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HIV/AIDS Stigma Attitudes among Educators in KwaZulu-Natal, South Africa

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Abstract

Background—One hundred and twenty educators from KwaZulu-Natal, South Africa, underwent HIV/AIDS training. The educators were surveyed about their attitudes toward people with HIV.

Methods—The educators completed self-administered survey questionnaires both before and after two interventions. Measures included demographic characteristics, teachers' knowledge about HIV/AIDS, self-efficacy in handling HIV/AIDS situations, and attitudes (stigma and otherwise) towards HIV-related issues.

The first intervention was a CD-ROM and the second intervention involved educators receiving a two day workshop on HIV transmission, risk factors, and actions that educators should know and undertake.

The first step entailed testing the stigma instrument for its internal consistency, and developing and testing potential subscales from the instrument. The second step entailed testing for the statistical associations between stigma (as measured by the stigma instrument and its subscales) and various demographic and HIV knowledge related variables.

Results—The overall stigma scale had a Cronbach alpha coefficient of 0.66. Educators in the workshop generally had lower baseline levels of stigma than those in the CD-ROM intervention. Following both interventions the stigma levels of both groups of educators were significantly reduced. The levels of stigma reduction varied by educators' demographic indicators. The largest

reductions in stigma were reported for those educators who had better general AIDS knowledge; better knowledge about risk of transmission; university education, rural residence and younger age.

Conclusions—The levels of teachers' stigma attitudes were statistically significantly lower after both types of HIV/AIDS training and were also statistically significantly associated with improvements in HIV knowledge.

Keywords

School Psychology; Risk Behaviors; Human Sexuality; Health Educators

Introduction

South Africa has the largest number of HIV positive people of any country and one of the highest HIV prevalences in the world. Estimates from a national study using population-based surveys with biomarkers for HIV showed the overall HIV prevalence in 2004 to be around 10.8%.¹ The study also showed that the HIV prevalences for 15-19 year olds were 9.4% for girls and 3.2% for boys, and the prevalences for 2-14 year olds were 3.5% and 3.2%, respectively, confirming statistics found in an earlier study.² While these statistics indicate that pupils of primary or secondary school age have lower HIV prevalence than the total population of South Africa, the statistics also indicate that a non-negligible percentage of pupils (e.g., 9.4% of 15-19 year old girls) may already have HIV. Educators not only have the opportunity to teach pupils to acquire life skills to remain HIV-free, they are also faced with the challenges of teaching and supporting pupils with HIV and pupils from households affected by HIV. As teachers are role models in the classroom as well as in the community, their attitudes and how they themselves treat others with HIV may have important social ramifications. If teachers held stigmatizing attitudes towards those with HIV, this not only could negatively impact pupils affected by HIV, but other pupils might imitate such actions and grow up with unhealthy stigmatizing attitudes. Although there are studies in South Africa on teachers' HIV prevalence³ and on teachers' knowledge about HIV⁴, whether teachers themselves have stigmatizing attitudes towards people with HIV and whether such negative attitudes could be altered with some kind of intervention are important questions that have not been well addressed in the literature.

Several studies have documented AIDS stigma in southern Africa.⁵⁻⁸ For example, in townships around Cape Town, South Africa, it was found that less than 50% of the respondents felt that it was safe for people with AIDS to work with children and that more than 33% believed that people with AIDS must expect some restrictions in their freedom.⁶ Various studies have also shown that AIDS stigma constituted barriers to HIV/AIDS prevention and treatment, such as accessing programs in voluntary counseling and testing, prevention of mother-to-child HIV transmission,⁹⁻¹¹ and disclosure of HIV status and use of condoms.¹²

Many intervention programs aimed at reducing HIV stigma have incorporated multiple modalities, ranging from pure information campaigns, to role-playing, to actual contact with people with AIDS, such as greater involvement of people with AIDS or "GIPA" in the workplace.¹³ Although knowledge about HIV/AIDS and its routes of transmission has been shown to be associated with HIV related stigma attitudes,⁷ a review of AIDS stigma interventions¹⁴ indicated that interventions that consisted solely of information about HIV/AIDS¹⁵⁻¹⁶ were mostly ineffective in *changing* stigma. Instead, actual contact with people with AIDS seemed to be the more promising approach. The active thought of a close relative with HIV also achieved reductions in stigma.¹⁶

This study examined the HIV-related stigma attitudes amongst 120 educators in KwaZulu-Natal (KZN), South Africa, both *before* and *after* two interventions aimed to teach educators how to handle HIV-related issues in the classroom setting.

