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Title Page

Title

HIV-related stigma and optimism as predictors of anxiety and depression among HIVpositive men who have sex with men in the United Kingdom and Ireland

Authors

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Abstract

This study investigated the associations between forms of HIV-related optimism, HIV-related stigma, and anxiety and depression among HIV-positive men who have sex with men (MSM) in the United Kingdom and Ireland. HIV health optimism (HHO) and HIV transmission optimism (HTO) were hypothesised to be protective factors for anxiety and depression, while the components of HIV-related stigma (enacted stigma, disclosure concerns, concern with public attitudes, and internalised stigma) were hypothesised to be risk factors. Data were collected from 278 HIV-positive MSM using an online questionnaire. The prevalence of psychological distress was high, with close to half (48.9%) of all participants reporting symptoms of anxiety, and more than half (57.9%) reporting symptoms of depression. Multiple linear regressions revealed that both anxiety and depression were positively predicted by internalised stigma and enacted stigma, and negatively predicted by HHO. For both anxiety and depression, internalised stigma was the strongest and most significant predictor. The results highlight the continued psychological burden associated with HIV infection among MSM, even as community support services are being defunded across the United Kingdom and Ireland. The results point to the need for clinicians and policy makers to implement stigma reduction interventions among this population.

Keywords

HIV/AIDS; HIV-related optimism; HIV-related stigma; anxiety; depression; men who have sex with men.

Introduction

With access to effective antiretroviral therapy (ART), those diagnosed as HIV-positive today can expect to remain in good health, and to have a life expectancy similar to HIV-negative individuals (UNAIDS, 2016). Additionally, ART results in sexual non-infectiousness when viral suppression is achieved (Rodger et al., 2014). The belief among people living with HIV (PLHIV) in the efficacy of ART to produce these favourable outcomes has been termed 'HIV-related optimism' (Peterson, Miner, Brennan, & Rosser, 2012). HIV-related optimism has been differentiated into HIV health optimism (HHO), the belief that one will remain healthy due to treatment efficacy, and HIV transmission optimism (HTO), the belief that HIV is more difficult to transmit due to treatment efficacy (Prestage et al., 2012). While greater dispositional optimism has been associated with better psychological outcomes among PLHIV, notably reduced anxiety and depression (Willie et al., 2016), no research to date has examined these specific forms of HIV-related optimism as possible protective factors against anxiety and depression.

A construct that has been researched extensively in relation to psychological outcomes among PLHIV is HIV-related stigma, the socially constructed and shared knowledge about the devalued status of PLHIV (Steward et al., 2008). A recent meta-analysis found stigma to be a strong risk factor for depression, and a somewhat weaker risk factor for anxiety (Rueda et al., 2016). While the meta-analysis authors treated HIV-related stigma as a unitary construct, stigma is typically differentiated into 4 components: enacted stigma, disclosure concerns, concern with public attitudes, and internalised stigma (Berger, Ferrans, & Lashley, 2001; Earnshaw & Chaudoir, 2009). While recent research has suggested that, of these components, internalised stigma is the strongest risk factor for anxiety and depression (Hernansaiz-Garrido & Alonso-Tapia, 2017), confirmatory research is warranted.

Research examining anxiety and depression among PLHIV is particularly important at this time, given the continuing high prevalence of these disorders among this population (Miners et al., 2014), combined with the fact that community support services for PLHIV are being partly or wholly defunded across the UK and Ireland (The National AIDS Trust, 2017). This defunding is based on the assumption that the efficacy of ART, and the consequent radical improvements in health outcomes and transmission risk, has improved conditions for PLHIV to a degree that community support services are no longer necessary. However, this biomedical lens fails to give sufficient attention to the deleterious psychological consequences of HIV-related stigma, which persists regardless of improved medical outcomes (Murphy, Hevey, O'Dea, Ni Rathaille, & Mulcahy, 2015b). When considering anxiety and depression among PLHIV, it is possible that HIV-related optimism will be a strong enough protective factor to offer insulation from the known risk factor of HIV-related stigma. However, the current authors are not aware of any extant research that has simultaneously examined these protective factors and risk factors for anxiety and depression among PLHIV.

The current study sought to address this gap in the literature by determining the relative importance of the components of stigma (enacted stigma, disclosure concerns, concern with public attitudes, internalised stigma) and the forms of HIV-related optimism (HHO and HTO) in predicting depression and anxiety. It focused on men who have sex with men as they constitute the group most affected by HIV in the UK and Ireland, and indeed across Western and Central Europe, North America, and many other parts of the world (UNAIDS, 2016). Lacking any basis for an *a priori* structural model for this population that could be tested or

modified, the components of stigma and the forms of HIV-related optimism were combined within a simple predictive model. It was hypothesised that the components of stigma would act as risk factors (H1a), that internalised stigma would be the strongest risk factor (H1b), and that both HHO and HTO would act as protective factors (H2a, H2b).

