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Authors

Huang, Feifei
Chen, Wei-Ti
Shiu, Cheng-Shi
et al.

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The Mediating Effects of Mindfulness on Perceived Stress From HIV Stigma in People Living With HIV in Myanmar: A Cross-sectional Study

Feifei Huang, RN, PhD • Wei-Ti Chen, RN, CNM, PhD, FAAN* • Cheng-Shi Shiu, MSW, PhD, GStat • Sai Htun Lin, MB, BS • Min San Tun, MS • Thet Wai Nwe, MPH • Yin Thet Nu Oo, MB, BS, MPH • Htun Nyunt Oo, MB, BS, MPH

Abstract

HIV is a highly stigmatized and stressful condition for people with HIV (PWH). As a country heavily influenced by religion, especially Buddhism, we explore how the perceived stress from HIV stigma interacts with the mediator of mindfulness on PWH in Myanmar. From January to July 2020, a sample of 248 eligible PWH was recruited by quasi-random sampling methods from a private Facebook group in Myanmar. Data on demographics, HIV stigma, mindfulness, and perceived stress were collected. The bias-corrected percentile bootstrap method was used to test multiple mediation analyses. The path from perceived HIV stigma to perceived stress (direct effect $\beta = 0.16$) and the mediating effect of mindfulness on that stress were significant (indirect effect accounts for 45.15% of total effect). The findings indicate that interventions enhancing mindfulness-based practice should be considered to reduce HIV stigma and, therefore, lower perceived stress among PWH in Myanmar.

Key words: HIV, perceived stress, stigma, mindfulness, mediating analysis

HIV stigma, or the social devaluation and discrediting of people with HIV (PWH), has been implicated as a formidable barrier to HIV prevention, testing, and treatment adherence (Kamitani et al., 2018). HIV stigma is a fundamental cause of health inequalities and poor health outcomes (Hatzenbuehler et al., 2013), especially in low- and middle-income countries such as Myanmar (Tun et al., 2019). Myanmar, also called Burma, is located in the western portion of mainland Southeast Asia. In Myanmar, 60% of PWH feel ashamed of having HIV, and 18% are denied access to health services (Than et al., 2021). Also, higher levels of stigma experienced by PWH have been associated with lower antiretroviral therapy (ART) adherence (Sweeney & Vanable, 2016), faster disease progression, and poorer mental health, including depression and a lower satisfaction with life (Aung et al., 2017).

In addition to stigmatization, living with HIV is a stressful condition for PWH (Kamitani et al., 2018). Perceived stress is defined as how a person feels about the stress in their life and their ability to handle it (Phillips, 2013). Stressors reported by PWH include, but are not limited to, medication side effects, physical discomfort, uncertainty about one's future, social isolation, violence, unemployment, and financial problems (Adamu et al., 2019; Chen et al., 2013; Gousse et al., 2018). Both stigmatization and stress decrease quality of life (Tun et al., 2019). Thus, researchers have been working tirelessly to discover how to reduce stigma and perceived stress for those living with HIV.

There is a growing focus on potential protective factors, such as mindfulness, to lower the effects of HIV-related stigma and perceived stress (Kerrigan et al., 2021). Mindfulness originates from practices of Buddhism and generally "involves focusing one's attention non-judgmentally on the present moment while accepting emotional reactions without getting caught up in them" (Kabat-Zinn, 2003, p. 146). Studies that examined the role of mindfulness among PWH have found that greater mindfulness is associated with better mental health, lower internalized HIV stigma, greater adherence to ART, and improved HIV-related clinical outcomes (e.g., higher $CD4^+$ T-cell count; Kerrigan et al., 2021; Scott-Sheldon et al., 2019). As suggested by the

Feifei Huang, RN, PhD, is an Associate Professor, School of Nursing, Fujian Medical University, Fuzhou, Fujian province, China. Wei-Ti Chen, RN, CNM, PhD, FAAN, Associate Professor, School of Nursing, University of California Los Angeles, Los Angeles, California, USA. Cheng-Shi Shiu, MSW, PhD, GStat, Associate Professor, Department of Social Work, National Taiwan University, Taipei, Taiwan. Sai Htun Lin, M.B., B.S., Advocacy, Human Right & Technical Services Department, Secretariat Office, Myanmar Positive Group (MPG), Yangon, Myanmar. Min San Tun, MS, Advocacy, Human Right & Technical Services Department, Secretariat Office, Myanmar Positive Group (MPG), Yangon, Myanmar. Thet Wai Nwe, MPH, National AIDS Program, Department of Public Health, Ministry of Health and Sports, Naypyidaw, Myanmar. Yin Thet Nu Oo, M.B., B.S, MPH, Deputy Director, Health System Research Division, Department of Medical Research, Yangon, Myanmar. Htun Nyunt Oo, M.B., B.S, MPH, Deputy Director, Health System Research Division, Department of Medical Research, Yangon, Myanmar.

