acceptable fit with the requirement of two of the three acceptable indices: SRMR 0.033, CFI 0.957 and RMSEA 0.128, which combined indicated a good fit. All five items forming the construct had factor loadings of between 0.6 and 0.8. Reliability was further estimated with a

**Table 2** Sample characteristics

	<i>n</i> (%)
Sex	
Male	221 (27.5)
Female	583 (72.5)
Age, years, mean $\pm$ SD ( <i>n</i> = 804)	43.68 $\pm$ 9.96
Education level	
No education	4 (0.5)
Primary	41 (5.3)
Secondary	139 (17.8)
Matriculation	282 (34.8)
Diploma	215 (26.5)
Degree	123 (15.0)
Race	
Black	707 (88.1)
Coloured	27 (3.3)
White	66 (8.1)
Asian	4 (0.5)
Time worked in the hospital, years, mean $\pm$ SD ( <i>n</i> = 804)	11.78 $\pm$ 9.70
TB knowledge (scale 0–10), mean $\pm$ SD ( <i>n</i> = 804)	7.18 $\pm$ 1.11
Exposed to TB through work	
Yes	601 (74.8)
No	138 (17.2)
Not sure	65 (8.1)
Type of HCW	
Medical staff	413 (51.4)
Administrative staff	105 (13.1)
Support staff	286 (35.6)
Would use the OHU for TB screening	
Yes	709 (88.1)
No	95 (11.8)
Would use the OHU for anti-tuberculosis treatment	
Yes	623 (77.5)
No	181 (22.5)
Would use the OHU for IPT	
Yes	76.9 (76.9)
No	23.1 (23.1)

SD = standard deviation; TB = tuberculosis; HCW = health care worker; OHU = occupational health care unit; IPT = isoniazid preventive therapy.

Cronbach's  $\alpha$  of 0.840, which indicated a reliable measurement of Other HCWs External Stigma (Table 1).

The structural model used to test the impact of TB stigma on the use of OHU services for TB, including control variables (Table 3), fitted the data well (RMSEA 0.022 and CFI 0.998; SRMR is not provided for probit models). The standardised  $\beta$  coefficients for the main effect of stigma and willingness to use OHU for TB services showed that an increased perception of other HCWs' stigma in the workplace reduced the probability of wanting to use any of the three types of OHU TB services (screening:  $\beta$  -0.214,  $P$  = 0.000; treatment:  $\beta$  -0.161,  $P$  = 0.001; and IPT:  $\beta$  -0.170,  $P$  = 0.000). This effect persisted after including control variables in the model. Results also showed that increased TB knowledge had a significant positive effect on the probability of wanting to use OHU for anti-tuberculosis treatment ( $\beta$  0.127,  $P$  = 0.016) and IPT ( $\beta$  0.140,  $P$  = 0.008). The probability of wanting to use the OHU for anti-

**Table 3** Structural equation model estimates of others' TB stigma on the willingness to use the OHU for TB services (coefficients after controlling for hospital effects not shown in the table)

	TB screening $\beta$	TB treatment $\beta$	IPT $\beta$
Others' external TB stigma	-0.214*	-0.161 <sup>†</sup>	-0.170*
Sex (reference category: males)	-0.230	-0.191	-0.070
Age	-0.028	0.135 <sup>‡</sup>	0.105
Level of education, years (0–6)	-0.003	0.058	-0.040
TB knowledge score(1–10)	0.091	0.127 <sup>‡</sup>	0.140 <sup>†</sup>
TB exposure	0.056	0.024	0.011
Years working at the hospital	-0.012	-0.024	-0.029
Occupational category (reference category: medical staff)			
Administration/management	0.337	0.341	0.249
Support	0.004	0.117	0.150
Fit statistics	RMSEA 0.022; CFI 0.998		

\*  $P$  < 0.001.

<sup>†</sup>  $P$  < 0.01.

<sup>‡</sup>  $P$  < 0.05.

TB = tuberculosis; OHU = occupational health care unit; IPT = isoniazid preventive therapy; RMSEA = root mean square error of approximation; CFI = comparative fit index.

tuberculosis treatment also increased with age ( $\beta$  0.135,  $P$  = 0.028), which persisted after correlating age with years working at the hospital. The remaining control variables did not show a significant association with willingness to use the OHU for TB services.

With regard to the effect of predictors on the latent stigma variable, occupational category was the only variable in the model with a significant effect. Support staff had a greater tendency to have witnessed or perceived TB stigma in other colleagues ( $\beta$  0.233,  $P$  = 0.047) than medical staff, which was the reference category. It is important to note that control variables were questions asked to the respondents referring to themselves, while the items about TB stigma collected information on respondents' perception about other HCWs' stigmatising attitudes and behaviours (Table 3).

## DISCUSSION

The aim of the study was to test whether perceived TB stigma among HCWs in the workplace reduces their willingness to use the OHU for TB screening, treatment or IPT. Study results demonstrate that there is a definite negative association between witnessing TB stigma in the workplace and willingness among HCWs to use the OHU for TB services, especially for screening. This suggests that the perception of stigma is an important barrier to health care uptake. To our knowledge, this is the first study that focuses on this association. Applying 2011 international guidelines for occupational health services,<sup>14</sup> stigma reduction should be extended to TB, and in the light of our study results, to stigma against HCWs by other colleagues. Our results are in line with Khan et al., who reported a similar

problematic association between HIV stigma and the use of OHU services.<sup>15</sup>