Methods

Subjects

The educators were recruited as part of a larger study conducted by the Psychological Services Unit of the KZN Department of Education and Culture in Pietermaritzburg (PMB) to evaluate the effectiveness of two separate interventions to teach educators how to teach and to handle HIV/AIDS related issues in the classroom setting. Educators were recruited from the Pietermaritzburg region, located between Durban and Ladysmith. The sample has been detailed elsewhere,¹⁷ therefore only brief descriptions are given below. Sixty educators were selected from among eight primary and secondary schools in the PMB region in the KZN Province of South Africa to undergo an interactive CD-ROM computer intervention; and another sixty educators from another nine primary and secondary schools in the same region were elected to attend a separate two-day Care & Support Workshop (CSW). None of the educators had received training in HIV/AIDS issues before either of the two interventions.

Instruments

The educators completed self-administered survey questionnaires in English both before and after two interventions. Measures included demographic characteristics, teachers' knowledge about HIV/AIDS, self-efficacy in handling HIV/AIDS situations, and attitudes (stigma and otherwise) towards HIV-related issues.

Demographics—Participants were asked their gender, age, marital status, locality of residence (rural or urban), and educational level.

HIV Related Stigma—Despite an extensive literature search, a survey instrument did not exist to test *teachers'* HIV-related stigma attitudes, especially for situations that might arise in the classroom setting. At the time of surveying in 2004, a survey instrument did not exist to test the general public that was specifically designed for AIDS-stigma for South Africa, although one such instrument has recently been developed.¹⁸ This study's questionnaire did, however, ask teachers to agree or disagree (on a five point scale) with various attitudinal statements that were related to how the teacher viewed a person or pupil with HIV, such as “AIDS is a punishment for immoral behavior,” “the parents of all students in the class should be notified if there is a student with HIV/AIDS in the class,” and “I would quit my job before I would work with someone with AIDS.” Some of the stigma attitude questions came from a survey of HIV/AIDS designed for secondary school teachers,¹⁹ which has been tested for reliability and validity amongst pre- and in-service educators and counselors in the U.S.¹⁹⁻²⁰ and used among educators in Mozambique.²¹ Variations of these attitudinal statements have also been used in survey instruments designed to gauge attitudes of the public towards people with HIV/AIDS.^{18, 22} Four stigma-related questions commonly used in the Demographic and Health Survey (DHS) were also included, such as whether the teachers would care for a sick relative with AIDS at home, whether they would buy vegetables from a vendor with AIDS, whether they would keep a family member's HIV status secret, and whether a teacher with HIV but not sick should be allowed to teach.²³

HIV-Related Knowledge and Self-Efficacy—The survey also included questions on general knowledge about HIV as a disease and knowledge about HIV transmission risks.

Most of these questions came from an existing survey.¹⁹ Also added were another six questions on teachers' self-efficacy in teaching pupils about HIV and about sex.

Instrument Validation

The validation of the instrument entailed the construction of the stigma instrument, testing for its internal consistency, and developing and testing potential subscales from the instrument.

Construction of Stigma Instrument—The original study contained 25 attitudinal items about HIV. Some of the items were clearly not stigma-related (e.g., “More time should be spent teaching teachers about HIV/AIDS in their teacher preparation courses.”) and were eliminated from the list. While some items clearly had interpretations that indicated stigmatizing attitudes, some other items were not so clear cut. While agreeing to the statement “Parents of all students should be notified if a student with HIV/AIDS is in the class” might have connotations of planned avoidance of people with HIV and constituted stigma, agreeing to the statement “Teachers should be notified if they have a student with HIV/AIDS” might indicate intentions to pursue avoidance behavior or to provide extra care and sympathy. Based on these reasons, items that had both a positive and a negative interpretation were eliminated. Other items that had almost universal consensus among teachers, such as the near universal agreement to the statement that “a teacher with HIV but not sick should be allowed to continue teaching were also eliminated.” A total of 13 items were left.

