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The mediating role of individual resilience resources in stigma–health relationship among people living with HIV in Guangxi, China

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Abstract

Despite the vigorous global efforts to reduce stigma, HIV-related stigma continues to undermine the health status of people living with HIV (PLHIV). Internalized HIV stigma may cause stress adversely affecting the health of PLHIV. Resilience is the process of an effective coping and positive adaption in the face of adversities. To date, limited data are available on the mediating role of resilience in the relationship of internalized HIV stigma and health status among PLHIV in China. A cross-sectional survey was conducted among 2987 PLHIV in Guangxi Autonomous Region (Guangxi) in China. A mediation analysis was employed and Sobel test was used to test the mediation effect of individual resilience. Of the 2987 PLHIV, 62.8% were men. The mean age of the sample was 42.5 years (SD = 12.8). Over 57.7% of PLHIV reported their overall health status being poor. About 72% of PLHIV reported experiencing internalized HIV stigma. Internalized HIV stigma had a negative direct effect on self-rated health status ($p < .001$). Individual resilience resources mediated the relationship between internalized HIV stigma and self-rated health status ($p < .001$). Sobel test confirmed the mediation effect of resilience ($z = -8.359$, $SE = 0.003$, $p < .001$). Resilience as a protective factor might buffer the effect of internalized HIV stigma on health status. Multilevel interventions are needed to foster resilience of PLHIV in order to mitigate the negative impact of HIV stigma and to improve the overall health status of PLHIV.

Keywords

stigma; resilience; health status; HIV infection; PLHIV; China

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Introduction

People living with HIV (PLHIV) experience considerable HIV stigma and discrimination (Herek & Glunt, 1988). Despite the strenuous efforts over decades to reduce stigma, HIV stigma persistently undermines the health status of PLHIV worldwide (Earnshaw, Lang, Lippitt, Jin, & Chaudoir, 2015; Herrmann et al., 2013). HIV stigma includes (1) perceived stigma and (2) internalized stigma. Perceived stigma is the perception and recognition of PLHIV being stigmatized in the social context while internalized HIV stigma is PLHIV's feeling of themselves being discredited, dirty/unclean, and thinking themselves deserving the negative outcomes (Earnshaw, Smith, Chaudoir, Amico, & Copenhaver, 2013). PLHIV feel shameful about their HIV positive status when HIV-related stigma is internalized. Perceived stigma is a primary trigger for internalized stigma (Padurariu, Ciobica, Persson, & Stefanescu, 2011) and is positively associated with internalized stigma (Vogel, Wade, & Hackler, 2007). Internalized stigma among PLHIV is common. A study among 1063 PLHIV in South Africa indicated that more than 30% of participants reported feeling dirty, ashamed, or guilty for their HIV infection (Simbayi et al., 2007). Given that protective factors may mediate the association between internalized HIV stigma and adverse health outcome, it is important to understand the mediating effects of resilience on the association between internalized HIV stigma and health outcomes.

Resilience is viewed as the capacity of an effective coping and positive adaption in the face of adversities (Connor & Davidson, 2003). Individual resources of resilience (e.g., personality, self-esteem, coping styles, and spirituality) in tandem with social ecological resources (e.g., family relationship, social support) facilitate resilience. Although the emerging understanding of resilience has shifted from a concept of a trait to a dynamic process, from focusing on individual level factors to multiple levels interaction in shaping of adaptation and development of resilience, resilience is *ipso facto* an individual response (Connor & Davidson, 2003). Individual resources of resilience as the core were widely investigated in several population subgroups, including university students, patients with mental disorders, and the general population (Campbell-Sills & Stein, 2007; Connor & Davidson, 2003; Scali et al., 2012). In these studies, personality traits, coping styles, and psychiatric symptoms were viewed as potential individual resources of resilience (Campbell-Sills, Cohan, & Stein, 2006; Friborg, Barlaug, Martinussen, Rosenvinge, & Hjemdal, 2005). For instance, a longitudinal study tracked 205 participants from 10 to 20 years old and suggested personality traits are potential source of resilience (Shiner & Masten, 2012). A growing number of studies have examined the role of resilience in mental health outcomes (Davydov, Stewart, Ritchie, & Chaudieu, 2010; Dray et al., 2014). One study reported a negative association between resilience and mental health problems in HIV-infected former blood/plasma donors in China (Yu et al., 2009). To date, few studies have explored the association between resilience and overall health status among PLHIV.

