Factors associated with HIV-related stigma toward colleagues in the health care workforce in South Africa

Factors Associated With HIV-Related Stigma Toward Colleagues in the Health Care Workforce in South Africa

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Abstract

South Africa has the highest number of people living with HIV in the world and health care workers (HCWs) are as likely to be infected as the general population. Stigma in health care settings has severe implications for HCWs and health facilities when HCWs with HIV delay or avoid seeking care, causing increased morbidity and mortality. We explored factors associated with HIV stigma toward colleagues. A representative sample of 882 HCWs from 8 hospitals was surveyed in the Free State, South Africa. We applied multi-group structural equation modeling to compare effects between 3 professional categories. In all 3 groups, there was a significant negative relationship between stigmatizing attitudes against other co-workers and knowing a colleague living with HIV, having a colleague who worked to reduce stigma in the workplace, and having basic HIV knowledge. Our results have implications for understanding and crafting interventions to reduce HIV stigma among HCWs.

Key words: health care workers; HIV stigma; South Africa

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South Africa has the highest number of people living with HIV (PLWH) in the world (Joint United Nations Programme on HIV/AIDS, 2018). People infected with HIV also have a heightened risk of contracting tuberculosis (TB), resulting in South Africa having the world's highest incidence of TB (781 per 100,000 in 2016), of which 10.5% were multi-drug resistant (World Health Organization, 2017). The HIV epidemic with its large numbers of patients has thus inflicted an enormous strain on South African health services. Health care workers (HCWs) are as likely to be infected by HIV as the general population, which has created a problem of absenteeism in hospitals (van Rensburg, Heunis, & Steyn, 2012).

In South Africa, workplace health services for HIV has become an essential part of any health-system-strengthening strategy (Ncayiyana, 2004). This need was stated in a joint World Health Organization, International Labour Organization, and Joint United Nations Programme on HIV policy document on TB and HIV prevention and care for HCWs, which explicitly recommended on-site availability of occupational health services for the entire workforce (World Health Organization, 2010).

Despite the advances in workplace policy, HIV-related stigma has been shown to be a barrier to the uptake and successful long-term utilization of quality HIV prevention, testing, and treatment services by both HCWs and the general population (Nyblade, Stangl, Weiss, & Ashburn, 2009). It is likely that, at least to some extent, stigma will be more manageable in the context of South Africa's Universal Test-and-Treat strategy, launched in 2016, which (a) expanded HIV testing and treatment provision to a range of private providers, notably

pharmacies; (b) increased the number of access entry points; and (c) afforded greater anonymity of access, including for HCWs (South African Department of Health, 2016).

Stigma can be defined as the devaluing and discrediting of a person with a certain trait that is considered undesirable by a more powerful group. Other than causing discrimination and mistreatment, it can also lead to the stigmatized person internalizing negative views (Goffman, 1963; Link & Phelan, 2001). In the case of HCWs living with HIV, stigmatization by colleagues can, for example, take the form of gossiping, refusing to work with HCWs living with HIV, or verbal abuse (de Vries, Galvin, Mhlanga, Cindzi, & Dlamini, 2011; Stutterheim et al., 2017). Fear of negative reactions may cause HCWs to delay or avoid care. Consequences for the already overburdened health care workforce in South Africa are higher morbidity and mortality, which in turn has led to further strain on health care institutions.

HIV is a highly stigmatized and socially sensitive infectious disease because it is associated with sexual behaviors such as extra marital affairs and multiple sexual partners (Campbell, Foulis, Maimane, & Sibiya, 2005; Posel, 2004), so the responsibility for contracting HIV is considered to be the individual's (Skinner & Mfecane, 2004). There are also beliefs that HIV is caused by evil spirits and that PLWH are cursed (Campbell et al., 2005). HIV is further associated with low status social groups with whom many do not want to be associated, which has been documented in South Africa (Goffman, 1963; Wabiri & Taffa, 2013). HCWs may also be expected to be aware of potential risks of getting infected, and may be more harshly judged as a consequence (de Vries et al., 2011). Thus, the HIV status of HCWs is a highly sensitive topic in South African hospitals, as in the rest of society.

