Depression and Anxiety Among HIV+ Men who have Sex with Men and Men who have Sex with Women in China

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Abstract

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Background: China is currently experiencing an emerging HIV epidemic among men who have sex with men (MSM). Though studies have investigated biomedical risk factors and HIV prevention initiatives among Chinese MSM, few have examined mental health correlates that may underpin the growth of the epidemic. The purpose of this study was to understand mental health outcomes and coping resources of MSM relative to men who have sex with women (MSW) in an urban Chinese setting.

Methods: Cross-sectional survey data were collected in 2012 from a sample of 162 HIV-positive Chinese men recruited from Beijing Ditan Hospital. Descriptive and bivariate analyses were conducted for socio-demographic variables and measures of psychological distress and coping.

Results: Relative to MSW, MSM receiving HIV treatment were younger, more educated, and less likely to be in a relationship or have children. Both groups reported elevated levels of depression and anxiety. Sexual orientation did not significantly predict the level psychological distress. Instead, differences in psychological distress were driven by coping and socio-demographic variables including education.

Conclusion: Further research is needed to understand high levels of psychological distress among MSM in China. Findings suggest that interventions targeting coping strategies may have unique potential for addressing psychological distress in this population.

Keywords: MSM, depression, anxiety, coping, China

Despite low overall prevalence of HIV/AIDS in China, the epidemic is severe and rapidly growing among men who have sex with men (MSM). In China, MSM have the fastest growing HIV incidence rate relative to other at-risk groups (National Health and Family Planning Commission of the People's Republic of China, 2015). The proportion of all new HIV infections attributable to sexual transmission between Chinese men increased from 2.5% to 21.4% between 2007 and 2014 (UNAIDS, 2015). HIV prevalence estimates among Chinese MSM have also increased from 1.4% to 7.4% between 2001 and 2014, respectively (Wu, Rou & Cui, 2004; Chow, Wilson, Zhang, Jing & Zhang, 2014), and some researchers estimate that the true HIV prevalence is as high as 18% (National Health and Family Planning Commission of the People's Republic of China, 2015). Although this rising epidemic poses a significant public health challenge in China, few studies have attempted to elucidate salient factors that influence HIV treatment in this population.

Globally, psychological distress has been identified as a key driver as well as a product of the HIV epidemic as it negatively impacts health outcomes of people living with HIV/AIDS (PLWHA) (Uthman, Magidson, Safren & Nachega, 2014). Moreover, psychological distress may impact MSM more than men who have sex with women (MSW) (Choi, Steward, Miège, & Gregorich, 2016; Steward, Miège & Choi, 2013; Meyer, 1995). Among MSM, the added stress of being seropositive and a sexual minority has been shown to elevate the risk for adverse health outcomes, including non-adherence to medications and inconsistent access of health care, increased viral load, decreased quality of life and increased HIV risk behaviors (Rueda S, et al, 2016; Song, Yan, Lin, Wang, & Wang, 2016).

The minority stress theory posits that MSM experience excess stress due to their stigmatized status in a predominantly heteronormative society (Meyer, 2003). Meyer suggested

that psychological distress can result from distal processes, like external stressors and societal conditions, and proximal processes like subjective and internalized stressors, such as concealment of identity (Meyer, 2003). Findings from empirical literature provide supporting evidence. Compared to MSW, studies in the United States found that MSM reported higher levels of depression (Golin et al., 2009), increased reporting of suicidal ideation and suicide attempts (Mustanski, Andrews, Herrick, Stall & Schnarrs, 2014), and increased likelihood of having a mood or anxiety disorder (Bostwick, Boyd, Hughes & McCabe, 2010). In a large national sample of MSM in Australia, rates of depression were greater than 60% and rates of anxiety were nearly 40%, well above the national averages (3% and 11%, respectively) (Heywood & Lyons, 2016). Though evidence of psychosocial disparities between MSM and MSW is rapidly expanding in high-income settings, research on psychological distress among MSM in China and other low- and middle-income countries remains sparse.

Coping resources, such as social support and strategies, may moderate the positive association between minority stress and psychological distress (Hatzenbuehler, McLaughlin, & Xuan, 2012). A recent study with sexual minority young adults suggested that increased social support contributed to decreased cortisol reactivity to stressors (Burton, Bonanno, & Hatzenbuehler, 2014). Moreover, social support may have particular importance for MSM; a stronger association was identified between social isolation and depression for sexual minority males than sexual minority females or heterosexual participants (Hatzenbuehler, McLaughlin, & Xuan, 2012). Moreover, while maladaptive coping styles were positively correlated with psychological distress, adaptive coping styles were negatively correlated with distress (Meng & D'Arcy, 2016). Thus, social support and coping strategies are important factors influencing the development and impact of psychological distress among MSM.

