

Metacognitions mediate HIV stigma and depression/anxiety in men who have sex with men living with HIV

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Abstract

The study examined whether the relationships between HIV stigma and depression and anxiety would be mediated by metacognitive beliefs and thought control strategies in men who have sex with men living with HIV. Men who have sex with men living with HIV completed an online survey that measured 30-item Metacognitions Questionnaire, thought control strategies (Thought Control Questionnaire), as well as symptoms of depression (Patient Health Questionnaire-9) and anxiety (generalized anxiety disorder-7). The relationships between internalised and anticipated HIV stigma with depressive symptoms were mediated by Negative Metacognitive Beliefs and the use of Worry and Social thought control strategies. Negative Metacognitive Beliefs mediated the association between internalised HIV stigma and anxiety symptoms.

Keywords

anxiety, depression, HIV, men's health, sexual health

The implementation of highly active antiretroviral therapy (HAART) has meant that HIV is now commonly viewed as a chronic illness (Biswas, 2007; Vetter and Donnelly, 2006). Although this has resulted in significant improvements in the physical health of people living with HIV (PLWH), there continues to be a higher prevalence of anxiety and depression in this population (Bing et al., 2001; Grierson et al., 2009; Nacher et al., 2010). Comorbidity between anxiety and depressive symptoms in PLWH is also high (Pence et al., 2006; Schumacher et al., 2012). Furthermore, increased psychological distress in PLWH has also been shown to negatively affect HIV disease progression (Leserman, 2008; Schuster et al., 2012). Thus, it is vital to understand the potential variables and processes influencing depression and anxiety symptoms in PLWH.

HIV stigma continues to be a major stressor for PLWH and has consistently been associated with more psychological distress (Earnshaw and Chaudoir, 2009; Hatzenbuehler et al., 2011; Logie and Gadalla, 2009). Stigma towards PLWH may be connected to HIV as a condition, which is seen as preventable, incurable, contagious and potentially appearance altering (Herek, 1999). Similarly, HIV stigma

towards gay, bisexual and other men who have sex with men (MSM) may also be connected to prejudice around same sex behaviour, leading to stigma layering, with MSM stigmatised as a result of their HIV diagnosis and sexual orientation (Fay et al., 2011; Herek and Capitanio, 1999; Pickles et al., 2009; Reidpath and Chan, 2005).

HIV stigma is thought to occur through at least three processes (Earnshaw and Chaudoir, 2009): (a) *Enacted Stigma* (also called *Experienced Stigma*) refers to perceptions of overt or actual HIV stigma (Phillips et al., 2011; Scambler and Paoli, 2008), (b) *Anticipated Stigma* (also called *Felt or Perceived Stigma*) is the expectation of negative societal attitudes and discrimination from others

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(Earnshaw and Chaudoir, 2009; Herek et al., 2013; Phillips et al., 2011) and (c) *Internalised Stigma* (also called *Self-Stigma*) is the incorporation of these negative prejudicial attitudes into one's self-concept (Corrigan and Watson, 2002; Phillips et al., 2011). In a review by Earnshaw and Chaudoir (2009), greater enacted, internalised and anticipated HIV stigma perceptions of PLWH were consistently associated with poor mental health and low social support.

Given the high levels of depression and anxiety symptoms and continued perceptions of HIV stigma in MSM, there is a need to better understand the psychological processes linking HIV stigma to mental health outcomes. This study will examine the role of metacognitions in explaining differences in depression and anxiety symptoms in response to perceptions of HIV stigma in MSM living with HIV. Metacognition refers to the stored knowledge and experiences of thought processes and the strategies likely to reach one's objective, and involves beliefs and appraisals of one's cognitions (Flavell, 1979). One model of metacognition that has shown to be helpful in explaining psychopathology is the metacognitive model developed by Adrian Wells (1995). In this model, Wells (2008) proposed that depression and anxiety result from an unhelpful internal state called the cognitive attentional syndrome (CAS), which consists of perseverative thinking such as worry or rumination, threat monitoring and ineffective cognitive coping strategies. For example, someone experiencing high levels of social anxiety may have a CAS that involves a perseverative thinking style of worry that others will reject her or him, an attentional bias towards threat cues such as facial expressions of others or unhelpful cognitive coping strategies such as thought suppression. The experience of worry, attentional bias to threat cues and the use of ineffective coping strategies manifest themselves in the symptoms associated with the social anxiety. The CAS is thought to be triggered and maintained by metacognitive beliefs (i.e. unhelpful beliefs and appraisals of one's cognitions) (Wells, 2008). The meta-beliefs can be classified as positive meta-beliefs (such as 'If I worry about all possibilities I can avoid failure'), which provide the motivation to engage in perseverative thinking, and negative meta-beliefs (e.g. 'Worrying is uncontrollable'), which provide the motivation to employ a coping strategy to manage the perseverative thinking (Wells, 2008). An attentional bias towards threat cues and ineffective coping strategies are then linked to the maintenance of psychological disorders (Wells and Carter, 2009; Wells and Davies, 1994). While Well's metacognitive model was initially developed to explain the pathology of anxiety and depression, more recent developments have shown the application of the model to other forms of psychopathology such as alcohol misuse (Spada et al., 2013) and eating disorders (Vann et al., 2013).