Numerous studies have explored the determinants of HIV stigmatization by HCWs

toward patients and how it affects patient care (Donnelly et al., 2016; Kinsler, Wong, Sayles, Davis, & Cunningham, 2007; Wagner, Hart, McShane, Margolese, & Girard, 2014; Waluyo, Culbert, Levy, & Norr, 2015) and the determinants of HIV stigma among PLWH (Tsai, 2015). However, there is a wide knowledge gap about what predicts HIV stigma within and between the health care workforce (HCW-to-HCW), which has importance for individual health and wellbeing as well as for the health care system at large. Existing evidence about factors associated with HIV stigma has not accounted for the very specific context of HCW-to-HCW stigmatization in the health care setting (HCWs, by definition, are confronted with HIV in their workplaces), rendering it especially important to explore stigma in this group (Stutterheim et al., 2017).

Our study will expand the current literature on potential factors linked to HIV stigma by explicitly focusing on a series of characteristics unique in HCWs and potentially related to HIV stigmatization in this relevant professional group: (a) fear of contracting HIV at the workplace, (b) HIV knowledge, (c) knowing a colleague with HIV, and (d) having a colleague fighting stigma.

Our population, HCWs in South Africa, is everyone who works in any way to provide or enable health care in a health care facility. Thus, apart from clinical staff such as nurses and physicians, we have also included administrative and managerial staff such as receptionists and support staff (e.g., security workers, cooks, cleaners). Due to the heterogeneity of HCWs, we differentiated between three groups of HCWs and explored whether relationships differed between various professions working in the hospital.

Conceptualization of Stigma-Related Factors

Sayles, Ryan, Silver, Sarkisian, and Cunningham (2007) identified a link between fear of

contracting HIV and stigma. This is especially relevant in health care settings because HCWs come in contact with PLWH on a regular basis. Participants experienced fear of transmitting the virus through activities such as food sharing, using the same bathroom, or kissing. The results showed that fear of contagion could be related to a lack of knowledge about transmission as well as a predictor of HIV-related stigma (Sayles et al., 2007). Research has also demonstrated connections between fear of HIV and the willingness to work with employees living with HIV (Vest, Carr, Tarnoff, & Vest, 2006).

Knowledge about certain aspects of HIV has been a common predictor of HIV stigma (Vorasane et al., 2017). Yang et al. (2006) found a negative relationship between knowledge of how HIV is transmitted and HIV stigma, where transmission knowledge also had an effect on illness disclosure. Additionally, Hamra, Ross, Orrs, and D'Agostino (2006) further found a negative relationship between knowledge about HIV and stigmatizing attitudes and behaviors toward children living with HIV in Kenya.

Beside studies on the general population, the relationship between HIV knowledge and stigma has also been explored in professional groups such as pharmacists (Balfour et al., 2010) and physicians (Massiah et al., 2004). In these studies, however, the target of the stigma has been the general population or PLWH. There is still a lack of understanding about the association between HIV knowledge and stigma in the health care workforce, where stigma targets and affects colleagues and the work place culture. We expected that more HIV knowledge would be associated with decreased stigma levels, but we were especially interested in whether this relationship differed across different professional groups (clinical staff, support staff, management) with varying levels of knowledge.

The undeniable presence of HIV in the workplace renders hospitals vulnerable for acts of HIV stigmatization but also provides non-stigmatizing HCWs the possibility to stand up against stigma. In line with the Diffusion of Innovation Theory (Rogers, 2010), we hypothesized that stigma fighters could act as change agents (Li, Cao, Wu, Wu, & Xiao, 2007). In other words, if HIV stigma were acknowledged and addressed by other colleagues in the workplace, for example through an awareness campaign or through personal expressions against stigma, research has suggested that these initiatives could reduce HIV stigma levels (Li, Liang, Lin, Wu, & Rotheram-Borus, 2010). A relationship between the actions of change agents fighting stigma and the perceived levels of stigmatization in the hospital have, to date, only been studied with regard to the stigmatizing opinions and attitudes of HCWs toward PLWH (Li, Guan, Liang, Lin, & Wu, 2013).