It is clear that MSM in China bear a disproportionate fraction of the HIV burden (National Health and Family Planning Commission of the People's Republic of China, 2015; UNAIDS, 2015). However, few studies have aimed to understand correlates of the epidemic among MSM in China, and fewer still that examine psychological distress and coping resources in this population compared to MSW in China. In the current study, we explored the relation between sexual orientation and psychological distress and coping resources in a sample of urban, HIV-positive Chinese men. In line with models of minority stress, we hypothesized that MSM would display greater levels of depression and anxiety relative to MSW. We also expected that social support and coping would be significantly associated with psychological distress.

Methods

Procedures

The current study is a subset of a larger study examining mental health and well-being of PLWHA in China. Data were collected in 2012 from 162 men living with HIV/AIDS in Beijing. Clinic staff referred interested adults to research staff who explained the purpose, procedures, potential risks and benefits, and obtained written informed consent. Participants were eligible for inclusion if they were a minimum of 18 years old, Mandarin-speaking, and receiving HIV-related care at Beijing Ditan Hospital. Participants with evidence of psychological or cognitive impairment with potential to interfere with study participation were excluded from the study. Institutional Review Boards at the University of Washington and Beijing Ditan Hospital approved all study procedures. Participants received small monetary compensation (~$15 USD) in exchange for participation.

Measures

Sociodemographics: Sociodemographic variables assessed age, relationship status, children, education, employment, disclosure of HIV status, physical quality of life, and sexual behavior. A measure of physical quality of life was included as a proxy for physical health. Physical quality of life was assessed using a subscale of the World Health Organization Quality of Life (WHOQOL-BREF) measure (World Health Organization, 1996). The WHOQOL-BREF has 26 items total and has been widely used in China (Chang, 2017). The physical health subscale comprised of seven items which assess discomfort, energy and fatigue, mobility, sleep, work capacity, activities of daily living, and dependence on medicinal substances and medical aids. Each item is rated on a 5-point Likert scale.

Depression symptoms: Depression symptoms were assessed using the Beck Depression Inventory Revised (BDI-II). The 21-item measure assesses psychological and somatic manifestations of depressive symptoms over the prior two weeks. Each item is scored on a 4-point Likert scale, and a score of 16 or greater represents likely clinical depression in need of intervention (Beck, Steer, & Brown, 1996). The measure has been translated and utilized in various settings (Alansari, 2005; Gomes-Oliveira, Gorenstein, Lotufo, Neto, Andrade & Wang, 2012; Penley, Wiebe, & Nwosu, 2003).

Anxiety symptoms: Anxiety symptoms were measured through the Zung Self-Rating Anxiety Scale (SAS) (Zung, 1971), which is widely used to measure anxiety in China (Yi, et al., 2013; Yin, et al., 2015). The SAS includes 20 items on a 4-point Likert scale. Summed scores below the clinical cut off of 45 are considered normative, with higher scores indicating higher levels of anxiety.

Coping resources: Measures of social support and coping styles were used to assess domains of coping. The Medical Outcomes Study – Social Support Scale (MOS-SSS) was used to assess the perceived availability of social support, through 28 items on a 5-point Likert scale (Sherbourne & Stewart, 1993). The scale has been clinically validated in China (Yu et al., 2015), and assesses the perceived availability of four domains of social support (affective, tangible, emotional and informational, and positive social interaction).

Coping styles were assessed using the Brief COPE, a 28-item scale on a 4-point Likert scale containing 2 items representing each of the 14 coping styles (Carver, 1997). This has been translated to Chinese and validated in China (Su et al., 2015). Following the indicated protocol, a 2-component factor analysis was conducted using data from the sample representing more "adaptive" coping styles (active coping, instrumental support, reframe, planning, acceptance, emotional support, and planning) (α =.747), and "maladaptive" coping styles (denial, substance use, disengagement, and self-blame) (α =.507). Three forms of coping (self-distraction, venting, and religion) did not fall into either domain and were excluded from analyses.