Construction of Stigma Subscales—In addition to overall AIDS-related stigma, theoretical latent variables that might better explain the various dimensions of stigma were also of interest.²⁴ These were first grouped in terms of an interpretation of the items' underlying intended meanings. For instance, the item, “I would rather work in a school where the teachers and pupils don't have HIV,” was considered to be similar to another item, “I would quit my job before I would work with someone with AIDS.” Both had the underlying meaning that the teacher who answered yes to those questions would be more likely to be unwilling to work with people or pupils with HIV (for whatever reason). Based on an interpretation of the underlying meanings of the attitudinal statements, items that seemed to probe similar underlying latent constructs were grouped together.

Interventions

The teachers in this study underwent one of two interventions. They either were presented with an interactive CD-ROM on computer or participated in a 2-day CSW. Both interventions, although quite different in approach, involved the provision of much information about HIV. Additionally, the CSW included role-playing to empower teachers to deal with HIV situations, and the CD-ROM included the use of an actor playing the role of a pupil afflicted with AIDS and the use of the interactive nature of the CD-ROM to teach teachers how to deal with various situations related to HIV *in the first person*. Although neither intervention involved actual contact with a person with AIDS, the role play in the CSW and the protagonist character in the CD-ROM video both involved indirect contact with a person with AIDS. Prior studies have demonstrated the power of cinema and film in facilitating dialogues about HIV/AIDS in communities that were formerly silent about the subject matter,²⁵ and the power of active imagery in achieving HIV stigma reduction.¹⁶

The CD-ROM—The first intervention tool was a CD-ROM called “Everything You Wanted to Know about HIV/AIDS in the Classroom, but Were Afraid to Ask: A Teacher's Interactive Journey,” developed by the American Association of Colleges for Teacher Education and the Centers for Disease Control and Prevention. An updated edition of the

CD-ROM entitled “My Year with Tony” was used.²¹ This video-embedded CD-ROM is designed to prepare educators to skillfully engage issues of HIV/AIDS, by providing a story about a pupil named Tony who was infected with HIV and plagued with illnesses and absences related to the disease. Throughout the video, the educator-viewer is required to make a series of choices after various video clips, with each decision followed by a series of developments that affected other students, their parents, and the educator's career. Issues encountered included decisions regarding confidentiality, first aid and universal precautions, sports participation by an HIV infected child, the difficulties of educator-parent relationships, and the many questions children have regarding death.

The CSW—The second intervention involved educators from the PMB region coming to a central spot to receive a two day workshop on HIV transmission, risk factors, and actions that educators should know and undertake when confronted by the many everyday challenges that result from HIV/AIDS infection. The workshop involved lectures, role playing, and delivery of educational material for the educators to take back to their school to use as reference material. An important focus was on empowering these educators to act as mentors in their own school and thus to spread the ‘correct’ message about HIV/AIDS to their colleagues.

Data Analysis

Statistical analysis of the data was undertaken to determine the correlation between stigma (as measured by the stigma instrument and its subscales) and various demographic and HIV knowledge related variables. Common factor analysis was applied to the 13 items of the stigma instrument to determine the number of factors. Five factors had eigen value greater than one, but one item appeared to be a factor by itself. This item was the stigma item commonly used in the DHS on whether to buy vegetables from a vendor with AIDS. The number of factors was then restricted to four, and it was found that this DHS item was related to two other items; suggestive of fear of infection and desire to avoid people with HIV. Varimax rotation was then applied to the four factors, and items with factor loading greater than 0.50 were then retained and the resulting factors and their items were compared with the factors that came from the theoretical categorizations based on the items' underlying meanings. When the theoretical groupings and the factor groupings conflicted with each other, the theoretical groupings prevailed in the final construction of the four subscales for stigma. Two items that were not in any of the factors were eliminated, leaving 11 items in the overall stigma scale and four separate stigma subscales. Cronbach's alpha coefficient measures the internal consistency or the *internal consistency reliability* of how well a set of items measures a single unidimensional latent construct. It takes a value between negative infinity and 1. Cronbach's alpha will generally increase when the correlations between the items increase. For this reason, values closer to 1 indicate higher levels of correlation. Technically speaking, Cronbach's alpha is not a statistical test -- it is a coefficient of reliability (or consistency). Spearman's rank correlation coefficient is a non-parametric measure of correlation – that is, it assesses how well an arbitrary monotonic function could describe the relationship between two items, without making any other assumptions about the particular nature of the relationship between the items. It takes a value between negative 1 and 1.