Research about HCWs has indicated that knowing or being in contact with people living with stigmatized identities reduced external stigma toward others, also known as the contact hypothesis (Quinn & Earnshaw, 2011). This has also been acknowledged in the context of HIV and of HCW behaviors toward patients (Earnshaw, Smith, Chaudoir, Amico, & Copenhaver, 2013). Our study aimed to test this hypothesis – linking the contact with an HCW living with HIV to respondents' stigmatizing attitudes.

Methods

Data

The data used for our study were collected in 2016 as a baseline measurement for the study entitled, Toward 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 (Rau et al., 2018), a cluster randomized trial to develop and test interventions to reduce HIV- and TB-related stigma in HCWs in South African health care facilities. The study was approved by the ethical board of the Faculty of Health Science of the University of the Free State [ECUFS 55/2015] and by the University of Antwerp, Ethics Committee for the Social Sciences and Humanities [SHW_15_28_03].

The parameters used for sample size calculation were estimated from the preparatory Stigma Score Pilot Study and resulted in 882 HCW respondents, described in detail in the trial research protocol by Rau et al. (2018). Respondents were randomly sampled from the health care workforce register from all departments in eight hospitals in the Free State province of South Africa, and asked to fill in a baseline questionnaire. All hospital staff, regardless of profession, could be included in the study. Selected participants were contacted in the workplace by a researcher or fieldworker and, if s/he declined or was absent, a replacement was randomly selected until the required sample was obtained. A written consent form was obtained in advance from each participant. Respondents with low levels of reading literacy were gathered into small groups and trained fieldworkers went through the questions verbally and answered queries from the group; however, respondents filled in the questionnaires themselves. To enable confidentiality, each respondent returned the completed questionnaire in a sealed envelope.

Endogenous Variable Measure

Other HCW stigma toward colleagues. The HIV stigma measurement used for our study was the Respondents' External HIV Stigma Scale, which measured HCW perceptions, attitudes, and behaviors toward colleagues in the hospital. Its validity and reliability were demonstrated

in a study by Wouters et al. (2017).

Exogenous Variables Measures

A colleague is fighting stigma in the workplace. We used the statement, *Some health care workers in this hospital are doing something to stop stigma in the workplace*, with four response alternatives (1 = *Strongly agree*, 2 = *Agree*, 3 = *Disagree*, 4 = *Strongly disagree*). For clearer interpretation, these alternatives were recoded into a dummy variable (alternative 1 & 2 = 1 and 3 & 4 = 0).

Respondent knows of a colleague living with HIV. This variable was measured in the reply to the question, *Do you know of any staff members in your hospital who are HIV-positive?* It was coded *Yes* = 1 and *No* = 0.

HIV knowledge. Sum scores were used to analyze basic and advanced HIV knowledge, measured with five questions each. The questions were selected with input from a clinical expert on the context of health care work in the Free State, South Africa.

Being worried about contracting HIV in the workplace. Worry was measured with the statement, *I am worried about contracting HIV at work*, with replies coded as a dummy variable from the response alternatives *Yes, No,* and *Not applicable to me. Not applicable to me was recoded* as *No* (0), because the response indicated that the respondent was not worried about contracting HIV.

Control Variables Measures

The model also controlled for the respondent's age and gender, which were recoded into a dummy variable where *Male* = 0 and *Female* = 1.

Education level was measured with six alternatives: *No education*, *Primary* (year 1-6),

Secondary (year 7-9), *Matric* (graduation of high school after year 12), *Diploma* (postgraduate qualification), and *Degree* (e.g., MPhil or PhD).

Seniority was measured with the question, *How many years have you been working at this hospital?* Because the data were collected at eight different hospitals, we also controlled for hospital/study site effects where each hospital was used as a dummy variable except the hospital with the most respondents, which was used as reference. The names of the hospitals are not specified for confidentiality reasons.