Methods

Design

Cross-sectional data were collected from participants recruited to an online study between May and November 2014. Approval for this study was obtained from the relevant university and hospital research ethics committees.

Participant Recruitment

Participant eligibility criteria for the study were a minimum age of 18 years, selfidentification as a man who has sex with men, HIV seropositivity, and comfort with reading and writing in English. Eligibility criteria were listed in an online information letter and consent form. By taking part in the study participants implied that they satisfied these criteria. No other means of verification were employed. The study website was advertised in the United Kingdom (UK) and Ireland through HIV service organisations, sexual health organisations, and sex-seeking websites.

Instruments

Demographic Characteristics. Participants specified the following: age, country of residence, relationship status, time since diagnosis of HIV infection, medication status, self-reported viral suppression, length of time viral load had been undetectable (if applicable),

STI's in the last 6 months (on-going infections or recent diagnoses), sexual orientation, and number of casual partners in the 3 months prior to participation.

Anxiety and Depression. Symptoms of anxiety and depression were measured using the 14-item Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983). A metaanalysis of the HADS has reported very good mean internal consistency for both the anxiety subscale (mean $\alpha = .80$) and the depression subscale (mean $\alpha = .82$) (Bjelland, Dahl, Haug, & Neckelmann, 2002).

HIV Health Optimism. The belief that one's health will remain good after a HIV diagnosis due to the effectiveness of ART regimes was assessed using a 3-item scale developed by Prestage et al. (Prestage et al., 2012). Acceptable internal consistency ($\alpha = .79$) was reported by the original authors.

HIV Treatment Optimism. The HIV Treatments Optimism-Scepticism Scale (Van De Ven, Crawford, Kippax, Knox, & Prestage, 2000) was used to assess the perception that effective antiretroviral therapy reduces the risk of HIV transmission. The instrument was shown to be reliable by the original authors ($\alpha = .79$).

HIV-related Stigma. Perceptions of HIV-related stigma were assessed using a 16-item version of the HIV Stigma Scale (HSS) (Berger et al., 2001; Rueda et al., 2012). The HSS has 4 factors: enacted stigma (4 items, $\alpha = .89$), disclosure concerns (4 items, $\alpha = .82$), concern with public attitudes (4 items, $\alpha = .79$), and internalised stigma (4 items, $\alpha = .79$). Internal consistency for the 16-item version of the HSS has been reported as $\alpha = .88$ (Rueda et al., 2012).

To maximise accuracy in responses to the questionnaire, it was piloted with 8 HIVpositive MSM who had participated in a previous study (Murphy et al., 2015b), and who had agreed to be contacted again for research purposes. Each of the pilot-phase participants provided comments which were used to make slight amendments to the questionnaire before commencing with recruitment.

Data analysis

Several variables assessed were non-normally distributed, and so participant characteristics and descriptives for the study measures are presented using non-parametric statistics (medians and interquartile ranges [IQRs]). The recruitment strategy resulted in 2 samples: participants living in the UK, and participants living in Ireland. Mann-Whitney *U* tests and chi-square tests were used to compare samples, with statistical significance set at .001 to control for multiple comparisons (Abdi, 2007). Correlation coefficients (Spearman's *rho*) among the study variables were computed. Multiple linear regression was used to evaluate predictors of anxiety and depression. All analyses were performed using SPSS v23.

Results

Demographic Characteristics

Demographic characteristics for the samples are presented in Table 1. Two hundred and thirteen participants were living in the UK and 65 in Ireland. Across these samples, most participants were in their 40s, were single, sexually active, and identified as gay. Between 1 and 5 casual partners were most commonly reported, and most participants did not report a concurrent STI. The median time since diagnosis across samples was 7 years (*IQR*: 2.9 – 11.6). The great majority of participants were currently taking ART and had an undetectable viral load. Across samples, the median time since achieving viral suppression was 4.4 years (*IQR* = 1.5 - 8.0). Characteristics were compared across samples and no significant differences were found.

[INSERT TABLE 1 HERE]

Descriptive Statistics

Descriptive statistics for the samples are presented in Table 2. Across the samples, levels of anxiety, depression, and overall distress were high. Using the criteria recommended by the original authors of the HADS (Zigmond & Snaith, 1983), 15.47% (n = 43) of participants had scores indicative of mild anxiety (scores between 8 and 10), 23.74% (n = 66) had scores indicative of moderate anxiety (scores between 11 and 15), and 9.71% (n = 27) had scores indicative of severe anxiety (scores ≥ 16). With regard to depression, 24.10% (n =67) had scores indicative of mild depression, 27.70% (n = 77) had scores indicative of moderate depression, and 6.12% (n = 17) had scores indicative of severe depression.