Self-rated health status is a subjective evaluation of overall health by an individual. It is an indicator that may reflect multiple dimensions of health, including physiological, social, and mental health (Unden et al., 2008). Self-rated health status has been demonstrated as a valid measure of overall health (Haddock et al., 2006) with a good predictability for mortality (Idler & Benyamini, 1997). Since the wide availability of antiretroviral therapy (ART) to

PLHIV, the health status of PLHIV has been generally improving. However, limited data are available regarding the health status and associated protective factors among PLHIV in China.

In China, HIV stigma can be manifested in the society (Abler et al., 2014). A recent study reported that about 40% of respondents from general population in the society agreed that PLHIV should be isolated and 18% of them agreed that PLHIV should be punished (Abler et al., 2014). The majority of Chinese PLHIV feel stigmatized (Zhang et al., 2014). Despite the dramatic increase in global literature on health implications of HIV stigma (Hatzenbuehler, Phelan, & Link, 2013; Herek, Capitanio, & Widaman, 2002) and on the relationship of HIV stigma with mental health (Wingood et al., 2008), on CD4 counts and chronic illness comorbidity (Earnshaw et al., 2013), and on HIV symptoms (Earnshaw et al., 2015), data regarding the relationship between stigma and self-rated health status among PLHIV are scarce in China.

The moderate mediation effect of resilience on the relationship between HIV stigma and HIV symptoms has been demonstrated in a study by Earnshaw et al. (2015). The authors found that the association between HIV stigma and HIV symptoms was mediated by stress only among PLHIV who perceived low level of community support (Earnshaw et al., 2015). Perceived community support and receiving instrumental social support acted as resilience resources that moderated the relationship between stigma and stress (Earnshaw et al., 2015). The common coping strategies used by PLHIV to deal with stigma in Chinese culture included passive (avoidance) and active (problem-focused) strategies that occurred in both interpersonal and intrapersonal levels (Zhang et al., 2014). However, limited data are available regarding the protective effect of resilience in PLHIV in China. Therefore, this study assesses the individual health status and resilience in PLHIV, as well as the mediation effect of resilience on the relationship between stigma and self-reported overall health status. Social ecological resilience resources are not considered in this study because of the lack of data. A more complete analysis documenting the relative role of individual and social ecological resilience resources would have required information on a range of indicators which was not collected in the survey.

Method

Study site

The study was conducted in 2012–2013 in Guangxi Autonomous Region (Guangxi) in China. Guangxi is located in the southern China with a population of 46 million (National Bureau of Statistics of China, 2012). Guangxi has the second largest number of reported HIV cases among 31 provinces in China (China Ministry of Health, 2012).

Sampling and survey procedure

A total of 17 cities and 75 counties in Guangxi were ranked in terms of cumulative number of reported HIV/AIDS cases and the two cities and 10 counties with the largest cumulative number, accounting for 43% of the reported cases, were selected as the sampling frame. From the list of known HIV cases in local Center for Disease Control and Prevention

(CDC), 10% were randomly drawn in each of the 12 selected study sites. We recruited those who were at least 18 years of age and physically and mentally able to complete a survey questionnaire. Selected participants were contacted and invited to participate in the survey in the local CDC or community health centers where the participants received medical care. About 90% of the selected participants consented to participate in the study. About 20% of the participants completed the questionnaire in Mandarin by themselves and the remaining completed the questionnaire through one-on-one interview because of their reading difficulties or their personal preference. The interviewers were local CDC staff or health care workers from HIV clinics who received intensive two-day training on research ethics and interview skills. Each survey was conducted in a private place, and no one was allowed to stay with the respondent during the survey except the interviewer. Confidentiality was assured, and respondents were allowed to skip any questions they did not want to answer and were permitted to withdraw from the study at any time. The entire questionnaire took about 75–100 minutes to complete. Each participant received a gift at completion of the survey as a compensation for their time. A total of 3002 PLHIV consented and participated in the survey. After removing 15 incomplete questionnaires, we analyze data for 2987 participants for this paper. The research protocol was approved by the Institutional Review Boards at both Wayne State University in the United States and Guangxi CDC in China.