Hospital referred to the hospital where the respondent worked. Hospitals were treated as dummy variables (0/1) where the largest hospital with the most respondents was selected as the reference category.

Analysis

As a preliminary analysis, we looked at distribution of the independent (exogenous) variables in the three professional groups, clinical, administration/management, and support staff. To test for differences in the independent variables between the three occupational groups, we applied analysis of variance or contingency table analysis with subsequent Bonferroni-corrected post hoc tests (Bland & Altman, 1995).

For the analysis of factors associated with HIV stigma, we used multi-group structural equation modelling (SEM) with Mplus, a method that can jointly incorporate observed variables and latent variables constructed of several items in order to optimally model social reality. It required a two-step approach, with a Measurement Model to assess the latent construct (HIV stigma) and a Structural Model to assess relationships between observed and latent variables. The first step was to test the latent stigma scale and establish construct validity (that it

measured what we intended it to measure). This was done by observing the fit indices provided, based on the cut-off values on the Hu and Bentler (1999) guidelines where two of three criteria had to be met: CFI/TLI ≥ .95, RMSEA ≤ .06, and SRMR ≤ .08. We also tested internal consistency to establish that the included items were of similar importance for the construct, where a Cronbach's Alpha of more than 0.7 usually indicates good reliability of the measure (Santos, 1999).

Because HCWs are a heterogeneous group and work in different hospital departments with different working cultures and characteristics, multiple-group confirmatory factor analysis was used based on three professional categories: (a) clinical HCWs (e.g., physicians, nurses, auxiliary health care staff), (b) administrative or managerial staff, and (c) support staff (e.g., receptionists, cleaners, cooks, security guards). In multi-group SEM analysis, the constructed measurement (the respondent's external HIV stigma) had to be validated and deemed reliable in each of the groups; the constructed measurement had to capture the same meaning (Meuleman, Davidov, & Billiet, 2009). This was established through invariance testing in Mplus where the construct (HIV stigma) was tested to establish the level of invariance the construct would allow: configural, metric, or scalar invariance. Configural invariance indicates that the items forming the stigma construct would be the same in each group. Metric, or measurement invariance, means that the factor loadings would be the same over the groups; this type of invariance is required to compare regression effects between the three groups. Scalar invariance is where the construct is most invariant across the group, where the intercepts and error terms of the items are the same; it is required to compare factor intercepts between the groups (Dimitrov, 2010).

The second step was to create a structural model where the latent variable (stigma scale) was regressed on the four observed factors believed to be associated with stigma. And finally, the control variables were added to the model. The same structural analysis was then performed for each of the three occupational groups, using the same constructed scale of HIV stigma as the outcome variable in each group. The procedure used multiple line regression as an estimator as it accounted for non-normal distribution in the dependent variable. The command resulted in list-wise deletion of missing cases (Muthén & Muthén, 2017).

As a final step of the multiple-group analysis, we wanted to test whether the differences in strength of the paths (regression coefficients) were significant between the groups (e.g., does HIV knowledge have a significantly different impact on stigma among clinical staff vs. management staff?). This was done by comparing step-by-step (i.e., path-by-path) pairs of professional groups with each other (clinical vs. management, patient vs. support, and management vs. support). In other words, for each path and for each pair of professional categories, we compared the basic model, in which a certain path (e.g., from HIV knowledge to stigma) was set equal across a specific pair of professional categories (e.g., clinical staff vs. management staff) with a more complex model in which the regression path differed across the groups using a chi-square difference test. If the chi-square difference test was significant, it indicated that the model with the free path was to be preferred – or, in our example that the path from HIV knowledge to stigma was different between management and patient staff. In other words, the strength of the effect that an independent variable had on HIV stigma would then differ significantly between two occupational groups. The procedure was reiterated for each path and for each pair of professional groups (Satorra & Bentler, 2010).