Statistical Association between Stigma (and Changes in Stigma) and

Demographics—Most of the questionnaire items were of the Likert scale type; e.g., 1=strongly disagree, 2=disagree, 3=uncertain, 4=agree, and 5=strongly agree. Pre- and post-intervention scores were investigated, segregated by demographic groups, both using the individual Likert scale items as well as the composite Likert scale scores. Since these Likert type items were not distributed normally and given the small sample size, nonparametric

tests were performed. Comparisons of differences in specific item scores as well as in the composite scores between demographic subgroups were done using Wilcoxon's rank sum (Mann-Whitney) test. For comparisons of within-sample differences in pre- and post-intervention survey responses, the McNemar's test was performed to test whether there were more educators with decreased stigma level than those with increased level (after having gone through the intervention). Testing if the *amount* of change in the teachers' stigma scores were statistically different before and after the interventions, was undertaken by using the Wilcoxon signed rank statistics.²⁶ To study variables related to AIDS-stigma and of changes in AIDS-stigma, regression analysis using ordinary least squares and ordinal logits was undertaken, with the AIDS-stigma scores as the dependent variable, and with demographics and AIDS-related knowledge scores (and changes of these scores) as explanatory variables.

Results

Table 1 presents the 11 stigma items in the overall stigma scale and the four subscales derived from theoretical categorization and factor analysis. The scores for individual items ranged from 1 to 5, with 1 being least stigmatizing and 5 being most stigmatizing. Teachers who strongly agreed, agreed, or were uncertain about these stigma statements (i.e., those who gave answers of 5, 4, or 3, respectively) were considered as having given 'stigmatizing' answers.

The 'overall stigma scale' combined all 11 items and had a Cronbach α of 0.66. No single item contributed disproportionately to the scale's consistency; deletion of any item from the scale did not increase the Cronbach alpha (Column 7). The percentage of teachers who gave stigmatizing answers varied widely among the items (Column 3). For instance, 16% of the teachers reported that they strongly agreed, agreed, or were uncertain about Item 1 ("AIDS is a punishment for immoral behavior"), and 52% worried about possible casual contact with a person with AIDS (Item 9).

Table 2 presents the mean HIV/AIDS attitude scores for the four subscales and the overall stigma scale – *at the baseline* (i.e., before the intervention). Although most items' mean scores were not stigmatizing (i.e. below 3), there was wide variation in the teacher's answers, and almost all items had answers that ranged from 1 to 5 (not reported in the table).

Mean scores among the various demographic groups as well as among the two separate interventions are also shown in Table 2. Since the teachers were not randomized into the two interventions, the baseline attitudinal scores differed between the two groups. Teachers in the CSW generally had lower baseline levels of stigma than those in the CD-ROM intervention. Also, teachers who had university education, resided in urban areas, were male, or were younger all had lower stigma scores. It is clear that teachers from different demographic backgrounds showed different levels of stigma at the baseline.

Table 3 presents the *changes* in stigma attitudes after the interventions, both in terms of the number of teachers whose stigma level worsened, remained unchanged, or improved, as well as in terms of the mean changes in scores. In terms of overall Stigma (bottom row), teachers with reductions in stigma (N=69, Column 4) far outnumbered those that had increases in stigma (N=32, Column 2), and this was statistically significant ($p < .01$ by McNemar's Test). The overall composite scores decreased by an average of 1.69 points after the intervention (Column 6), which was also statistically significant ($p < .01$ by Wilcoxon signed rank test). Teachers' attitudes on the Fear of Infection Subscale also showed improvements with the interventions. The score changes for each stigma item, for the stigma subscales, and for the

overall stigma scale were not significantly different between interventions (not reported in table).