This study will use Wells and Cartwright-Hatton's (2004) 30-item Metacognitions Questionnaire (MCQ-30) to assess five different types of metacognitive beliefs. *Negative Metacognitive Beliefs* represents beliefs that worry is

dangerous and uncontrollable and has consistently been identified as the strongest metacognitive predictor of psychological distress, showing significant positive relationships with depression and anxiety symptoms (Allot et al., 2005; Spada et al., 2008a, 2008b; Tajrishi et al., 2011; Yilmaz et al., 2011). Another metacognitive belief termed *Need to Control Thoughts* represents beliefs that one should be in continuous control of one's thoughts (Wells and Cartwright-Hatton, 2004) and has shown significant positive associations with both depression and anxiety symptoms in non-clinical samples (Spada et al., 2008b; Yilmaz et al., 2011). The metacognitive belief entitled *Cognitive Confidence* is focused on a lack of confidence in cognitive processes such as memory (Wells and Cartwright-Hatton, 2004) and is associated with depressive rather than anxious symptoms (Spada et al., 2008a). *Positive Metacognitive Beliefs* refers to the perceived benefits of worry to prevent distress and improve mood while *Cognitive Self-Consciousness* involves the tendency to monitor thoughts. Neither appear to be associated with depressive or anxious symptoms (Spada et al., 2008a).

Metacognitive beliefs dictating the meaning and importance placed on one's cognitions are believed to trigger the use of ineffective thought control strategies aimed at suppressing or removing distressing thoughts (Wells and Carter, 2009). Research assessing these strategies has typically used Wells and Davies (1994) Thought Control Questionnaire (TCQ) that examines five thought control strategies. Worry as a thought control strategy involves using minor worries as a means of suppressing more upsetting thoughts and has been associated with both anxiety (generalized anxiety disorder (GAD); Coles and Heimberg, 2005; Wells and Carter, 2009) and depression (Barahmand, 2009; Wells and Carter, 2009). Punishment as a thought control strategy involves using behaviours such as slapping, pinching and yelling at oneself to manage distressing thoughts (Wells and Davies, 1994) and may be more strongly linked to generalised anxiety than to depressive symptoms (Wells and Davies, 2009). In contrast, thought control strategies focused on talking about distressing thoughts with peers (Social), rationally analysing thoughts (Reappraisal) and focusing on work or more pleasant activities (Distraction) have shown either non-significant or negative associations with psychological distress (Wells, 2008). This study builds upon a recent study which further demonstrates the important role of both metacognitions and thought control strategies in differentiating those who are currently depressed from those who have previously been depressed and those who have never been depressed (Halvorsen et al., 2014).

As such, unhelpful metacognitions and ineffective thought control strategies are predicted to mediate HIV stigma with symptoms of depression and anxiety in MSM living with HIV. Specifically, it is hypothesised that (a) the relationship between greater enacted, internalised and anticipated HIV stigma and more depressive symptoms will be mediated by greater Negative Metacognitive Beliefs, Need

to Control Thoughts and lack of Cognitive Confidence and more use of Worry as a thought control strategy and (b) the relationship between greater enacted, internalised and anticipated HIV stigma and more anxiety symptoms will be mediated by greater Negative Metacognitive Beliefs and Need to Control Thoughts and more use of Worry and Punishment as thought control strategies.

Method

Participants

Participants were 106 gay, bisexual and other MSM living with HIV, aged 24 to 74 years ($M=44.6$ years; standard deviation (SD)=10.97 years). The majority of participants reported being born in Australia (73.6%) and currently living in Australia (86.8%). Over half of the participants reported being in either full-time (39.6%) or part-time/casual (18.9%) employment and 9.4 per cent reported being unemployed. The majority of participants reported having engaged in higher education (e.g. diploma or technical college=26.4% or undergraduate degree=27.7%). Nearly all of the participants identified their sexual orientation as gay (92.5%). Over half of the participants reported being single (57.5%) and 39.6 per cent reported being in a long-term relationship. The mean year of HIV diagnosis was 1999 ($SD=9.2$ years), with the majority of participants reporting that they were taking antiretroviral therapy (80.2%), had no current health problems associated with their HIV diagnosis and/or medication side-effects (65.1%) and had an undetectable viral load (73.6%). The mean year of starting antiretroviral therapy (ART) was 2003 ($SD=7.4$ years). The demographic data are presented in Table 1.