Results

Descriptive Statistics

Of the 882 respondents, two did not disclose their professions and thus could not be included in the multiple-group analysis. Table 1 shows the respondents who were subsequently included in the SEM analysis. All three professional categories consisted of a majority of female staff with the largest gender discrepancy in clinical staff (80.63% female), while the same ratio for administration/management staff was 57.52% women and 63.99% women for support staff (Table 1). The distribution between occupational groups differed significantly ($p < 0.05$). The mean age in all three groups was just older than 40 years, with 43.79 years for clinical staff, 42.39 years for administration/management, and 43.83 years for support staff. The three groups differed significantly in education level; the mean highest education for clinical HCWs was diploma (mean 4.83) while matric was the most common degree for administration/management (mean 4.45). Support staff generally had the lowest education but also with matric as the most common finished education level (mean 3.72). The distribution of races across the occupational groups showed that a large majority of the respondents were Black (85.36% of clinical HCWs, 80.53% of administration/management, and the largest majority in support staff with 93.57%). The rest identified as White or Colored, and a few clinical HCWs identified as Asian. The number of years respondents had worked in their hospitals was, on average, 11 to 12 years, with no significant differences between the groups.

A substantial proportion of the respondents were worried about getting infected with HIV at work, especially among the clinical HCWs (45.72%) and the support staff (46.94%). The administration/management respondents were not as worried, with 23.89% answering *yes* to

the statement, differing significantly ($p < 0.05$) from the other groups.

More than half of the HCWs across all three groups stated that other colleagues in their departments worked to diminish HIV stigma (69.73% of clinical HCWs, 64.66% of administration/management staff, and 65.72% of support staff), with no significant difference between groups. The proportion of the respondents who knew of a colleague living with HIV infection, however, differed significantly, with a majority (63%) of the clinical HCWs, half (50%) of the administration/management staff, and about a third (34.59%) of the support staff.

For HIV knowledge sum scores, all three groups had high basic knowledge of HIV, with a mean of 4.33 for clinical workers, 3.07 for administration/management, and 4.00 for support staff. Clinical workers had significantly higher ($p < 0.05$) basic knowledge than the other two groups, which did not differ from one another. On the advanced HIV knowledge sum score, clinical workers had the highest mean score with 3.32, followed by administration/management with 2.36, and support staff with a mean score of 2.24. As with basic HIV knowledge, clinical staff differed significantly with higher knowledge than the other two groups ($p < 0.05$).

The four items designed to measure respondent HIV stigma were compared across the three professional categories, using analysis of variance and Bonferroni-corrected post hoc tests (Table 2). The mean score of the items tended to be 1.5 to 2, and three of the items differed significantly on the mean between clinical staff and support staff ($p < 0.05$). The tendency then was that clinical staff generally had lower levels of external HIV stigma than support staff.