Measures

Internalized stigma—Eight items were used to measure individual internalized stigma. We selected these eight items from the AIDS-related stigma scale that represents negative self-perception in relation to HIV infection (Berger, Ferrans, & Lashley, 2001). Each item had a 4-point Likert response option (strongly disagree, disagree, agree, and strongly agree). A composite score was calculated by summing the scores of these eight items. The score ranged from 7 to 32, with a higher score indicating a higher level of internalized stigma. The internal consistency of the scale is high (Cronbach's $\alpha = .92$).

Resilience—An abridged 10-item version of Connor–Davidson Resilience Scale (CD-RISC-10) was used to measure individual resilience (internal resilience resource; Campbell-Sills & Stein, 2007). The abridged version of CD-RISC-10 was correlated with the original 25-item scale and was more stable than the original one and had excellent psychometric properties (Prince-Embury, 2013). The 10 items had a 5-point response option ranging from 0 (not true at all) to 4 (true nearly all of the time). A composite score was created by summing responses to these 10 items, with a higher score indicating a higher level of resilience. This scale had a high internal consistency reliability in this sample (Cronbach's $\alpha = .95$).

Self-rated health status—Participants were asked a question: “How do you evaluate your overall health status in the last month?” with response options: poor, fair, good, very good, and excellent. For the purpose of data analysis, the responses to this item were dichotomized into good (1 = good, very good, excellent) and poor (0 = poor, fair).

Demographic and health-related factors—Data regarding a number of relevant demographic factors were included in the analysis. These factors included age, gender,

ethnicity (1 = Han, 0 = minority), marital status (1 = currently married, 0 = not currently married), education (years of formal schooling), employment status (1 = full-/part-time, 0 = unemployed), monthly family income (1 = 0–999 Yuan, 2 = 1000–1999 Yuan, 3 = 2000–2999 Yuan, 4 = 3000–3999 Yuan, 5 = 4000–4999 Yuan, 6 = 5000 Yuan and more). In addition, drug use (1 = yes, 0 = no), CD4 counts (1 = ≥ 500 , 0 = < 500), and ART (1 = yes, 0 = no) were also included in the analysis. A logarithmic transformation of CD4 counts was done, and the values of logarithm of CD4 counts were used in multiple regression.

Statistical analyses

First, descriptive statistics were obtained to describe the frequency distribution of demographic characteristics. Statistical significances of differences in demographic characteristics by health status were tested using ANOVA for continuous variables and Chisquare test for categorical variables. The NPar median test was employed to test the difference of CD4 counts by health status. Second, Pearson correlation analysis was conducted to assess the association between internalized stigma, resilience, and self-rated health status. Third, mediation analysis was employed following the guidelines by Baron and Kenny (1986). Multivariate linear regression analysis (with continuous variable “resilience” as the dependent variable) and multivariate logistic regression analysis (with dichotomized variable “health status” as the dependent variable) were performed to examine the role of resilience in mediating the effect of the internalized stigma on health status (Figure 1). One multivariate linear regression model (model 1) and two multivariate logistic regression models (model 2 and model 3) were used to test the effect of mediator (resilience, M). In the first model, the independent variable (internalized stigma, X) was regressed on the mediation variable (resilience, M) with a regression coefficient a . In the second model, the independent variable (internalized stigma, X) was regressed on the dependent variable (self-rated health status, Y) with a regression coefficient c . In the third model, the independent variable (X) and the mediation variable (M) were simultaneously regressed on dependent variable (Y) with regression coefficients c' (X on Y) and b (M on Y). In addition, those factors that were significant in the bivariate analysis including age, gender, marital status, education, employment status, income, health insurance, drug use, CD4 counts (logarithm), and ART were controlled in each of the regression models. Sobel Z-test was used to confirm the mediation effect (Sobel, 1982). All statistical analyses were performed using SPSS 18.0 for Windows.

Results

Demographic characteristics

Table 1 shows demographic characteristics of the sample. Of the 2987 participants in this study, 62.8% were men. The mean age of the respondents was 42.5 years ($SD = 12.8$). About 70.7% of participants were Han nationality, 80.2% lived in the rural areas, 66.5% were currently married, 73.1% were employed full- or part-time at the time of the survey, 53.1% had monthly family income less than 1000 Yuan, 19.3% had used drugs in the past, and 72.1% were on ART. The median CD4 count was 318.0 (range: 0–2000).