Procedure

Participants were recruited by using posters, business cards, website advertisements, email banners and news stories within the MSM population. The study was advertised within the Sexual Health and HIV Service in Brisbane, medical centres, gay press social media sites (e.g. Facebook™, Twitter™ and online magazines), Queensland Universities, Ninemsn and HIV-positive websites in Queensland, Tasmania, South Australia, Western Australia and Victoria. Emails were sent and online advertisements were also posted on Poz Vibrations, a dating site for PLWH. Participants were asked to forward the survey link onto other MSM.

Measures

Demographics. Questions were asked regarding age, country of birth, country residing, postcode, highest level of education, main source of income, relationship status, year of HIV diagnosis and whether or not respondents experienced health problems associated with their HIV diagnosis

and/or HIV medication side-effects. Viral load detectability was scored on a 3-point Likert scale ('Undetectable', 'Detectable', 'Don't know/unsure'). These questions were adapted from Australian studies (National Centre in HIV Social Research, 2009; Slavin et al., 2011).

HIV stigma. HIV stigma was assessed through Bunn et al.'s (2007) 32-item HIV Stigma Scale. The HIV Stigma Scale measures how stigmatised individuals feel in regard to living with HIV. The HIV Stigma Scale included the following factors: Enacted HIV Stigma (e.g. 'I have lost friends by telling them that I have HIV') comprised of six items measures the perceived overt experience of HIV stigma. Both Disclosure Concerns (e.g. 'Telling someone I have HIV is risky'), which is made up of eight items, and Concern with Public Attitudes about People with HIV/AIDS (abbreviated to 'Public Attitudes'; e.g. 'Most people are uncomfortable around someone with HIV'), which has six items, reflect the anticipation of HIV stigma in the future. Finally, Negative Self-Image (e.g. 'I feel guilty because I have HIV') has seven items and captures the internalisation of HIV stigma as being a valid part of one's identity. Alpha levels for the HIV stigma factors in this study were .94, .90, .92 and .92, respectively.

Metacognitive beliefs. Participants completed the MCQ-30 (Wells and Cartwright-Hatton, 2004). The MCQ-30 is comprised of five subscales rated on a 4-point Likert scale (1='Do not agree', 2='Agree slightly', 3='Agree moderately' and 4='Agree very much'). The MCQ-30 factors are as follows: Positive Metacognitive Beliefs about worry (e.g. 'Worrying helps me cope'), Negative Metacognitive Beliefs about worry being uncontrollable and dangerous (e.g. 'When I start worrying I cannot stop'), Cognitive Confidence (e.g. 'I have poor memory'), Need to Control Thoughts (e.g. 'Not being able to control my thoughts is a sign of weakness') and Cognitive Self-Consciousness (e.g. 'I pay close attention to the way my mind works'). Alpha levels for the MCQ-30 factors in this study were .88, .87, .91, .80 and .84, respectively.

Thought control strategies. Participants completed Wells and Davies (1994) 30-item TCQ, which measures five factors, each consisting of six items. The TCQ is rated on a 4-point Likert scale (1='Never', 2='Sometimes', 3='Often' and 4='Almost always'). The TCQ factors are as follows: Distraction ('I do something that I enjoy'), Social ('I ask my friend if they have similar thoughts'), Worry ('I worry about more minor thoughts instead'), Punishment ('I punish myself for thinking the thought') and Reappraisal ('I try to interpret the thought'). Alpha levels for the TCQ factors in this study were .76, .79, .82, .67 and .72, respectively.

Depression. Depressive symptoms (e.g. 'Do you have little interest or pleasure in doing things') experienced in the

Table 1. Descriptive characteristics of sample.

Characteristics	<i>n</i> (%)
Country of birth	
Australia	78 (73.6)
United States	14 (13.2)
Other	14 (13.2)
Country currently residing	
Australia	92 (86.8)
United States	13 (12.3)
Other	1 (.9)
Highest level of education	
Primary/elementary school	1 (.9)
Secondary/high school up to year 10	18 (17)
Secondary/high school up to year 12	16 (15.1)
Diploma or technical college/TAFE	28 (26.4)
Undergraduate degree	29 (27.7)
Main employment status	
Full-time work	42 (39.6)
Part-time or casual work	20 (18.9)
Retiree	6 (5.7)
Student	5 (4.7)
Pension	23 (21.7)
Unemployed	10 (9.4)
Relationship status	
Long-term relationship including de-facto or married	42 (39.6)
Single including 'widowed' or divorced	61 (57.5)
Short-term relationship	3 (2.8)
Sexual orientation	
Gay	98 (92.5)
Bisexual	5 (4.7)
Transgender	2 (1.9)
Heterosexual	1 (.9)
Year diagnosed with HIV (<i>M</i> = 1999; <i>SD</i> = 9.2)	
1980–1987	14 (13.1)
1988–1995	25 (23.6)
1996–2004	21 (19.8)
2005–2012	46 (43.4)
Currently taking ART, Yes	85 (80.2)
Year started ART	
1988–1993	12 (11.3)
1994–1999	17 (16)
2000–2005	15 (14.2)
2006–2012	43 (40.57)
Has health problems associated with HIV or ART, Yes	37 (34.9)
Viral load	
Undetectable	78 (73.6)
Detectable	20 (18.9)
Don't know/unsure	8 (7.5)