HHO was strongly endorsed, to a degree similar to that reported by the original authors of the scale (Prestage et al., 2012). The level of HTO seemed to be markedly higher than that previously reported in the literature, but that is perhaps not surprising as knowledge of the implications of viral suppression has become more widespread (Callander & Senn, 2013; Murphy, Hevey, O'Dea, Ni Rathaille, & Mulcahy, 2015a). The level of HIV-related stigma seemed to be very similar to that reported by the authors of the adapted version of the HIV Stigma Scale (Berger et al., 2001; Rueda et al., 2012). Again, no significant differences were found across samples, and so they were merged in inferential analyses.

[INSERT TABLE 2 HERE]

Correlates of Anxiety and Depression

Correlations among the study variables are presented in Table 3. Anxiety had a significant negative correlation with self-reported viral suppression and HHO, and a significant positive correlation with all four components of HIV-related stigma. Depression

had a significant negative correlation with HHO, and a significant positive correlation with enacted stigma, concern with public attitudes, and internalised stigma (but not with disclosure concerns).

[INSERT TABLE 3 HERE]

Predictors of Anxiety and Depression

Two multiple linear regression analyses were performed with anxiety and depression as the dependent variables. Variables that were significantly correlated with anxiety and depression were entered as predictors in the respective regression analyses. Variables were tested for multicollinearity, and the regression models' residuals were tested for normality, linearity, and homoscedasticity. No violations of the assumptions of multiple linear regression were found; all VIF values were < 2.5, and tolerance values > .40 (Allison, 1999). In the model for anxiety however, disclosure concerns produced a suppressor effect in that its association with anxiety changed from positive to negative, and it enhanced the regression coefficients of the other predictors in the model. Disclosure concerns was therefore removed from the model prior to further interpretation (Field, 2013). Coefficients for both regression models are show in Table 4.

[INSERT TABLE 4 HERE]

The regression model for anxiety was significant, F(5,272) = 25.49, p < .001, and accounted for a moderate amount of variance, $R^2 = .32$. All predictors were significant except for concern with public attitudes. Anxiety was negatively predicted by self-reported viral suppression ($\beta = ..11$) and HHO ($\beta = ..18$), and positively predicted by enacted stigma ($\beta =$.18) and internalised stigma ($\beta = ..37$). The strongest and most significant predictor of anxiety was internalised stigma. The regression model for depression was also significant, F(4, 273) = 18.05, p < .001, and accounted for a moderate amount of variance, $R^2 = .21$. All predictors were significant except for concern with public attitudes. Depression was negatively predicted by HHO ($\beta = .15$), and positively predicted by enacted stigma ($\beta = .15$) and internalised stigma ($\beta = .36$). As with anxiety, the strongest and most significant predictor of depression was internalised stigma.

Discussion

This study has provided novel quantitative data explicating the associations between forms of HIV-related optimism, HIV-related stigma, and anxiety and depression among HIVpositive MSM in the United Kingdom and Ireland. The importance of the current findings is underscored by the high prevalence of psychological distress among the participants, with almost half the sample reporting some degree of anxiety, and well over half reporting some degree of depression. These high rates of anxiety and depression are congruent with previous studies (Heywood & Lyons, 2016; Miners et al., 2014).

As hypothesised (H1a), the components of HIV-related stigma were risk factors for anxiety and depression, as both outcomes were significantly and positively predicted by enacted stigma and internalised stigma. H1a was not fully supported however, as concern with public attitudes was not a significant predictor of anxiety or depression, and disclosure concerns could not be properly assessed due to the previously mentioned suppressor effect. Hypothesis H1b was supported, as internalised stigma was the strongest risk factor for both anxiety and depression.

As hypothesised (H2a), HHO was a protective factor for both anxiety and depression, having a significant positive predictive relationship with both outcomes. However, HTO did not have a significant correlational relationship with either anxiety or depression and was not included in either regression analysis, and so hypothesis H2b was not supported. That selfreported viral suppression was a significant predictor of anxiety even when controlling for HHO suggests that the HIV-related optimism measures used in this study did not adequately capture all facets of the associated constructs.