Self-rated health status and correlations with stigma and individual resilience

In bivariate analysis, age, gender, marital status, education, employment status, monthly family income, drug use, CD4 counts, and ART were significantly associated with self-rated health status (Table 1). More than 57.7% of PLHIV reported their overall health status as poor (12.7% “Poor” and 45.0% “Fair”), while 42.3% reported as good (24.2% “Good” and 14.3% “Very good”, and 3.9% “Excellent”; Table 2). The mean score of self-rated health status was 2.52 on the 5-point scale ($SD = 1.01$). Participants reporting “Poor” health status had the highest internalized HIV stigma score (mean = 20.32, $SD = 4.52$) while participants reporting “Excellent” health status had the lowest internalized HIV stigma score (mean = 16.13, $SD = 4.91$). Participants reporting “Poor” health status had the lowest resilience score (mean = 28.06, $SD = 8.81$) while participants reporting “Excellent” health status had the highest resilience score (mean = 38.13, $SD = 8.33$). The correlation coefficients were -0.15 ($p < .01$) between internalized stigma and resilience, -0.14 ($p < .01$) between internalized stigma and health status, and 0.29 ($p < .01$) between resilience and health status.

The prevalence of internalized HIV stigma

Table 3 shows that about half of the participants strongly agreed or agreed with the statement that “People’s attitudes make me feel worse because I have HIV”. The proportions who strongly agree or agree were 46% for “Having HIV makes me feel I’m a bad person”, 45.9% for “I feel I’m not as good as others because I have HIV”, 36.6% for “Having HIV in my body is disgusting to me”, 35.1% for “I avoid making new friends because I have HIV” and “Having HIV makes me feel unclean”, and 34.0% for “I feel set apart, isolated from the rest of the world”. About 29.5% of the sample strongly agreed or agreed with the statement that “I feel guilty because I have HIV”. Overall, more than 71.9% of the participants reported some feelings of internalized HIV stigma.

Mediation analysis

Mediation analysis indicated that individual resilience significantly mediated the effect of internalized stigma on self-rated health status (Table 4 and Figure 1). Resilience was negatively associated with the internalized stigma (regression coefficient = -0.494 , $SE = 0.035$, $p < .001$), after controlling for key demographic and health-related factors (age, gender, marital status, education, employment status, income, health insurance, drug use, CD4 counts, and ART). Model 2 showed a direct effect of internalized HIV stigma on health status. Health status was negatively associated with the internalized stigma (regression coefficient = -0.084 , $SE = 0.01$, $p < .001$). Model 3 showed that when both resilience and internalized stigma were included in the model, resilience was positively associated with the reported health status (regression coefficient = 0.052 , $SE = 0.005$, $p < .001$) while the significant direct effect of internalized HIV stigma on self-rated health status was reduced (regression coefficient was changed from -0.084 to -0.060), but it still remained significant. Results of the Sobel test confirmed that the association between internalized HIV stigma and self-rated health status is significantly mediated by resilience ($z = -8.359$, $SE = 0.003$, $p < .001$). In addition, in model 3, self-rated health status of PLHIV were significantly associated with gender, residence, employment status, income, and drug use.

Discussion

To the best of our knowledge, this is the first attempt using a large sample of PLHIV in China to explore the role of individual resilience resources in mediating the effects of internalized HIV stigma on self-rated health status. Our findings provide evidence to inform future interventions and research in improving health status and quality of life among PLHIV.

Because HIV infection has become a chronic health condition with the wide availability of ART, having a good health status among PLHIV is critical for enhanced quality of life and the longevity of this subgroup. Although mortality of PLHIV has been reduced since the introduction of ART (Liu et al., 2013), a considerable number of PLHIV are still in overall poor health status that may reflect their poor physical health status and psychosocial state. Results from this study indicate that more than two-third of PLHIV experienced some level of internalized HIV stigma. Internalized HIV stigma might result in psychological stress, which, in turn, might result in increased HIV symptoms, reduced CD4 counts, as well as poor health status (Earnshaw et al., 2015).

Mediation analysis results in this study suggested that resilience as protective factor might alleviate the effect of internalized HIV stigma on self-rated health status. PLHIV with higher level of resilience are likely to have positive emotions and positive coping strategies (e.g., positive reappraisal, problem-focused coping) to deal with the effect of internalized HIV stigma and be able to find the positive meaning about their HIV serostatus (e.g., learning a lesson). They might change their thoughts about HIV infection (e.g., considering it similar to other chronic illness), cope internalized HIV stigma effectively (e.g., reducing the feeling of guilt), increase self-worth and building optimism of life, or change their behavior in dealing with the disease (e.g., disclosing serostatus to others, increasing adherence to ART, seeking needed care, and developing healthy diets). They might actively access social support and care resources to cope with their physical symptoms and depressive symptoms. These positive actions in turn might reduce HIV symptoms and increase CD4 counts for PLHIV and enable PLHIV to report a better overall health status.