ART: antiretroviral therapy.

last 2 weeks were assessed using the Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001). Responses are rated on a 4-point Likert scale (0 = 'Not at all', 1 = 'Several days', 2 = 'More than half of the days' and 3 = 'Nearly

every day'). This measure has previously been used with PLWH (Clarke et al., 2010; Mao et al., 2009; Monahan et al., 2009). The alpha level for the PHQ-9 in this study was .94.

Anxiety. Anxiety symptoms were measured through the Generalized Anxiety Disorder Questionnaire (GAD-7; Spitzer et al., 2006), which has seven items assessing how much an individual has been bothered by anxiety symptoms in the last 2 weeks (e.g. 'Feeling nervous, anxious or on edge'). Responses are rated on a 4-point Likert scale (0 = 'Not at all', 1 = 'Several days', 2 = 'More than half of the days' and 3 = 'Nearly every day'). This measure has previously been used with PLWH (Shacham et al., 2012). In this study, the alpha level for the GAD-7 was .95.

Analysis plan

Only the demographic variables that were significantly associated with the dependent variables (DVs; depression and anxiety) were used as covariates in the mediational models. Significant bivariate correlations between the independent variables (IVs; HIV stigma types), mediators (metacognitive beliefs and thought control factors) and DVs (depression and anxiety) were included in hierarchical regressions. Given the possible large number of permutations that could be entered into the mediation models, only significant unique associations between the IVs and mediators and the DVs, after controlling for potential covariates, were included in mediational analyses.

The mediational models were assessed using Preacher and Hayes' SPSS macros (Hayes and Preacher, 2012; Preacher and Hayes, 2008a), which allow for multiple covariates, mediators (INDIRECT macro) and predictors (MEDIATE macro). These macros were used to examine estimated path coefficients and bias-corrected bootstrap confidence intervals, for the total and specific effects between variables. Bootstrapping was chosen over the traditional Sobel test as it allows for multiple IVs and mediators, adjusts all paths for the potential influence of covariates, is reliable for smaller samples as it does not require assumptions of normality and has higher power while keeping reasonable control over Type 1 error (Preacher and Hayes, 2008b).

Results

Descriptive statistics for the DVs

Both the depressive and anxious symptom scores showed a good degree of variance with the mean score for depressive symptoms being 9.71 ($SD=8.38$) and the mean score for anxiety symptoms being 8.25 ($SD=6.81$). Using the cut-offs for depressive symptomatology suggested by Kroenke, Spitzer and Williams (2001), 35 per cent of the sample fell within the minimal symptom range, 23.6 per cent were in the mild range, 9.4 per cent were in the moderate range, 17.9 per cent were in the moderate-severe range and 14.2 per cent were in the severe depressive range. Using the cut-offs for anxious symptomatology suggested by Spitzer et al.

(2006), 39.6 per cent of the sample feel within the minimal symptom range, 20.8 per cent were within the mild range, 15.1 per cent were within the moderate range and 18.9 per cent were within the severe range.

Identifying potential covariates for mediation models

Of the demographics, only age and health problems related to HIV symptoms and/or HIV medication side-effects proved to have significant bivariate correlations with depression and anxiety (see Table 2), and so only these variables were included as covariates in the remaining analyses.

Testing the mediation model for depression

Variables with significant bivariate correlations were entered into a hierarchical regression analysis. Significant unique associations between the IVs (HIV stigma factors) and mediators (TCQ factors and MCQ-30 factors were entered separately) on the DV (depression), after controlling for the two covariates, were then used in the mediation model for depression. From this step, we found significant unique associations between (a) internalised (Negative Self-Image) and anticipated (Public Attitudes) HIV stigma and depression and (b) between two MCQ-30 factors (Negative Metacognitive Beliefs and Need to Control Thoughts) and two TCQ factors (Worry and Social) and depression. These variables were then entered into a bootstrapping analysis controlling for age and health problems related to HIV symptoms and/or medication side-effects.