Analyses

Given the increased risk for HIV transmission during anal sex, we opted to group men based on the transmission risk behaviors. The 38 men who reported *only* having sex with women were thus compared to 93 men who currently reported having *any* sex with men. Though we recognize that the current gender of one's sex partners is neither an accurate nor definitive marker of sexual orientation, we identify those groups as "men who have *any* sex with men" (MSM) and "men who *only* have sex with women" (MSW) for the purpose of our analyses.

Thirty-one of the 162 men did not respond to the item about the gender of their sex partners, precluding classification as either MSM or MSW. Descriptive analyses suggest that the socio-demographic, coping resources, and psychological distress indicators of the men who did not disclose the gender of their sex partners generally fell between the MSM and MSW (Table 1); bivariate analyses comparing these men to both MSM and MSW indicated some statistically significant differences with both groups (data not shown). In order to include these participants in the analyses, we ran multiple imputations in R using the Amelia package (Blackwell, Honaker, & King, 2015), a statistical software program designed specifically for missing data imputation, and included variables significantly correlated with missingness into the model. Item-level variables for key outcome variables were included in the imputation and summary scores for key outcome variables were calculated within the imputed datasets.

We conducted descriptive and bivariate analyses for socio-demographic variables and measures of psychological distress and coping resources. Next, linear regression models were used to determine the effect of sexual orientation on depression and anxiety, controlling for differences in socio-demographics, social support and coping style. Socio-demographic variables were included in the model if they were significantly different in the bivariate analysis and were not highly correlated with another predictor ($r > 0.80$). Model fit from the imputed and listwise-deleted models were then compared and interpreted.

Results

Socio-demographic characteristics are presented in Table 1. Among the 131 men included in this analysis, mean age was 37 years (SD = 9.5). Thirty-two percent were currently

married or had a steady partner, and less than half had children (39%). Nearly 70% had a minimum of a high-school education and 65% were employed.

Overall, participants reported elevated depression, with mean BDI-II score slightly above the overall clinical cut-off (17.02, SD = 11.3) as well as the affective (9.88, SD = 7.3) and somatic (7.19, SD = 4.9) subscales. Over half the sample scored above the mean on each cut-off. Overall SAS scores averaged 43.30 (SD = 8.7), indicative of moderate levels of anxiety.

Clear socio-demographic differences emerged between MSM and MSW participants. Relative to MSW, MSM were younger (41.3 versus 35.6 years old) and less likely to be in a relationship (68% versus 19%) or have children (73% versus 28%). Compared to MSW, MSM were also more educated (47% versus 79%) had a minimum of a high school education and more than twice as likely to be employed (34% versus 72%).

Unadjusted comparisons between MSM and MSW on key psychological distress and coping variables presented in Table 1 are difficult to interpret, given the large socio-demographic variation between the two groups of men, as well as because they do not include men who did not disclose the gender of their sex partners. Consequently, adjusted comparisons for depression and anxiety controlling for key socio-demographic differences are presented in Tables 2 and 3. Parallel analyses were conducted comparing the listwise-deleted model and the model with the imputed data for the men who did not disclose the gender of their sex partners. Analyses were conducted to test whether social support, adaptive- or maladaptive-coping moderated the relationship between sexual orientation and depression and anxiety. No moderation was found. (Data not shown.)

Results for the depression outcome models are presented in Table 2. Compared to the listwise-deleted model, the imputed model demonstrated improved model fit. Thus, only results

from the imputed model (Model 2) are discussed. Sexual orientation and employment status did not significantly impact BDI-II scores. However, higher BDI-II scores were associated with worse reported physical quality of life and greater endorsement of maladaptive coping.

Results for the anxiety outcome models are presented in Table 3. Compared to the model with listwise-deleted data, the model with imputed data also had better in-sample model fit. Therefore, only the findings from the imputed model (Model 2) are discussed. Mirroring the depression model, sexual orientation was not a significant predictor of anxiety. Higher SAS scores were associated with greater endorsement of adaptive coping, worse physical quality of life and a high-school or greater level of education.

Discussion

Overall, men receiving HIV treatment at Beijing Ditan Hospital reported elevated levels of depression and anxiety. Relative to MSW, MSM were younger, more educated and less likely to be in a relationship or have children. Differences in psychological distress were less dependent on sexual orientation and instead driven by coping, quality of life, and socio-demographic characteristics. Our findings suggest that maladaptive coping and poorer physical quality of life were associated with increased endorsement of depression. Younger, more educated men with poorer quality of life and more adaptive coping skills were more likely to endorse anxiety symptoms.