There are some potential limitations in this study. First, the causal interpretations need to be precluded because of the cross-sectional nature of data. Future studies with a longitudinal design are needed to confirm the findings of this study. Second, self-reported data may be subject to some bias (e.g., social desirability response, error in recall). Further study is also needed to examine differences on their responses between PLHIV who filled out the questionnaire by participants themselves and those who were interviewed by interviewers. Third, measurement of resilience may need to be validated in the future research. CD-RISC-10 emphasizes on individualistic contributions to the resilience process thereby may have a limitation in the collectivist contexts of Chinese society.

Despite these limitations, this study provides insights and important implications for future research, interventions, and health education. Measuring resilience factors at individual, family, and community levels can help researchers broaden the understanding the process of resilience. Interventions aiming at fostering resilience of PLHIV to overcome stigma and

stress of illness are needed. Longitudinal data are needed to help researchers to understand the pathways and developmental trajectories of resilience. Moreover, interventions that combine stigma reduction and resilience development are needed. Additionally, given PLHIV are in an overall poor health, it is necessary to provide comprehensive services to PLHIV to meet their physical, mental, and social needs. Integrated intervention programs should target multiple components including mental health care, disclosure, and adherence to treatment, coping skills, and social support. Community-level interventions are needed to enhance the resilience of PLHIV to cope with stigma and to understand that resilience processes within the supportive communities.

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References

- Abler L, Henderson G, Wang X, Avery M, Zhang Y, & Pan S (2014). Affected by HIV stigma: Interpreting results from a population survey of an urban center in Guangxi, China. *AIDS and Behavior*, 18, S192–S201. doi:10.1007/s10461-013-0556-3 [PubMed: 23892728]
- Baron RM, & Kenny DA (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173–1182. [PubMed: 3806354]
- Berger BE, Ferrans CE, & Lashley FR (2001). Measuring stigma in people with HIV: Psychometric assessment of the HIV stigma scale. *Research in Nursing & Health*, 24, 518–529. doi:10.1002/Nur.10011 [PubMed: 11746080]
- Campbell-Sills L, Cohan SL, & Stein MB (2006). Relationship of resilience to personality, coping, and psychiatric symptoms in young adults. *Behaviour Research and Therapy*, 44, 585–599. doi:10.1016/j.brat.2005.05.001 [PubMed: 15998508]
- Campbell-Sills L, & Stein MB (2007). Psychometric analysis and refinement of the Connor-Davidson Resilience Scale (CD-RISC): Validation of a 10-item measure of resilience. *Journal of Traumatic Stress*, 20, 1019–1028. doi:10.1002/jts.20271 [PubMed: 18157881]
- China Ministry of Health. (2012). 2012 China AIDS Response Progress Report Beijing: China Ministry of Health.
- Connor KM, & Davidson JRT (2003). Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety*, 18, 76–82. [PubMed: 12964174]
- Davydov DM, Stewart R, Ritchie K, & Chaudieu I (2010). Resilience and mental health. *Clinical Psychology Review*, 30, 479–495. doi:10.1016/j.cpr.2010.03.003 [PubMed: 20395025]
- Dray J, Bowman J, Freund M, Campbell E, Wolfenden L, Hodder RK, & Wiggers J (2014). Improving adolescent mental health and resilience through a resilience-based intervention in schools: Study protocol for a randomised controlled trial. *Trials*, 15, 289–297. doi:10.1186/1745-6215-15-289 [PubMed: 25037455]
- Earnshaw VA, Lang SM, Lippitt M, Jin H, & Chaudoir SR (2015). HIV stigma and physical health symptoms: Do social support, adaptive coping, and/or identity centrality act as resilience resources?. *AIDS and Behavior*, 19, 41–49. doi:10.1007/s10461-014-0758-3 [PubMed: 24715226]