The relationship between internalised (Negative Self-Image) HIV stigma and Social thought control was non-significant (see the dotted line Path a in Figure 1). Zero was also contained within the biased-corrected bootstrap confidence interval for this relationship, indicating that Social thought control was not a significant mediator for internalised HIV stigma. Metacognitive beliefs based on the Need to Control Thoughts showed significant positive associations with internalised (Negative Self-Image) and anticipated (Public Attitudes) HIV stigma; however, it was not significantly associated with depression. Zero was also not contained within the biased-corrected bootstrap confidence intervals for these relationships, indicating that Need to Control Thoughts was not a significant mediator of depression in response to internalised (Negative Self-Image) or anticipated (Public Attitudes) HIV stigma.

Negative Metacognitive Beliefs and use of Worry as a thought control strategy significantly mediated the relationship between internalised (Negative Self-Image) HIV stigma and depression (see bold pathways in Figure 1). More internalisation of HIV stigma as part of one's identity was related to more depressive symptoms, indirectly through greater Negative Metacognitive Beliefs about thoughts being dangerous and uncontrollable and more use of Worry as a thought control strategy. This was indicated

Table 2. Bivariate correlations between the dependent variables (depression and trait anxiety symptoms), independent variables (stigma factors), mediators (MCQ and TCQ factors) and control variables (age and health problems associated with HIV and/or HIV medication side-effects).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 Depressive symptoms	1	.86***	.52***	.25*	.52***	.62***	.39***	.74***	.39***	.59***	.44***	-.22*	-.43***	.54***	.47***	.03	-.23*	.33**
2 Trait anxiety symptoms		1	.48***	.27**	.51***	.51***	.44***	.80***	.41***	.61***	.54***	-.15	-.29**	.54***	.54***	.15	-.25*	.32**
3 Enacted			1	.38***	.50***	.71***	.38***	.50***	.26**	.34***	.23*	-.01	-.22*	.39***	.32**	-.08	-.18	.41***
4 Disclosure Concerns				1	.50***	.44***	.24*	.29**	.14	.32**	.30**	.05	-.33**	.24*	.31**	-.04	-.11	.13
5 Negative Self-Image					1	.56***	.37***	.52***	.27**	.49***	.28**	-.18	-.27**	.47***	.47***	-.07	-.23*	.25**
6 Public Attitudes						1	.45***	.50***	.29**	.44***	.37***	.07	-.36***	.48***	.38***	.11	-.31**	.26**
7 MCQ Positive							1	.41***	.38***	.45***	.33***	.04	-.18	.44***	.35***	.12	-.28**	.19
8 MCQ Negative								1	.35***	.59***	.60***	-.15	-.25*	.46***	.49***	.08	-.16	.40***
9 MCQ Confidence									1	.45***	.32**	-.13	-.24*	.33**	.30**	.05	-.01	.28**
10 MCQ Need Control										1	.49***	-.10	-.34***	.37***	.55***	.04	-.18	.18
11 MCQ Self-Consciousness											1	.05	-.15	.27**	.37***	.47***	-.17	.17
12 TCQ Distraction												1	.21*	.06	.06	.46***	-.05	-.10
13 TCQ Social													1	-.27**	-.30**	.08	.00	-.02
14 TCQ Worry														1	.58***	.19	-.21*	.26**
15 TCQ Punishment															1	.20*	-.17	.19*
16 TCQ Reappraisal																1	-.11	-.07
17 Age																	1	.18
18 Health Problems																		1

MCQ: Metacognitions Questionnaire; Enacted: enacted HIV stigma; Disclosure Concerns and Public Attitudes: anticipated HIV stigma; Negative Self-Image: internalised HIV stigma; Health Problems: reported health problems associated with HIV symptoms and/or HIV medication side-effects.

* $p < 0.05$ level (two-tailed); ** $p < 0.01$ level (two-tailed); *** $p < 0.001$ level (two-tailed).