Table 1

Descriptive Statistics

	Clinical HCW *n* = 446	**Administration/ Management *n* = 116**	**Support staff *n* = 318**	**Total *N* = 880**
	***n* (%) missing = 2**	***n* (%) missing = 3**	***n* (%) missing = 7**	***N* (%) Missing = 12**
HIV stigma, arbitrary mean (SE)	0 (reference)	-0.09 (0.05)	0.17 (0.04)*	
Colleague who works against HIV stigma				
Yes	311 (69.7)	75 (64.7)	209 (65.7)	587 (67.6)
No	134 (30.0)	39 (33.6)	109 (34.3)	281 (32.4)
Knows a colleague living with HIV				
Yes	281 (63.0)*	58 (50.0)	110 (34.6)*	442 (50.9)
No	165 (37.0)*	58 (50.0)	208 (65.4)*	426 (49.1)
Worried about being infected with HIV at work				
Yes	203 (45.7)	27 (23.9)*	146 (46.9)	376 (43.3)
No	241 (54.3)	86 (76.1)*	165 (53.1)	492 (56.7)
Basic HIV knowledge (1-5)	4.33 (0.73)*	3.97 (0.9)	4.0 (0.91)	4.17 (0.84)
Advanced HIV knowledge (1-5)	3.32 (1.18)*	2.36 (1.02)	2.24 (1.08)	2.81 (1.24)
Age, mean *(SD)*	43.79 (10.13)	42.39 (10.08)	43.83 (9.58)	43.61 (9.93)
Education level (1-6), *M (SD)*	4.83 (0.93)*	4.45 (0.79)*	3.42 (0.88)*	4.28 (1.10)
Gender				
Female	358 (80.6)*	65 (57.5)*	199 (67.0)*	622 (71.7)
Male	86 (19.4)*	48 (42.6)*	112 (36.0)*	246 (28.3)
Race				
Black	379 (85.4)	91 (80.5)	291 (93.6)	761 (87.7)
Colored	19 (4.3)	6 (5.3)	9 (2.9)	34 (3.9)
White	42 (9.5)	16 (14.2)	11 (3.5)	69 (7.9)
Asian	4 (0.9)	-	-	4 (0.5)
Years working in the hospital, mean *(SD)*	11.75 (9.63)	12.48 (9.70)	11.10 (9.63)	11.61 (9.61)
Stigma items, *M (SD)*				
1. I would feel comfortable having HCWs who are known to	1.79 (0.76)*	1.96 (0.84)	1.95 (0.76)*	1.87 (0.78)

be HIV-positive working closely with me in my job				
2. HCW who have HIV should not feel guilty about it	1.54 (0.70)*	1.62 (0.72)	1.81 (0.81)*	1.65 (0.78)
3. HIV-positive HCWs can be good role models in the workplace	1.57 (0.69)	1.56 (0.62)	1.68 (0.74)	1.61 (0.70)
4. Doctors and nurses with HIV who are otherwise in good health should continue to practice medicine	1.42 (0.59)*	1.54 (0.66)	1.59 (0.67)*	1.50 (0.63)

Note. * = difference within the group is significant with $p < 0.05$ with Bonferroni correction.

Table 2

Confirmatory Factor Analysis of Respondent External HIV Stigma

External HIV stigma **Alpha: 0.783**	**Standardized Loading**	***M***	***SD***
1. I would feel comfortable having HCWs who are known to be HIV-positive working closely with me in my job	0.524	1.87	0.775
2. HCW who have HIV should not feel guilty about it.	0.736	1.65	0.755
3. HIV-positive HCWs can be good role models in the workplace	0.757	1.61	0.701
4. Doctors and nurses with HIV who are otherwise in good health should continue to practice medicine	0.727	1.50	0.633
	Cronbach's Alpha: 0.783		

Note. HCW = health care worker.

Measurement Model

The model fit indices also indicated a good fit to the data. For the HIV Respondents' External HIV Stigma scale, the model fit passed all requirements with SRMR = 0.012, RMSEA = 0.034, and CFI = 0.995 (Table 2). The reliability and internal consistency of the stigma scale were sufficient with a Cronbach's Alpha value of 0.783.

The tests for measurement equivalence over the three groups showed that fixing the factor loadings across the three professional groups did not significantly change the model fit compared to the unrestricted model ($\chi^2 = 4.36$, $p = 0.628$), which indicated that the constructed measurement for HIV stigma could be held equal across the three groups (metric invariance). However, further fixing the intercepts between the three groups significantly deteriorated the model fit ($\chi^2 = 16.17$, $p = 0.013$) which meant that we could compare correlations between the groups but not the means of the latent constructs (Dimitrov, 2010). The modification indices of the Mplus output indicated that one of the items (item 3, Table 2) strongly influenced the model fit, and when we freed its intercept to vary among the professional groups, we obtained partial scalar invariance. Partial scalar invariance is considered to be sufficient for latent mean comparisons across groups (Meuleman et al., 2009). When using clinical staff as the reference group, fixing the stigma mean to zero, the administration/management group had a mean of 0.09 times the clinical group, which was not a significant difference. However, support staff had a comparative mean of 0.17 times more stigma, which was significant ($p < 0.000$). There was, however, no significant difference when comparing the stigma levels in the administration/management group to the support staff.