- Earnshaw VA, Smith LR, Chaudoir SR, Amico KR, & Copenhaver MM (2013). HIV stigma mechanisms and well-being among PLWH: A test of the HIV stigma framework. *AIDS and Behavior*, 17, 1785–1795. doi:10.1007/s10461-013-0437-9 [PubMed: 23456594]
- Friborg O, Barlaug D, Martinussen M, Rosenvinge JH, & Hjemdal O (2005). Resilience in relation to personality and intelligence. *International Journal of Methods in Psychiatric Research*, 14, 29–42. doi:10.1002/Mpr.15 [PubMed: 16097398]
- Haddock CK, Poston WSC, Pyle SA, Klesges RC, Vander Weg MW, Peterson A, & Debon M (2006). The validity of self-rated health as a measure of health status among young military personnel: Evidence from a cross-sectional survey. *Health and Quality of Life Outcomes*, 4, 57–65. doi:10.1186/1477-7525-4-57 [PubMed: 16939653]
- Hatzembuehler ML, Phelan JC, & Link BG (2013). Stigma as a fundamental cause of population health inequalities. *American Journal of Public Health*, 103, 813–821. doi:10.2105/Ajph.2012.301069 [PubMed: 23488505]
- Herek GM, Capitanio JP, & Widaman KF (2002). HIV-related stigma and knowledge in the United States: Prevalence and trends, 1991–1999. *American Journal of Public Health*, 92, 371–377. doi:10.2105/Ajph.92.3.371 [PubMed: 11867313]
- Herek GM, & Glunt EK (1988). An epidemic of stigma: Public reactions to AIDS. *American Psychologist*, 43, 886–891. doi:10.1037//0003-066x.43.11.886 [PubMed: 3063145]
- Herrmann S, McKinnon E, Hyland NB, Lalanne C, Mallal S, Nolan D,... Duracinsky M (2013). HIV-related stigma and physical symptoms have a persistent influence on health-related quality of life in Australians with HIV infection. *Health and Quality of Life Outcomes*, 11, 56–68. doi:10.1186/1477-7525-11-56 [PubMed: 23566318]
- Idler EL, & Benyamini Y (1997). Self-rated health and mortality: A review of twenty-seven community studies. *Journal of Health and Social Behavior*, 38, 21–37. doi:10.2307/2955359 [PubMed: 9097506]
- Liu E, Rou K, McGoogan JM, Pang L, Cao X, Wang C,... Wu Z (2013). Factors associated with mortality of HIV-positive clients receiving methadone maintenance treatment in China. *Journal of Infectious Diseases*, 208, 442–453. doi:10.1093/infdis/jit163 [PubMed: 23592864]
- National Bureau of Statistics of China (2012). Sixth national census data released. Beijing: National Bureau of Statistics of China Retrieved September 12, 2012, from http://www.stats.gov.cn/was40/gjtjj_detail.jsp?searchword=C8CBBFDA&channelid=6697&record=18
- Padurariu M, Ciobica A, Persson C, & Stefanescu C (2011). Self-stigma in psychiatry: Ethical and biopsychosocial perspectives. *Revista Romana De Bioetica*, 9, 76–82.
- Prince-Embury S (2013). The Connor-Davidson resilience scale In Prince-Embury S & Saklofske DH (Eds.), *Resilience in children, adolescents, and adults: Translating research into practice, the springer series on human exceptionality* (pp. 161–166). New York: Springer.
- Scali J, Gandubert C, Ritchie K, Soulier M, Ancelin ML, & Chaudieu I (2012). Measuring resilience in adult women using the 10-items Connor-Davidson Resilience Scale (CD-RISC). Role of trauma exposure and anxiety disorders. *PLoS ONE*, 7, e39879. doi:10.1371/journal.pone.0039879 [PubMed: 22768152]
- Shiner RL, & Masten AS (2012). Childhood personality as a harbinger of competence and resilience in adulthood. *Development and Psychopathology*, 24, 507–528. doi:10.1017/S0954579412000120 [PubMed: 22559127]
- Simbayi LC, Kalichman S, Strebel A, Cloete A, Henda N, & Mqeketo A (2007). Internalized stigma, discrimination, and depression among men and women living with HIV/AIDS in Cape Town, South Africa. *Social Science & Medicine*, 64, 1823–1831. doi:10.1016/j.socscimed.2007.01.006 [PubMed: 17337318]
- Sobel ME (1982). Asymptotic intervals for indirect effects in structural equations models In Leinhardt S (Ed.), *Sociological methodology* (pp. 290–312). San Francisco, CA: Jossey-Bass.
- Uden AL, Elofsson S, Andreasson A, Hillered E, Eriksson I, & Brismar K (2008). Gender differences in self-rated health, quality of life, quality of care, and metabolic control in patients with diabetes. *Gender Medicine*, 5, 162–180. doi:10.1016/j.genm.2008.05.003 [PubMed: 18573483]