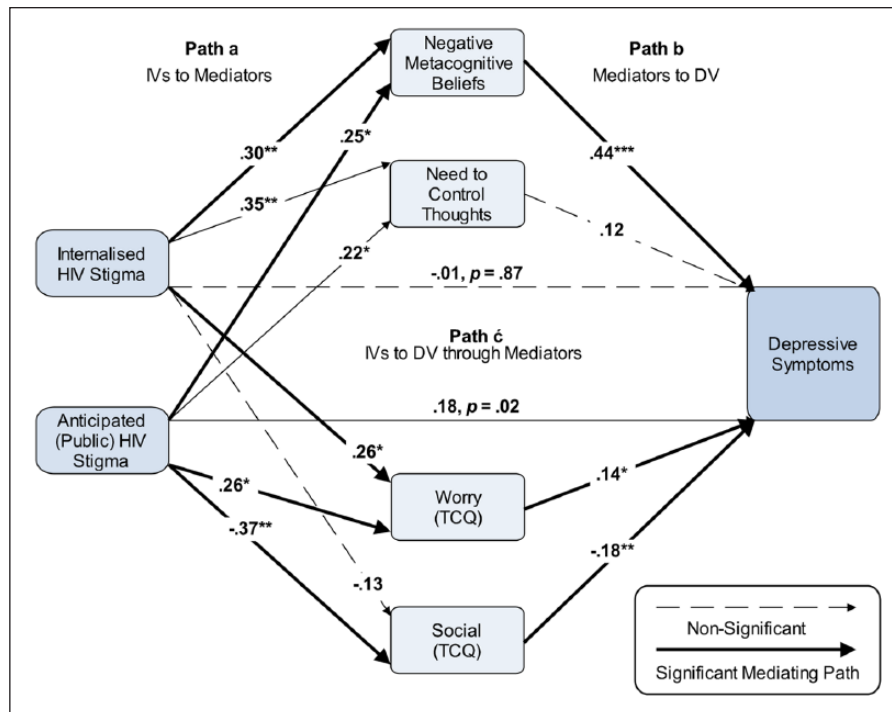


Figure 1. Standardised coefficients for the depression mediational model.

by zero not being contained within biased-corrected bootstrap confidence intervals for these mediators. The previously significant direct relationship between internalised (Negative Self-Image) HIV stigma and depression was also non-significant when the mediators were included (see internalised HIV stigma Path c and Path \hat{c} in Figure 1).

Negative Metacognitive Beliefs and Worry and Social thought control strategies significantly mediated the relationship between anticipated (Public Attitudes) HIV stigma and depression (see bold pathways in Figure 1). Thus, more anticipation of HIV stigma from the public was related to more depressive symptoms, both directly and indirectly, through greater Negative Metacognitive Beliefs, more use of Worry and less use of peers (Social thought control) to control distressing thoughts. This was indicated by zero not being contained within bias-corrected bootstrap confidence intervals for these mediators. The previously significant direct relationship between anticipated (Public Attitudes) HIV stigma and depression substantially dropped; however, it remained significant when the mediators were included (see anticipated HIV stigma Path c and Path \hat{c} in Figure 1).

The overall mediational model for depression explained 69 per cent of the variance, $F(8, 97) = 26.95$; $p < .001$. The mediators explained 24 per cent variance, $F_{Chg}(5, 96) = 16.90$, $p < .001$. Of the significant mediators, Negative Meta-cognitive Beliefs explained most of the unique variance ($sr^2 = 9.24$), followed by Social ($sr^2 = 2.53$)

and then Worry ($sr^2 = 1.30$) thought control strategies. There was an approximate 10 per cent overlap between the mediators in predicting depressive symptoms. It should be noted that a stronger direct relationship was found between anticipated (Public Attitudes) HIV stigma and depression ($\beta = .42$), than between internalised HIV stigma (Negative Self-Image) and depression ($\beta = .22$) prior to the mediators being included. Thus, more variance was needed to be explained by the mediators in order for the relationship between anticipated HIV stigma and depression to become non-significant when the mediators were included.

Testing the mediation model for anxiety

A hierarchical regressions analysis was performed using only significant bivariate correlations between the IVs (HIV Stigma factors) and mediators (MCQ-30 and TCQ factors assessed separately) on the DV (anxiety), while controlling for the two covariates. From this step we found significant unique associations between (a) internalised (Negative Self-Image) HIV stigma and anxiety and (b) between Negative Metacognitive Beliefs and the use of Worry and Punishment thought control strategies and anxiety. These variables were then entered into a bootstrapping analysis controlling for age and health problems related to HIV symptoms and/or medication side-effects.

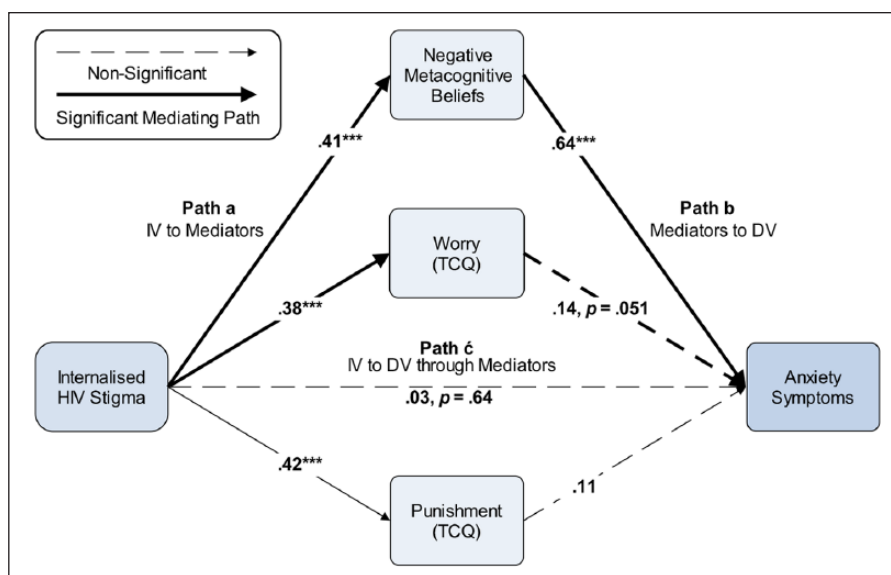


Figure 2. Standardised coefficients for the anxiety mediational model.