When one compares the protective factors and the risk factors in the regression models above, it is clear that internalised stigma was the strongest and most highly significant predictor of both anxiety and depression, far exceeding the predictive power of HHO, the only consistently significant protective factor. This simultaneous examination of both risk and protective factors for anxiety and depression, facilitating their direct comparison, is a strength of this study.

Clinical and Policy Implications

This study has important implications for clinicians and policy makers concerned with psychological wellbeing among HIV-positive MSM. As stated, the results showed that the most important predictor of anxiety and depression was internalised stigma. Clinicians should aim to proactively assess internalised stigma among their service users with brief validated instruments such as the 4-item internalised stigma subscale of the HSS utilised in this study (Rueda et al., 2012). Where necessary, clinicians should provide effective stigma reduction interventions at the intra- and inter-personal levels, such as cognitive behavioural therapy and peer support groups (Heijnders & Van Der Meij, 2006). Policy makers should implement stigma reduction interventions at the local and national levels, such as school-based education and raising awareness and knowledge among the general population (The People Living with HIV Stigma Survey UK 2015, 2016). Such interventions would act as a counter to the stigmatising discourses surrounding HIV infection (Murphy et al., 2015b), and would therefore serve to combat both internalised and enacted stigma.

This call to clinicians and policy makers to address HIV-related stigma is especially relevant at this time, as both the UK and Ireland have seen a drastic cutting of community support services provided to PLHIV, with such cuts often justified by reference to improvements in the biomedical management of HIV infection (The National AIDS Trust, 2017). However, the beneficial outcomes of ART have not eliminated HIV-related stigma. The continued stigmatisation of HIV and those infected with the virus is dependent on social rather than medical phenomena and processes, and addressing HIV-related stigma therefore remains an urgent matter of concern.

As discussed above, self-reported viral suppression was a significant negative predictor of anxiety. Clinicians should therefore ensure that PLHIV are aware of the beneficial implications of viral suppression, including both health and transmission implications. Knowledge of the benefits of viral suppression has the potential to not only improve mental health outcomes, but also to promote adherence among patients receiving ART and treatment initiation among newly diagnosed individuals (Amico, Toro-Alfonso, & Fisher, 2005).

Limitations and Future Research

The measures used in the scale may not have been optimal and may have contributed to the failure to (fully) support hypotheses H1a and H2b: the stigma subscale assessing disclosure concerns produced a suppressor effect and could not be included in regression analyses, and as mentioned the HIV-related optimism scales may not have adequately captured the associated constructs. The development of robust, validated scales assessing both HIV-related optimism and HIV-related stigma is an avenue for future research, particularly given the changing nature of life with HIV in the era of ART.

The findings presented in this study are based on data collected from HIV-positive MSM living in the UK and Ireland. The findings should be generalised to other populations affected by HIV only with caution. Additionally, the online data collection method may have resulted in a biased sample not representative of all HIV-positive MSM within those two countries. Finally, the cross-sectional nature of the study design prevents causal determinations.

Conclusion

This article has examined both risk factors and protective factors for anxiety and depression among HIV-positive MSM in the UK and Ireland. The strong relationship between internalised HIV-related stigma and increased anxiety and depression was highlighted, as was the need for clinicians and policy makers to implement stigma reduction interventions among this population.

Author Declarations

Compliance with Ethical Standards

Ethical approval: All procedures performed in this study were in accordance with the ethical standards of the institutional research ethics committees and with the 1964 Helsinki declaration and its later amendments. This article does not contain any studies with animals performed by any of the authors.

Informed consent: Informed consent was obtained from all individual participants included in the study.

Disclosure Statement

The authors declare that they have no conflict of interest.

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Tables

Table 1. Demographic characteristics of the samples.

	United (N	d Kingdom (= 213)	Ireland $(N = 65)$		
Characteristic	N (%)	Median (IQR)	N (%)	Median (IQR)	
Age		44 (38 - 51)		43 (33 - 49)	
Relationship Status					
Single, not sexually active	24 (11.3)		10 (15.4)		
Single, sexually active	109 (51.2)		36 (55.4)		
Open relationship	59 (27.7)		11 (16.9)		
Closed relationship	18 (8.5)		8 (12.3)		
Other	3 (1.4)		0 (0.0)		
Sexual Orientation					
Gay	206 (96.7)		60 (92.3)		
Bisexual	6 (2.8)		5 (7.7)		
Other	1 (0.5)		0 (0.0)		
Number of Casual Partners					
0 Partners	39 (18.3)		8 (12.3)		
1 – 5 Partners	88 (41.3)		40 (61.5)		
6 – 10 Partners	46 (21.6)		9 (13.8)		
11 – 20 Partners	18 (8.5)		4 (6.2)		
> 20 Partners	22 (10.3)		4 (6.2)		
Sexually Transmitted Infections					
No concurrent STI	166 (77.9)		48 (73.8)		