- Vogel DL, Wade NG, & Hackler AH (2007). Perceived public stigma and the willingness to seek counseling: The mediating roles of self-stigma and attitudes toward counseling. *Journal of Counseling Psychology*, 54, 40–50.
- Wingood GM, Reddy P, Peterson SH, DiClemente RJ, Nogoduka C, Braxton N, & Mbewu AD (2008). HIV stigma and mental health status among women living with HIV in the Western Cape, South Africa. *South African Journal of Science*, 104, 237–240.
- Yu X, Lau JTF, Mak WWS, Cheng Y, Lv Y, & Zhang J (2009). Risk and protective factors in association with mental health problems among people living with HIV who were former plasma/blood donors in rural China. *AIDS Care*, 21, 645–654. doi:10.1080/09540120802459770 [PubMed: 19444674]
- Zhang Y, Golin CE, Bu J, Emrick CB, Nan Z, & Li M (2014). Coping strategies for HIV-related stigma in Liuzhou, China. *AIDS and Behavior*, 18, 212–220. doi:10.1007/s10461-013-0662-2

Figure 1.

Mediation analysis.

Note: Numbers are unstandardized coefficients and standard errors are given in parentheses.

* $p < .05$; ** $p < .01$; *** $p < .001$. Sobel test statistics = $-8.359 (0.003)$ ***.

Table 1.

Demographic characteristics of the sample.

	Total, <i>n</i> (%)	Self-rated health status, <i>n</i> (%)	
		Good	Poor
<i>N</i> (%)	2987	1264 (42.3)	1721 (57.7)
Age, mean (SD)	42.46 (12.83)	41.43 (12.67)	43.21 (12.90) ***
<30	391 (13.1)	208 (53.2)	183 (46.8)
31–40	1222 (41.1)	521 (42.7)	700 (57.3)
41–50	642 (21.6)	240 (37.4)	401 (62.6)
51–60	340 (11.4)	138 (40.6)	202 (59.4)
>60	379 (12.7)	153 (40.4)	226 (59.6)
<i>Gender</i>			
Male	1876 (62.8)	733 (39.1)	1141 (60.9) ***
Female	1111 (37.2)	531 (47.8)	580 (52.2)
<i>Ethnicity</i>			
Han	2109 (70.7)	882 (41.9)	1225 (58.1)
Minorities	873 (29.3)	380 (43.5)	493 (56.5)
<i>Residence</i>			
Urban	591 (19.8)	254 (43.1)	336 (56.9)
Rural	2391 (80.2)	1008 (42.2)	1382 (57.8)
<i>Marital status</i>			
Currently married	1939 (66.5)	867 (44.7)	1071 (55.3) ***
Not currently married	978 (33.5)	374 (38.3)	603 (61.7)
Years of formal schooling, mean (SD)	6.97 (2.99)	7.13 (3.11)	6.85 (2.91) *
<i>Employment</i>			
Full-/part-time	2174 (73.1)	1000 (46.0)	1172 (54.0) ***
Unemployed	800 (26.9)	259 (32.4)	541 (67.6)
<i>Monthly income (Yuan)</i>			
< 1000	1572 (53.1)	566 (36.0)	1005 (64.0) ***
1000–1999	870 (29.4)	417 (48.0)	452 (52.0)

	Total, <i>n</i> (%)	Self-rated health status, <i>n</i> (%)	
		Good	Poor
2000–2999	334 (11.3)	171 (51.2)	163 (48.8)
3000–3999	84 (2.8)	46 (54.8)	38 (45.2)
4000–4999	36 (1.2)	22 (61.1)	14 (38.9)
5000	62 (2.1)	32 (51.6)	30 (48.4)
<i>Drug use</i>			
Yes	575 (19.3)	150 (26.1)	424 (73.9) ***
No	2399 (80.7)	1113 (46.4)	1285 (53.6)
CD4 counts, median (range) ^a	318.0 (0–2000)	354.0 (0–1313)	295.0 (1–1999) ***
< 500	2293 (80.3)	932 (40.6)	1361 (59.4)
500	561 (19.7)	286 (51.0)	275 (49.0)
<i>Antiretroviral therapy (ART)</i>			
Yes	2146 (72.1)	934 (43.5)	1211 (56.5) *
No	830 (27.9)	326 (39.3)	503 (60.7)

^aMedian test.* $p < .05$.** $p < .01$.*** $p < .001$.