However, the results also indicated a positive association between the level of TB knowledge and willingness to use OHUs for anti-tuberculosis treatment and IPT. A reason for this could be that greater knowledge about TB, such as the treatment course and the use of IPT for the management of HIV-positive people, could motivate HCWs to use the OHU due to the relatively easy access to these services. Previous research has also found a positive association between knowledge and health care uptake.<sup>24</sup> Moreover, including a TB knowledge component regarding TB curability among potential stigma-reducing interventions has been shown to reduce the effect of stigmatising attitudes among HCWs.<sup>25</sup>

Age was also positively associated with the willingness to use the OHU for anti-tuberculosis treatment, in line with a Ugandan study where older HCWs preferred to use in-house facilities for HIV treatment.<sup>26</sup>

A limitation to the analysis was that we could not control for within- and between-variance effects between the different hospitals due to an insufficient number of groups. The recommended number of second-level groups for multilevel modelling to prevent bias ranges from 21 to 50, and this study only included six hospitals. When implementing potential stigma-reducing interventions, potential differences between the participating hospitals thus need to be considered when analysing the effects. Another limitation is that alternative models of care (e.g., HCWs accessing TB services outside the workplace) have not yet been investigated. In this regard, South Africa and the Free State Department of Health have begun to implement the universal test and treat (UTT) programme, where HIV-positive people have ready access to antiretroviral treatment outside the workplace. This could also affect the way people might access TB services, as there is a high rate of co-infection, and UTT programmes often include TB screening.

Our results indicate that there is a direct path between perceived TB stigma among HCWs and the willingness to use OHUs for TB services, and screening in particular. This would be a special incentive for the introduction of stigma-reducing interventions aimed at HCWs, including the use of workshops, campaigns and HCWs as change agents against workplace stigma.<sup>4,27</sup> More evidence is needed on the relative effectiveness of different interventions in this context.<sup>28</sup> However, as the South African health system is progressing towards new ways of organising TB and HIV care, more research is needed about TB stigma and alternative ways of providing health care for HCWs.

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Conflicts of interest: none declared.

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## R É S U M É

**CONTEXTE :** La tuberculose (TB) est la première cause de décès en Afrique du Sud, et le personnel de santé (HCW) est particulièrement affecté. L'absentéisme qui en résulte met à rude épreuve le système de santé déjà surchargé. Les unités de médecine du travail des hôpitaux (OHU) sont rentables et d'une importance cruciale pour s'attaquer à l'épidémie de TB, mais la crainte d'être stigmatisé par les autres collègues peut amener les HCW à éviter le recours aux OHU.

**OBJECTIF :** Vérifier si la perception d'une stigmatisation vis-à-vis de la TB parmi les collègues a un effet négatif sur la volonté à recourir aux OHU pour des services liés à la TB.

**SCHEM :** Dans l'Etat Libre d'Orange, Afrique du Sud, un échantillon représentatif de 804 HCW de six hôpitaux ont été interrogés à propos de la stigmatisation sur les lieux de travail comme facteur de

prédiction de l'utilisation des OHU pour les services de TB. En appliquant une modélisation par équation structurelle, nous avons également contrôlé les variables exogènes.

**RÉSULTATS :** Il y a eu une relation négative significative entre la perception des attitudes et comportements stigmatisant parmi les collègues et l'utilisation de OHU pour le dépistage de la TB ( $\beta -0,21$  ;  $P = 0,000$ ), le traitement de la TB ( $\beta -0,16$  ;  $P = 0,001$ ) et le TPI ( $\beta -0,17$  ;  $P = 0,000$ ).

**CONCLUSION :** L'effet négatif de la stigmatisation liée à la TB sur l'utilisation des OHU parmi les HCW peut avoir un impact sur leur santé et augmenter les coûts hospitaliers. Cette situation doit être affrontée grâce à des interventions luttant contre la stigmatisation relative à la TB parmi les HCW sur les lieux de travail.

## RESUMEN

**MARCO DE REFERENCIA:** La tuberculosis (TB) es la principal causa de muerte en Suráfrica y afecta de manera desproporcionada a los profesionales de salud (HCW). El absentismo que resulta rebasa la capacidad de un sistema de salud cuya carga de atención era ya excesiva. Las unidades de salud laboral en los hospitales (OHU) son costoeficaces y de gran importancia en la lucha contra la epidemia de TB; sin embargo, el temor a la estigmatización por parte de otros colegas puede impedir que los HCW acudan a estas unidades de atención.

**OBJETIVO:** Investigar si la percepción de estigmas relacionados con la TB en los colegas ejerce un efecto negativo en la disposición de los HCW para acudir a las OHU en busca de servicios de TB.

**MÉTODO:** En la provincia del Estado Libre en Suráfrica se supervisó una muestra representativa de 804 HCW de seis hospitales, con el fin de examinar la estigmatización en el lugar de trabajo como un factor pronóstico de la

utilización de las OHU en busca de servicios de TB. Se aplicó una modelización con ecuaciones estructurales y se controlaron las variables exógenas.

**RESULTADOS:** Se observó una correlación negativa, con significación estadística, entre la percepción de actitudes y comportamientos de estigmatización en los compañeros de trabajo y la utilización de las OHU para la detección sistemática de la TB ( $\beta -0,21$ ;  $P = 0,000$ ), el tratamiento antituberculoso ( $\beta -0,16$ ;  $P = 0,001$ ) y el tratamiento preventivo con isoniazida ( $\beta -0,17$ ;  $P = 0,000$ ).

**CONCLUSIÓN:** El efecto negativo que ejercen los estigmas por TB en la utilización de las OHU por parte de los profesionales sanitarios tiene repercusiones en su salud y aumenta los costos hospitalarios. Es necesario abordar esta situación con intervenciones encaminadas a luchar contra la estigmatización relacionada con la TB de los HCW en su lugar de trabajo.