At least 1 concurrent STI	47 (22.1)	17 (26.2)	
Years Since Diagnosis	7	.4 (3.0 – 12.2)	5.0 (1.5 - 9.6)
Medication Status			
Currently taking ART	188 (88.3)	56 (86.2)	
Not currently taking ART	25 (11.7)	9 (13.8)	
Self-reported Viral Suppression			
Detectable	34 (16.0)	13 (20.0)	
Undetectable	173 (81.2)	48 (73.8)	
Unknown	6 (2.8)	4 (6.2)	
Years Viral Load Undetectable [†]	5	5.0 (2.0 - 8.0)	3.0 (0.7 – 7.0)

Note. [†]Calculations were based on data from participants who had an undetectable viral load

			United Kingdom	Ireland
			(N = 213)	(N = 65)
Measure	α	Possible Range	Median (IQR)	Median (IQR)
HADS	.93	0 - 42	16 (8.5 – 24.0)	14 (4.5 – 23.0)
Anxiety	.90	0 - 21	7.0 (3.0 – 12.0)	6.0 (2.0 – 12.0)
Depression	.84	0 - 21	9.0 (5.0 - 12.0)	8.0 (3.0 - 10.0)
HHO	.78	3 – 15	12.0 (10.0 - 13.0)	12.0 (10.0 - 13.5)
HTO	.82	12 - 60	34.0 (27.5 - 38.0)	31.0 (26.5 - 37.0)
HRS Total	.89	16 - 80	52.0 (42.0 - 60.0)	54.0 (46.0 - 60.5)
Enacted Stigma	.89	4 - 20	12.0 (9.0 - 16.0)	12.0 (8.0 - 16.0)
Disclosure Concerns	.82	4 - 20	16.0 (12.0 - 18.0)	16.0 (14.5 - 19.5)
CPA	.79	4 - 20	13.0 (10.0 - 15.0)	12.0 (10.5 - 14.5)
Internalised Stigma	.79	4 - 20	11.0 (8.0 - 15.0)	12.0 (9.0 - 15.0)

Table 2. Descriptive statistics for the samples.

Note: HADS = Hospital Anxiety and Depression Scale; HHO = HIV Health Optimism; HTO = HIV Transmission Optimism; HRS = HIV-Related Stigma; CPA = Concern with Public Attitudes.

	Age	TSD	SVS	HADS-A	HADS-D	HHO	HTO	ES	DC	CPA	IS
Age											
TSD	.44**										
SVS	.24**	.34**									
HADS-A	11	.03	13*								
HADS-D	05	.09	09	.82**							
HHO	05	04	09	30**	24**						
HTO	.02	.13*	.18*	11	09	.52**					
ES	.02	.13*	.00	.36**	.28**	17**	03				
DC	17**	12*	.01	.13*	.01	.00	06	.33**			
CPA	10	02	.02	.32**	.28**	17**	03	.52**	.46**		
IS	24**	14	03	.49**	.41**	19**	15*	.39**	.47**	.49**	

Table 3. Correlations (Spearman's *rho*) among the study variables (N = 278).

Note. TSD = Time Since Diagnosis; SVS = Self-reported Viral Suppression; HADS-A = HADS Anxiety; HADS-D = HADS Depression; HHO = HIV Health Optimism; HTO = HIV Transmission Optimism; ES = Enacted Stigma ; DC = Disclosure Concerns; CPA = Concern with Public Attitudes; IS = Internalised Stigma.

* *p* < .05. ** *p* < .001.

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	В	SE	β	95% CI for B
Anxiety				
Constant	4.46	1.80		
Self-reported Viral Suppression	-1.42	.68	11*	(-2.77,08)
HIV Health Optimism	36	.10	18**	(56,16)
Enacted Stigma	.21	.07	.18**	(.07, .36)
Concern with Public Attitudes	.04	.09	.03	(15, .24)
Internalised Stigma	.47	.07	.37***	(.32, .62)
Depression				
Constant	5.71	1.64		
HIV Health Optimism	25	.09	15**	(44,06)
Enacted Stigma	.15	.07	.15*	(.02, .28)
Concern with Public Attitudes	08	.09	06	(26, .09)
Internalised Stigma	.40	.07	.36***	(.26, 54)

Table 4. Multiple linear regressions predicting anxiety and depression (N = 278).

Note. B = Regression Coefficient; SE = Standard Error; β = Standardised Regression Coefficient; CI = Confidence Interval.

* p < .05. ** p < .01 *** p < .001