The results from ordinary least squares are presented, because the findings, especially those involving the size of impact from various explanatory variables, are easier to interpret with linear regressions. The top panel in Table 4 presents a series of regression analyses of the relationships between baseline stigma level and teacher's demographics as well as the teacher's own baseline scores on (i) general knowledge about AIDS, (ii) knowledge about HIV transmission risk, and (iii) self-efficacy in teaching pupils about sex, AIDS, condoms, partner persuasion, and abstinence. These explanatory variables are listed in Column 1 (with the self-efficacy variable omitted because it was not statistically significant for any of the regressions). The dependent variables (i.e., overall stigma and its subscales) are in the row towards the top. Column 2 presents the relationship between the various explanatory variables and the overall stigma scale. General AIDS knowledge, knowledge about risk of transmission, university education, rural residence and younger age were associated with statistically significant lower levels of stigma. For the dichotomous explanatory variables, such as whether the teacher had a university education, resided in rural areas, was single, male, or between the ages of 21-30 (versus above 30), the coefficients in Table 4 were standardized by the standard deviation of the dependent variable. Thus, prior to the interventions, a teacher with a university education would have an overall stigma scale score that was 0.481 standard deviations less than a teacher without a university education, having controlled for everything else. A teacher residing in a rural area would have an overall stigma scale score that was 0.358 standard deviations less than a teacher from an urban area. For the HIV risk knowledge variable, the coefficients were standardized with the standard deviations of both the dependent variable and the explanatory variables. For instance, a teacher with HIV transmission risk knowledge score that was 1 standard deviation above the mean would have a 0.275 standard deviation lower overall stigma level than the stigma level expressed by a teacher whose knowledge about HIV transmission risks was only average. Younger teachers, teachers with a university degree, and teachers with higher levels of general knowledge and specific knowledge about HIV transmission risks were less stigmatizing as measured on the overall stigma scale and some stigma subscales (by virtue of having a negative coefficient). Rural residence was associated with lower stigma levels in the overall scale.

Since the teachers were not assigned randomly to the two interventions, the type of intervention that the teachers were assigned was also controlled for by using a dummy variable for the CSW.

As already shown in Table 3, teachers showed stigma reductions in the overall scale and the fear of infection subscale after the intervention. In order to assess how teacher demographics and improvements in HIV knowledge were related to changes in stigma attitudes, a series of regressions were performed using the post-intervention stigma score as the dependent variable, but controlling for pre-intervention baseline stigma score as well as the other variables of interest. The results are shown in the bottom panel of Table 4. Of particular interest was how *changes* in knowledge were related to improvements in stigma attitudes – having controlled for the stigma level *at the baseline* as well as the knowledge levels *at the baseline*. Having controlled for these baseline levels, it was found that improvements in general AIDS knowledge and improvements in HIV transmission risk knowledge were both associated with statistically significant lower post-intervention stigma levels. Teachers with a university education or who were single also had lower post-intervention stigma levels for the fear of infection and involuntary disclosure subscales, respectively. The two interventions did not result in statistically significant differences in stigma changes, having controlled for the other variables.

Finally, to validate these findings using a stigma measurement question commonly used in the DHS surveys, logistic regression was performed to examine whether refusal to buy from a shop owned by someone with AIDS was associated with the explanatory variables. The results are shown in Column 7 of Table 4. In the top panel, teachers who had higher levels of knowledge about HIV transmission risk had lower odds of refusal. In the bottom panel, the odds of refusal after the interventions were much lower for teachers who showed improvements in general AIDS knowledge and in transmission risk knowledge. Teachers whose general AIDS knowledge improved by 1 standard deviation from the mean (or about 15% of all teachers) would be 9.2 times less likely (i.e., the inverse of 0.130) to refuse to buy vegetables from a shop owner with AIDS than a teacher who only had average improvement in general AIDS knowledge. Additionally, teachers whose knowledge about HIV transmission risks that improved by 1 standard deviation from the mean (or about 15% of all teachers) would be 6.6 times less likely (i.e., the inverse of 0.151) to refuse to buy vegetables from a shop owner with AIDS than a teacher who only showed average improvement in knowledge about HIV transmission risk.