Structural Model

The results of the structural analysis showed significant relationships with the respondent external HIV stigma in some of the explanatory variables (Table 3). The variable with the seemingly strongest effect on respondent HIV stigma was knowing a colleague living with HIV compared to those who did not (β = -0.400, p = 0.0001). Further, having colleagues who did something to reduce stigma in the work department also had a negative effect on stigma (β = -0.242, p = 0.002).

The results further demonstrated that basic HIV knowledge was significantly and negatively related to HIV stigma (β = -0.111, p = 0.003), implying that those with a higher basic HIV knowledge demonstrated less stigma. However, advanced HIV knowledge remained insignificant.

Taking control variables into account, there was a weak but significant association between age and HIV-related stigma (β = -0.094, p = 0.047), implying that older respondents in general were more stigmatizing than younger HCWs (Logie & Gadalla, 2009). There was, however, no significant association between fear of contracting HIV in the workplace and HIV stigma, either with or without other factors or control variables in the model. Neither did the results show any significant effect on HIV stigma related to gender, education level, occupational category, or number of years worked at the hospital. When controlling for hospital effect, certain hospitals showed a significant association with HIV stigma but, in general, there was no such association.

Table 3

Factors Associated With HIV Stigma

	Total sample (*N* = 868)	
	Standardized β	**2-tailed *p*-value**
Colleague works against HIV stigma	**-0.242**	**0.002**
Knows a colleague living with HIV	**-0.400**	**0.0001**
Worried about contracting HIV at work	0.120	0.102
Basic HIV knowledge	**-0.111**	**0.003**
Advanced HIV knowledge	0.003	0.933
Occupational category		
Clinical staff (reference)		
Administration/management staff	0.098	0.406
Support staff	0.104	0.300
Age	**0.094**	**0.047**
Gender		
Male (reference)		
Female	0.125	0.139
Education	-0.091	0.062
Years working in the hospital	-0.025	0.581
Hospital		
Hospital 1 (ref)		
Hospital 2	-0.077	0.697
Hospital 3	-0.165	0.120
Hospital 4	**-0.235**	**0.020**
Hospital 5	**-0.673**	**0.002**
Hospital 6	-0.190	0.143
Hospital 7	**-0.410**	**0.003**
Hospital 8	0.269	0.189

Multiple-Group SEM

Finally, we used multiple-groups SEM to assess whether the above-described paths differed significantly across the three professional groups (Table 4). For this goal, we assessed the difference in strength of each individual path (beta coefficient) between the three professional groups. In practice, we started with the most simple model, which supposed that all paths were equal across all professional groups. Subsequently, we released the paths one by one between all pairs of professional groups to assess whether this would significantly improve

the model fit. In the end, releasing the paths did not improve the model fit, indicating that none of the paths significantly differed across the three professional groups. Thus, there is no need to report the individual structural models in each of the occupational groups.

Table 4

Chi-Square Difference Tests of Paths Between Occupational Health Groups (Corrected) for Significant Variables

	Colleague Works Against Stigma		**Knows a colleague Living with HIV**		**Basic HIV Knowledge**	
	χ^2	*p*	χ^2	*p*	χ^2	*p*
Clinical vs. Administration/Management	1.797	0.180	1.069	0.301	1.135	0.287
Administration/Management vs. Support	0.603	0.437	0.899	0.343	0.987	0.321
Support vs. Clinical	2.158	0.142	0.858	0.354	0.973	0.324

Discussion

Sub-Saharan Africa, and South Africa in particular, has been severely affected by the HIV epidemic, which has led to a crisis in the health care system with severe understaffing of health care facilities. HIV-related stigma among HCWs in a South African context has been shown to have a negative impact on the care of PLWH, as well as on the health and health care utilization of HCWs themselves (Nyblade et al. (2009) Simbayi et al. (2007)). Our study focused on context-based factors such as whether a colleague was doing something to prevent HIV stigma in the workplace, whether the respondent knew of a colleague living with HIV, fear of contracting HIV in the workplace, and HIV knowledge. Using SEM with a validity- and reliability-tested stigma scale to measure external HIV stigma in HCWs, our results provide valuable insight in what can

predict –and potentially prevent – HIV-related stigma between colleagues in the health care workforce.