Our data did not support our minority-stress theory-informed hypotheses that HIV-positive MSM would endorse higher levels of psychological distress relative to their MSW counterparts, due to the increased chronic stress due to experiences of oppression from a

dominant social group (Meyer, 2003). We also anticipated that coping resources like adaptive coping styles and social support would be negatively correlated with psychological distress, in accordance with Hatzenbeuhler's formative work on the buffering effects of coping resources (Hatzenbuehler, McLaughlin, & Xuan, 2012). Instead, we found that maladaptive coping was positively associated with increased endorsement of depression and adaptive coping was significantly positively associated with anxiety. Social support was not significant in either analysis. Other studies have found particular subscales of social support to be more salient than others, however, we did not have sufficient power to add these to our analysis (Yang, 2015). These findings highlight the importance of considering coping resources and highlight the importance of more data to understand the mechanisms.

One explanation for our surprising finding is that variables related to socio-demographic differences insulated MSM from the negative effects of minority stress. Because MSM in our sample were younger, more educated and more likely to be employed, it is possible that this group has enhanced contact with financial and social resources known to buffer against the adverse health consequences associated with an HIV diagnosis. In bivariate analysis, MSM demonstrated significantly higher rates of social support and adaptive coping compared to MSW, however these differences became insignificant when included with other predictors in the multivariate models.

Another possible explanation for the lack of difference in psychological distress between MSM and MSW is that the stigma of being HIV-positive could be overwhelming the degree to which HIV-related stigma influences psychological distress. HIV-related stigma is pervasive in China and has been demonstrated to have a significant impact on psychological distress and health outcomes (Li, Hsieh, Morano, & Sheng, 2016). For our study, it is possible that

internalized stress of not being open about their HIV status acted as a proximal process contributing to elevated anxiety and depression (Meyer, 2003).

While sexual orientation did not significantly predict the level of psychological distress, coping resources was a significant predictor of depression and anxiety. These findings are in accordance with Hatzenbeuhler's findings about the potential buffering effect of coping strategies on the impact of minority stress on psychological distress.

Given the difficulties inherent in research conducted with stigmatized populations, it is important include participants whose stigma may have contributed to partial study participation. Thus, we imputed data for the participants who did not indicate the gender of their current sex partners in analyses, who accounted for nearly 20% of the sample (Blackwell, Honaker, & King, 2015). While the imputed models had stronger model fit compared to the listwise-deleted models, there were minimal differences between significant estimates and modest differences in nonsignificant estimates between groups based on sexual orientation operationalized with and without the missing data. These findings suggest that the men who did not disclose the gender of their sex partners might have socio-demographic characteristics, coping resources, and mental health outcomes that differ from both the MSM and MSW.

Our study is subject to some limitations. Data were cross-sectional and self-reported, and the sample may not be representative of the population of HIV-positive men in China. Sexual orientation was assessed with a behavioral indicator as opposed to self-reported identity, thus limited our interpretation of our results based on sexual orientation. The absence of a stigma measure precludes our ability to test the mediating role of internalized or experienced stigma on psychological distress and coping, a potential key explanatory variable. Further, the absence of clinical data such as ART adherence, viral load and CD4 count preclude us from examining the

impact of psychological distress on important health outcomes. Future studies should simultaneously incorporate these variables in order to more rigorously clarify the role of psychological variables on HIV risk behaviors and other health outcomes in this population.

In conclusion, more research is needed to better understand the high levels of psychological distress among MSM in China. These findings suggest that implementing interventions enhancing adaptive coping skills may lessen the psychological distress experienced by both HIV-positive MSM and MSW in China. In particular, it is possible that coping interventions could selectively target physically ill HIV-positive men. Future studies should aim to more rigorously characterize the relationship between sexual orientation, psychological distress and coping resources in conjunction with comprehensive measures of stigma, ART adherence, and physical health. Such work is needed to address to address the overall health of men living with HIV in China, and ultimately improve medical outcomes as well as quality of life.