Discussion

In Table 1 four factors clearly emerged from the theoretical interpretation of the underlying reasons for the stigma attitudes, forming four potential subscales within the overall stigma scale. These stigma subscales were (1) Moral Judgment about HIV, (2) desire for Involuntary Disclosure of HIV status, (3) Unwillingness to Work with people or pupils with HIV, and (4) Fear of Infection. While the first and fourth subscales were closest to the traditional measures for symbolic and instrumental stigma, respectively, the second and third subscales could proxy avoidance intentions or behaviors arising out of both fear of infection and disdain for people with HIV. Item 11 (“Won’t buy vegetables from someone with AIDS”) clearly proxied for underlying fear of infection. The Cronbach alpha for the Fear of Infection Stigma Subscale was only 0.49, perhaps indicating multiple constructs embedded in the three items. Deletion of Item 11 increased the alpha to 0.53 (Column 7). The key results are reported using both Item 11 as an individual item and the Fear of Infection Stigma Subscale.

The mean scores in Table 2 infer that the “average” teacher did not hold particularly stigmatizing attitudes against people with HIV/AIDS. However, many of the teachers did hold such attitudes at the baseline. For instance, from Table 1 Column 3, it is evidenced that 15% of the teachers wanted HIV test results publicized (Item 4) and that 52% worried about possible casual contact with a person with AIDS (Item 9).

It should be emphasized that the results in Table 3 were derived without having controlled for baseline scores or other demographics, which were shown in Table 2 to be significantly related to stigma. Teachers with higher levels of stigma (or higher baseline scores) might benefit more or show more room for improvement in stigma attitudes from the interventions than teachers who already had very low levels of stigma. Controlling for these differences, a series of regression analyses were performed to examine the determinants of stigma and of stigma change, using both ordinary least squares and ordinal logistic regressions. The two regression methods yielded virtually identical results, albeit slightly stronger results with logistic regressions.

Given the results in the top and bottom panels of Table 4, improvements in HIV knowledge were clearly associated with stigma reduction, with statistically significant and sizeable effects. The recent national survey report indicates that information about HIV and close contact with persons with HIV may not be sufficient to reduce stigma;¹ in fact, the report advocated the use of legal measures and activism to challenge stigma and discrimination.²⁷

Since teachers' actions are often imitated by their students, the teachers not only must learn how to be non-stigmatizing in their own behaviors, but they also need to learn how to “police” against stigma as expressed by others in the school. How to achieve this “policing” function remains to be explored in future research.

Limitations

This study, nevertheless, suffers from many limitations, and interpretations of the findings should be made with caution. In addition to the small sample size ($N = 112$), budgetary constraints did not allow the recruitment of a third group of teachers who did not undergo any intervention as an ultimate control group. (These teachers would have done the pre-test, followed by the viewing of a video unrelated to AIDS, followed by the post-test). Nevertheless, it is doubtful that all of the stigma change that was observed in this study could be fully explained just by the re-taking of the tests or the passage of time.

Another important limitation of this study is that even though it was found that improvements in knowledge contributed significantly to stigma reduction, it is not possible to fully explain the mechanism of this change or the subcomponents of the interventions that affected this change. While improvements in knowledge about HIV transmission risk should reasonably lead to reductions in stigma related to fear of infection (Table 4, Column 6, bottom panel), it is unclear why an enhanced understanding about HIV as a disease process (general AIDS knowledge) would decrease stigma related to moral judgment (Table 4, Column 3, bottom panel). It is likely that the interventions changed a variable that was not measured in this study but that variable was correlated with both the teachers' moral judgment stigma and their general AIDS knowledge.

Implications for School Health

The main implication of this study is that both of the HIV/AIDS training interventions -- Care and Support Workshop and the CD-Rom intervention -- had the effect of reducing teacher's stigmatizing attitudes towards people with HIV. That is, the implementation of appropriate teacher training in HIV/AIDS education may reduce stigma in the school community. Stigma remains a major impediment to improving the situation that HIV positive students and educators find themselves in the South African schools. Many HIV positive individuals refuse to identify themselves voluntarily, given the widespread stigmatizing attitudes current in schools and society more generally.