Greater use of Punishment as a thought control strategy did not significantly mediate the relationship between internalised (Negative Self-Image) HIV stigma and anxiety symptoms. This was indicated by zero not being contained within the biased-corrected bootstrap confidence interval for Punishment. However, Negative Metacognitive Beliefs significantly mediated the relationship between internalised (Negative Self-Image) HIV Stigma and anxiety symptoms (see bold pathways in Figure 2). The use of Worry as a Thought Control strategy only narrowly missed criteria for statistical significance. Thus, greater internalisation of HIV stigma as being a valid part of one's identity was indirectly related to more anxiety symptoms, through more Negative Metacognitive Beliefs. This was indicated by zero not being contained within the biased-corrected bootstrap confidence intervals for these mediators. The previously significant relationship between internalised (Negative Self-Image) HIV stigma and anxiety symptoms was also non-significant when the mediators were included (see internalised HIV stigma Path c and Path \hat{c} in Figure 2). The overall mediational model for anxiety explained 69 per cent of the variance: $F(6, 99) = 37.42, p < .001$. The mediators explained 36 per cent of the variance: $F_{chg}(3, 99) = 38.62, p < .001$. Of the significant mediators, Negative Metacognitive Beliefs explained most of the unique variance ($sr^2 = 23.62$), followed by Worry ($sr^2 = 1.21$). There was an approximate 10 per cent overlap between the mediators in predicting anxiety symptoms.

Discussion

This study examined a sample of MSM living with HIV. We hypothesised that the relationship between greater enacted, internalised and anticipated HIV stigma and more

depressive symptoms would be mediated by greater Negative Metacognitive Beliefs, Need to Control Thoughts and Cognitive Confidence and more use of Worry as a thought control strategy. Additionally, the relationship between greater enacted, internalised and anticipated HIV stigma and more anxiety symptoms was predicted to be mediated by greater Negative Metacognitive Beliefs and Need to Control Thoughts and more use of Worry and Punishment as thought control strategies.

The results of the study found that of the stigma types, internalised HIV stigma was a unique predictor of both depression and anxiety symptoms, while anticipated HIV stigma from the public was also a unique predictor of depressive symptoms. These stigma types may be viewed as more intrapersonal experiences, highlighting the fact that MSM living with HIV may not necessarily need to be overtly discriminated against in order to experience psychological distress (Deacon, 2006; Herek, 2002). PLWH generally know that HIV is a potentially stigmatised condition, with this knowledge motivating some PLWH to avoid discrimination, through social withdrawal and other behaviours which may limit life opportunities (Herek, 2002). This highlights the need to assess mental health outcomes in relation to specific aspects of HIV stigma, with the process of internalising negative HIV perceptions particularly detrimental to mental health.

Negative Metacognitive Beliefs was the only metacognitive beliefs to mediate the relationship between HIV stigma perceptions and depressive and anxious symptoms. This suggests that links between HIV stigma and depression and anxiety symptoms in MSM living with HIV may be connected to perceptions of one's thoughts being dangerous and uncontrollable. Negative Metacognitive Beliefs may increase the importance placed on HIV stigma thoughts

and in turn magnify the level of distress experienced. This is consistent with the previous research finding that Negative Metacognitive Beliefs has the strongest association with depressive and anxiety symptoms (Spada et al., 2008a, 2008b; Tajrishi et al., 2011; Yilmaz et al., 2011). It is also consistent with a recent finding that Negative Metacognitive Beliefs was the only metacognition (as measured by the MCQ-30) to differentiate currently depressed participants from previously depressed participants and those who have never been depressed (Halvorsen et al., 2014). These results are also consistent with Negative Metacognitive Beliefs being identified as the strongest metacognitive predictor of depression and anxiety symptoms in other chronic diseases such as Parkinson's disease when controlling for disease factors (Allot et al., 2005). As such, Negative Metacognitive Beliefs appears to be a risk factor in understanding the psychological vulnerability in response to HIV stigma within some MSM living with HIV.

Contrary to prediction, the Need to Control Thoughts and lack of Cognitive Confidence were not found to be significant mediators. These findings may be consistent with metacognitive models of mental health disorders, which identify Negative Metacognitive Beliefs as being the most proximate to psychological distress (Wells, 2008). However, a lack of confidence in memory may be more of a byproduct of Positive and Negative Metacognitive Beliefs and increased severity of depressive symptoms (Papageorgiou and Wells, 2003). In this study, a community sample was used with a continuum of levels of depression and anxiety, as such metacognitive beliefs focused on a lack of confidence in one's memory may be more important in clinically depressed populations of MSM living with HIV. Similarly, contrary to a recent study by Halvorsen et al. (2014), we did not find any association between the use of Punishment as a thought control strategy and current symptoms of depression. It is possible that this may also reflect a difference in populations and requires further exploration.