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Table 1. Socio-demographic, Psychological Distress, and Coping Resources of Chinese MSM and MSW living with HIV/AIDS (unadjusted)

	TOTAL (*n*=162)	**MSW (only) (*n*=38)**	**MSM (any) (*n*=93)**	**Chi Sq or *t* test**	**"Missing" men (n=31)**
Socio-demographics					
Age (years)	M (SD) 37.02 (9.50)	M (SD) 41.25 (9.10)	M (SD) 35.55 (9.61)	-3.94**	M (SD) 36.43 (8.37)
Committed Relationship	% 31.9% (51/160)	% 68.4% (36/38)	% 19.4% (18/93)	29.12**	% 24.1% (7/29)
Has Children	39.4% (63/160)	73% (27/37)	28.0% (26/93)	22.21**	33.3% (10/30)
Educated (More than HS)	68.8% (110/160)	47.4% (18/38)	78.5% (73/93)	12.32**	65.5% (19/29)
Employed	64.2% (102/159)	34.2% (13/38)	72.0% (67/93)	7.21**	60.7% (17/28)
Physical Quality of Life	22.71 (5.09)	21.26 (6.18)	23.80 (4.64)	2.30*	21.26 (4.80)
Psychological Distress					
Depression (BDI)	17.02 (11.29)	29.16 (14.02)	15.53 (10.14)	1.84 †	17.63 (10.26)
Affective Subscale	9.88 (7.30)	11.50 (8.60)	9.11 (6.93)	1.66 †	10.19 (6.50)
Somatic Subscale	7.19 (4.88)	8.66 (6.17)	6.42 (4.15)	2.05*	7.68 (4.78)
Anxiety (SAS)	43.30 (8.73)	45.18 (11.19)	43.01 (7.74)	-1.04	42.00 (8.38)
Coping Resources					
Perceived Social Support (MOS-SSS)	2.28 (0.95)	1.95 (.99)	2.41 (0.91)	-2.58**	2.27 (0.94)
Adaptive Coping (Brief COPE)	18.15 (3.81)	14.84 (3.53)	18.7 (3.65)	-2.49**	18.06 (3.91)
Maladaptive Coping (Brief COPE)	6.37 (1.56)	6.47 (1.74)	6.38 (1.46)	0.33	6.24 (1.69)

** p < .01
*p < .05
† p < .10

Table 2. Predictors of depression using listwise deletion versus multiple imputation

	Model 1: Listwise deletion		Model 2: Multiple Imputation	
	Estimate	(S.E.)	Estimate	(S.E.)
Sexual Orientation	-0.35	(1.70)	0.85	(1.38)
Age (years)	-0.01	(0.006)	-0.01	(0.006)
At least high school level of education	2.47	(1.62)	1.99	(1.49)
Employed	-4.36	(1.45)*	-2.33	(1.35)
In Relationship	2.59	(1.74)	2.96	(1.72)
Has Children	0.20	(1.66)	0.77	(1.62)
Social Support	-0.70	(0.88)	-0.06	(0.84)
Adaptive Coping	0.02	(0.21)	-0.09	(0.20)
Maladaptive Coping	2.59	(0.49)*	2.39	(0.46)*
Physical Quality of Life	-1.18	(0.16)*	-1.37	(0.16)*
Constant	29.68	(5.58)*	33.08	(5.12)*
Model	Linear		Linear	
N	123		162	
AIC	842		1130	
In-sample mean absolute error (MAE)	5.4%		5.7%	
In-sample root mean squared error (RMSE)	6.7%		7.3%	

*p < .05

Table 3. Predictors of anxiety using listwise deletion versus multiple imputation

	Model 1: Listwise deletion		Model 2: Multiple Imputation	
	Estimate	(S.E.)	Estimate	(S.E.)
Sexual Orientation	-1.65	(1.81)	-0.95	(1.37)
Age (years)	-0.02	(.006)*	-0.02	(.006)*
At least high school level of education	4.57	(1.77)*	4.13	(1.42)*
Employed	-1.15	(1.55)	-0.85	(1.31)
In Relationship	0.31	(1.95)	1.12	(1.65)
Has Children	0.79	(1.84)	0.39	(1.60)
Social Support	0.02	(0.92)	0.30	(0.84)
Adaptive Coping	0.71	(0.21)*	0.78	(0.19)*
Maladaptive Coping	-0.24	(0.54)	0.03	(0.44)
Physical Quality of Life	-0.98	(0.18)*	-0.86	(0.15)*
Constant	54.61	(6.21)*	46.60	(4.94)*
Model	Linear		Linear	
N	109		162	
AIC	745		1114	
In-sample mean absolute error (MAE)	5.4%		5.7%	
In-sample root mean squared error (RMSE)	6.6%		7.0%	

*p < .05