Teacher's general AIDS knowledge improved as a result of the interventions as well as an increase in transmission risk knowledge and both of these outcomes were associated with reduced stigma. In the context of South Africa, with the largest number of HIV positive people of any country and the lack of generalized teacher education campaigns around HIV/AIDS attitudes and knowledge, the results presented here indicate the benefits that can arise from such training. Given the lack of resources made available by government for HIV/AIDS training interventions in schools the role of non government organizations, both domestic and foreign, in providing those resources could be crucial in reducing the continuing HIV stigma related behavior in South African schools.

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Figure 1. Map of South Africa

Table 1
Internal Consistency of Overall Stigma Scale and of Stigma Subscales

1	2	3	4	5	6	7
Stigma Scales and Associated Items	Item Number	Percent of Teachers with Stigmatizing Answers	Item to Total Correlation within Subscale	Cronbach α if Deleted from Subscale	Item to Total Correlation for Overall Scale with All 11 Items	Cronbach α if Deleted from Overall Scale
<i>Subscale for Moral Judgment about HIV/AIDS (Cronbach $\alpha = 0.61$)</i>						
AIDS is a punishment for immoral behavior	1	16.1	0.31	0.67	0.20	0.66
I feel uncomfortable coming into contact with gay men because they may have AIDS	2	35.7	0.44	0.49	0.37	0.62
People with AIDS are responsible for getting their illness	3	31.3	0.54	0.35	0.38	0.62
<i>Subscale for Involuntary Disclosure of HIV Status (Cronbach $\alpha = 0.64$)</i>						
HIV test results should be made public so that others can avoid those with HIV	4	15.2	0.46	0.52	0.27	0.64
All children should be tested for HIV before entering school	5	24.1	0.50	0.46	0.39	0.62
The parents of all students in the class should be notified if there is a student with HIV/AIDS in the class	6	21.4	0.38	0.62	0.33	0.63
<i>Subscale for Unwillingness to Work with People or Pupils with HIV/AIDS (Cronbach $\alpha = 0.64$)</i>						
I would rather work in a school where the teachers and pupils don't have HIV	7	17.9	--	--	0.41	0.62
I would quit my job before I would work with someone with AIDS	8	5.4	--	--	0.27	0.64
<i>Subscale for Fear of Infection (Cronbach $\alpha = 0.49$)</i>						
I worry about possible casual contact with a person with AIDS	9	51.8	0.34	0.32	0.34	0.63
I am worried that I may have to teach a student with HIV/AIDS in my classroom	10	32.1	0.36	0.28	0.24	0.65
I would not buy vegetables from a shopkeeper or food seller who has the AIDS virus	11	13.4	0.21	0.53	0.19	0.66
<i>Overall Stigma Scale with All 11 Items (Cronbach $\alpha = 0.66$)</i>		1 through 11				

Table 2
Mean Scores for Stigma Scales and Stigma Subscales, by demographic groups at baseline (bigger number implies higher level of stigmatizing attitudes)

Overall Stigma Scale & Subscales	Maximum Score	Full Sample	Intervention		University		Rural		Single		Male		Age (21-30)	
			CD	PMB	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Subscale for Moral Judgement	15	6.0	6.8	5.3 **	6.2	5.7	5.4	6.7 **	6.3	5.6	6.0	6.0	6.1	5.6
Subscale for Involuntary Disclosure	15	5.4	5.8	5.1	5.6	5.1	5.2	5.6	5.5	5.2	5.5	5.2	5.6	4.4 *
Subscale for Willingness to Work with Person	10	3.2	3.4	3.1	3.4	2.9	3.0	3.5 *	3.3	3.1	3.2	3.3	3.3	3.1
Subscale for Fear of Infection	15	6.6	6.8	6.4	7.1	5.5 **	6.1	7.2 *	6.8	6.3	6.8	5.8 *	6.7	6.2
Overall Stigma Scale	55	21.3	22.9	19.8 **	22.3	19.1 *	19.7	23.0 **	21.9	20.2	21.6	20.3	21.6	19.3
Number of Observations		112	54	58	77	35	58	54	71	41	86	26	95	17