Because the study population consisted of all types of HCWs, they were divided and analyzed in three groups based on the type of work: clinical staff working directly with patients, administrative/managerial staff, and support staff (cleaners, cooks, security, etc.). The stigma scale was tested for measurement invariance to ensure that the meaning of the stigma construct was identical in all three groups. If an HCW knew a colleague living with HIV, the stigma level tended to be lower compared to those who did not. This supported the contact hypothesis described, for example, by Quinn and Earnshaw (2011) and Earnshaw et al. (2013). Those studies concluded that socializing with PLWH and stigmatized people could increase understanding and reduce stigma. Enabling a work environment where disclosure of HIV status is possible and encouraged might result in reduced stigma, and should be taken into account when crafting stigma reducing interventions. However, there might be a two-way direction of causality, an HCW living with HIV might disclose his/her status if s/he sensed that his/her colleagues were accepting and did not hold stigmatizing attitudes.

HIV stigma also tended to be lower if the respondent stated that other colleagues in their departments were working to stop HIV stigma. This result encourages interventions where HCWs are engaged in working against stigma, and speaks to the possibilities of using HCWs as change agents in the workplace, as studies by Li have mentioned (Li et al., 2013; Li et al., 2010).

Close to half of the participants were worried about contracting HIV at work, however, this was not significantly related to HIV stigma toward colleagues, contrary to what an American study has shown (Sayles et al., 2007). Our results suggest an absence of such a link in

the context of South African HCWs. The fear of contracting HIV can be related to caring for PLWH and thus has less to do with stigmatizing attitudes toward colleagues themselves.

Of the control variables, age stood out as significant (yet weakly so), indicating that older HCWs had more stigmatizing attitudes toward colleagues compared to younger ones. Other studies have also found this effect of age on stigma, such as a meta-analysis by Logie and Gadalla (2009).

Although our study was the first to focus on factors associated with HIV stigma among and between HCWs, it comes with several limitations. The hospitals did not allow us to ask the respondents about personal HIV status, which could have given valuable insight into the results. The results also came from a cross-sectional sample, which made it impossible to prove any causal direction. The possibility of reverse causation and mutually reinforced effects should be considered when interpreting the results. Qualitative research is needed to explore the nature of the factors associated with HIV stigma in HCWs.

Conclusion

The results of our study show that several factors were significantly associated with HCW HIV stigma toward their colleagues, which should be taken into account when crafting interventions and policies to reduce HCW-on-HCW HIV-related stigma in the workplace. Especially important seems to be contact with colleagues who are openly living with HIV and having other colleagues working to end stigma in the workplace. The latter gives a promising insight into interventions supporting HCW involvement in changing stigmatizing attitudes in the workplace. Involving HCWs while also encouraging an environment where colleagues living with HIV can be open about being infected could have mutually reinforcing effects. A similar

approach has been used to reduce stigma through change agents and public opinion leaders (Dearing, 2009; Li et al., 2013; Li et al., 2010). Interventions should also take into account the heterogeneity of the health care work force in order to capture potential effects specific to certain occupations but, in this case, the factors associated with HIV stigma did not vary over occupational categories, indicating that similar factors impact stigma among HCWs across different professional categories.

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Key Considerations

- HIV-related stigma directed from health care workers to other health care workers can hamper willingness to get tested and seek care.
- Factors associated with lower levels of this type of stigma are: having basic HIV knowledge, knowing of a colleague living with HIV, and having colleagues who are working to decrease HIV stigma in the workplace.
- Factors associated with HIV-related stigma must be considered when developing programs and interventions to decrease HIV-related stigma in health care workers.