Table 2. Correlation coefficients, and the mean (SD) of internalized HIV stigma, resilience and self-rated health status.

	Correlation coefficients			Self-rated health status				
	1	2	3	Mean (SD)	Poor	Fair	Good	Very good
<i>N</i> (%)								
1. Internalized HIV stigma scale	1			18.49 (4.35)	379 (12.7)	1342 (45.0)	723 (24.2)	426 (14.3)
2. Resilience scale	-0.15**	1		31.89 (8.43)	20.32 (4.52)	18.79 (4.25)	18.37 (4.06)	16.79 (3.96)
3. Self-rated health status (5-point scale)	-0.14**	0.29**	1	2.52 (1.01)	28.06 (8.81)	30.68 (8.11)	33.21 (7.51)	35.21 (8.23)

**
p < .01.

Table 3.

The prevalence of internalized HIV stigma among PLHIV.

Statements	Mean (SD)	Strongly agree/ agree, <i>n</i> (%)
2. People's attitudes make me feel worse about myself	2.45 (0.69)	1497 (50.1)
7. Having HIV makes me feel I am a bad person	2.43 (0.69)	1374 (46.0)
3. I feel I am not as good as others because I have HIV	2.40 (0.71)	1372 (45.9)
8. Having HIV in my body is disgusting to me	2.29 (0.68)	1092 (36.6)
4. I avoid making new friends because I have HIV	2.27 (0.68)	1048 (35.1)
5. Having HIV makes me feel unclean	2.26 (0.67)	1049 (35.1)
6. I feel set apart, isolated from the rest of the world	2.26 (0.68)	1015 (34.0)
1. I feel guilty because I have HIV	2.17 (0.68)	881 (29.5)
Total	18.49 (4.35)	2117 (71.9)

Table 4.

Mediation analysis of the effect of resilience on the relationship of internalized HIV stigma and self-rated health status.

	Model 1: ($X \rightarrow M$) DV = resilience (a)	Model 2: ($X \rightarrow Y$) DV = health status (c)	Model 3: ($X, M \rightarrow Y$) DV = health status (c') (b)
Age	-0.048 (0.014) ***	-0.016 (0.004) ***	-0.013 (0.004) **
Gender	-1.181 (0.345) **	0.033 (0.092)	0.030 (0.094)
Marital status	0.432 (0.327)	0.040 (0.089)	0.018 (0.091)
Years of formal schooling	0.317 (0.054) ***	-0.011 (0.014)	-0.028 (0.015)
Employment status	1.380 (0.357) ***	0.373 (0.099) ***	0.317 (0.101) ***
Monthly family income	0.932 (0.143) ***	0.211 (0.039) ***	0.171 (0.040) ***
Drug use	-1.861 (0.440) ***	-0.886 (0.125) **	-0.817 (0.127) ***
CD4 counts (log transfer)	0.856 (0.379) *	0.779 (0.113) ***	0.759 (0.114) ***
Antiretroviral therapy	0.877 (0.346) *	0.111 (0.095)	0.072 (0.096)
Internalized HIV stigma (X)	-0.494 (0.035) ***	-0.084 (0.010) ***	-0.060 (0.010) ***
Resilience (M)	-	-	0.052 (0.005) ***
Sobel test, z-value	-8.359 (0.003) ***		

Notes: Numbers are unstandardized coefficients and standard errors are given in parentheses.

X : internalized HIV stigma; M : resilience; Y : self-rated health status; DV, Dependent variable.

Model 1: multivariate linear regression, independent variable (internalized stigma, X) was regressed on the mediation variable (resilience, M) with a regression coefficient a .

Model 2: multivariate logistic regression, the independent variable (internalized stigma, X) was regressed on the dependent variable (self-rated health status, Y) with a regression coefficient c .

Model 3: multivariate logistic regression, the independent variable (X) and the mediation variable (M) were simultaneously regressed on dependent variable (Y) with regression coefficients c' (X on Y) and b (M on Y).

* $p < .05$.

** $p < .01$.

*** $p < .001$.