The finding that more use of Worry as a thought control strategy mediated the relationship between HIV stigma and depression is consistent with previous research which has found that depressed patients focused significantly more on minor worries as a thought control strategy than on non-clinical groups (Wells and Carter, 2009) and that the Worry thought control strategy is associated with depressive symptoms (Coles and Heimberg, 2005). Therefore, diverting one's attention to minor worries in an attempt to control distressing thoughts may continue to orient individuals to the content of ruminations, and in turn prevent emotional distress from naturally subsiding (Wells and Carter, 2009). However, contrary to previous studies (Wells and Carter, 2009; Wells and Davies, 1994), Worry narrowly missed being significantly associated with anxious symptoms in this study. This may reflect a weaker association in this population than others and a need for a larger sample size in order to reach statistical significance.

The finding that anticipated HIV stigma from the public and depressive symptoms was mediated by less use of peers to control distressing thoughts (Social thought control) is contrary to our prediction which was based on previous inconsistent relationships between Social thought control and psychological distress (Barahmand, 2009; Wells and Davies, 1994). However, Social thought control has generally been identified as more of an adaptive strategy (Coles and Heimberg, 2005; Wells and Carter, 2009). This is consistent with Wells and Carter's (2009) finding that patients with GAD and patients with depression used Social thought control significantly less than non-patient controls. As such, some MSM living with HIV who anticipate HIV stigma from the public may be less likely to discuss these thoughts with peers in an attempt to suppress their distress and in turn may be more likely to experience depressive symptoms. Social thought control may offer a unique understanding of the link between the anticipation of HIV stigma from the public and depressive symptoms in some MSM living with HIV and is consistent with previous research findings that social support mediates the impact of HIV stigma on both depressive symptoms and quality of life in PLWH (Rao et al., 2012). Also, inconsistent with prediction, Punishment was not a significant mediator of anxiety and this may be a unique characteristic of this population that requires further research.

Limitations

The power to detect significant results may have been restricted due to the use of a smaller sample size ($N=106$), and in-depth analyses with larger samples are recommended within future studies. This study was cross-sectional and as such causation cannot be assumed and so the hypothesised causal pathways need to be confirmed in a larger longitudinal study. The use of future longitudinal studies is particularly important given that previous research finding experiences of internalised HIV stigma and depressive symptoms in PLWH may reduce over time (Steward et al., 2011). Metacognitive models assume that Positive Metacognitive Beliefs increase worry and/or rumination, which is then associated with Negative Metacognitive Beliefs and ineffective thought control strategies (Wells, 2008). As such, Positive Metacognitive Beliefs may play an important role in earlier phases of the development of worry and/or rumination. In order to further examine this, future longitudinal research using larger samples and structural equation modelling is needed. Another possible limitation to consider is that some of the association between the Negative Self-Image factor and the PHQ-9 may have been due to the similarities in the wording of some of the items from the HIV Stigma Scale ('Having HIV/AIDS makes me feel that I am a bad person', 'I feel I'm not as good as others because I have HIV/AIDS', 'I feel guilty because I have HIV') with one item from the PHQ-9

(‘Feeling bad about yourself – or that you are a failure or have let yourself or your family down’). However, given that only one out of nine items of the PHQ-9 had such similar wording, we believe that this may have only had a small contribution to the overall associations. Finally, only MSM living with HIV were assessed, with participants predominantly collected from HIV-positive websites, health centres and snowball sampling. Therefore, findings may not generalise to all PLWH, or to MSM experiencing more severe HIV stigma concerns who potentially avoid all inadvertent opportunities of HIV disclosure.

Conclusion

HIV stigma involving internalised negative perceptions and anticipating stigma from others are associated with the experience of depressive symptoms in MSM who have HIV. This association is mediated by Negative Metacognitive Beliefs, as well as using Worry and Social thought control strategies. In contrast, anxious symptoms in MSM who have HIV are associated only with internalised HIV stigma and this association appears to be strongly mediated by negative metacognitions.

The results of this study provide preliminary evidence for the mediating role of metacognitions linking HIV stigma with the experience of depression of depressive and anxious symptoms in MSM. These findings provide insights into new directions for future research and interventions. For example, in addition to using HIV stigma campaigns to reduce HIV stigma in the wider community, interventions for MSM living with HIV and who are experiencing HIV stigma could also target negative metacognitions in order to reduce symptoms of depression and anxiety.

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