* p < 0.05,

** p < 0.01 by Wilcoxon Rank Sum Tests

Table 3
Changes in Stigma Attitudes after the Interventions, by numbers and by stigma scores

1	2	3	4	5
Overall Stigma Scale & Subscales	Stigma Increased	No Change	Stigma Decreased	Full Sample
	Number of Teachers			Score Change
Subscale for Moral Judgment (Items 1, 2, 3)	32	31	49	-0.22
Subscale for Involuntary Disclosure (Items 4, 5, 6)	31	34	47	-0.019
Subscale for Unwillingness to Work with Person (Items 7, 8)	23	54	35	-0.11
Subscale for Fear of Infection (Items 9, 10, 11)	29	21	62 **	-1.17 **
Overall Stigma Scale (Items 1 through 11)	32	11	69 **	-1.69 **

* $p < 0.05$,

**

$p < 0.01$; McNemar's Test used for number of teachers and Wilcoxon signed rank test used for score changes

Note: Score Change < 0 implies that stigma decreased after intervention

Table 4
Regression Analysis of the Determinants of Scores on Stigma Scale, Before and After the Intervention

1	2	3	4	5	6	7
	Overall Stigma	Moral Judgment	Involuntary Disclosure	Unwillingness to Work	Fear of Infection	Refuse to Buy from Owner with AIDS
	Higher Scores in Scale Indicate Higher Stigma Level					(1=Yes; 0=No)
	Standardized Coefficients					Odds Ratios
BEFORE intervention						
General AIDS Knowledge	-0.231 **	-0.086	-0.200 *	-0.134	-0.161	0.844
Transmission Risk Knowledge	-0.275 **	-0.129	-0.156	-0.159	-0.241 **	0.456 *
Care & Support Workshop	-0.356 *	-0.484 *	-0.287	-0.159	0.048	3.065
University Education	-0.481 **	-0.053	-0.244	-0.247	-0.593 **	0.262
Rural Residence	-0.358 *	-0.379	0.031	-0.286	0.195	1.769
Single	-0.155	-0.287	0.089	-0.151	-0.066	0.540
Male	-0.097	0.079	-0.090	-0.159	-0.321	2.420
Age 21-30	-0.837 **	-0.317	-0.799 **	-0.302	-1.054 *	0.398
F Statistics	6.270	2.060	2.030	1.370	3.510	
adjusted R squares	0.343	0.095	0.092	0.035	0.199	
AFTER Intervention						
Baseline of Dependent Variable	0.344 **	0.342 **	0.218 *	0.197 *	0.280 **	153.040 *
General AIDS Knowledge	-0.220	-0.262 *	-0.044	0.064	-0.384 **	0.130 *
Change in General AIDS Knowledge	-0.270 *	-0.294 *	0.014	-0.069	-0.390 **	0.109 *
Transmission Risk Knowledge	-0.027	0.071	0.117	-0.125	-0.120	2.780
Change in Transmission Risk Knowledge	-0.187 *	-0.058	-0.081	-0.194	-0.218 *	0.151 *
Care & Support Workshop	-0.093	-0.154	-0.113	0.148	-0.116	0.385
University Education	-0.083	-0.071	0.265	-0.251	-0.404 *	0.220
Rural Residence	0.154	0.063	0.284	0.148	-0.016	0.192
Single	-0.225	-0.141	-0.583 *	-0.041	0.196	1.159
Male	0.321	0.401 *	0.181	0.226	0.016	0.501

1	2	3	4	5	6	7
	Overall Stigma	Moral Judgment	Involuntary Disclosure	Unwillingness to Work	Fear of Infection	Refuse to Buy from Owner with AIDS (1=Yes; 0=No)
	Higher Scores in Scale Indicate Higher Stigma Level					
	Standardized Coefficients					Odds Ratios
Age 21-30	0.011	0.294	0.520	-0.600 *	-0.679 *	0.000
F Statistics	3.510	4.290	1.130	1.500	4.480	
adjusted R Squares	0.253	0.308	0.017	0.064	0.320	

* p < 0.05,
** p < 0.01