**Corresponding author: Wei-Ti Chen, e-mail: wchen@sonnet.ucla.edu*

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transactional model of stress and coping (Lazarus & Folkman, 1984), mindfulness influences how individuals respond to perceived stress (Herbert & Forman, 2011). More specifically, by paying more attention to stressors before they activate unpleasant feelings, PWH can use mindfulness as a coping strategy to appraise stressors less negatively and lower their perceived stress. Thus, based on the empirical evidence (Herbert & Forman, 2011; Kerrigan et al., 2021; Scott-Sheldon et al., 2019), we hypothesized that mindfulness will mediate the relationships between perceived stress and HIV stigma experienced by PWH.

Currently in Myanmar, especially during the recent political and civil unrest that has occurred there, PWH experience difficulties in accessing health care as well as ART and other medicines (Aung et al., 2021). With strong Buddhism influences, PWH in Myanmar rely on religion more during the unrest. Currently, few studies have explored the mitigating effect of mindfulness on the perceived stress arising from HIV stigma among PWH in Myanmar, a country heavily influenced by Buddhism and where mindfulness practice is common (de la Perriere, 2017; United Nations Demographic Statistics Database, 2017). We examined the interacting relationships among perceived stress, mindfulness, and HIV stigma. Based on the empirical evidence, we proposed the following hypotheses (Figure 1): HIV stigma negatively influences mindfulness, which negatively influences perceived stress (resulting in a positive indirect effect as the product of these two causal pathways), whereas HIV stigma positively influences perceived stress.

Methods

Participants

From January to July 2020, a sample of 248 eligible PWH was recruited from a closed Facebook group (content is available only to members) that included more than 18,000 people in Myanmar, 90% of whom were PWH. The remainder were health care providers, public health officers, and nongovernmental organization (NGO) organizers.

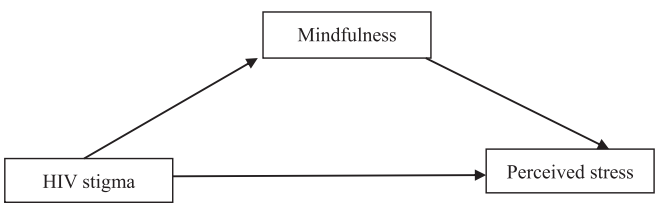

Figure 1. Hypothesized relationships among HIV stigma, mindfulness, and perceived stress.

This closed Facebook group is run by the NGO organizer, who is the site collaborator in this study. The research information was presented by the NGO research staff to recruit potential participants. We used the quasi-random sampling method (a type of systematic sampling) to recruit study participants; that is, using Facebook membership roster to contact every fifth member on the list until the sample size was achieved. Screening questions included being at least 18 years old, confirmed HIV, ability to provide study consent, and current resident of Myanmar.

Design

This cross-sectional descriptive study was approved by the institutional review board (IRB) of the University of California at Los Angeles (Number: #18–001769-CR-00001) and the in-country IRB of the Myanmar Ministry of Health and Sports (UPH-IRB [2019/Research/40]) and adhered to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement (von Elm et al., 2014). If participants agreed to participate, passed the screening questions, and were able to provide written informed consent by electronically signing, a link to the study survey was then sent directly to them through Facebook Messenger. All information was collected online through the Research Electronic Data Capture (REDCap) system, a web-based self-report survey tool that is supported by the involved institutions. By using the results from a previous pilot study, it was estimated that a sample size of 180 was sufficient (effect size = 0.03 with power = 0.08). Of the 536 PWH contacted through the private Facebook list, 248 passed the screening questions and 194 (78%) completed the REDCap survey. After completing the survey, participants were reimbursed with local cell phone cards (~$3, 4,500 Kyat) for their participation.

Measures

Mindfulness was measured by the Cognitive and Affective Mindfulness Scale-Revised-Myanmar version (CAMS-R-M), which was translated and adapted from the English version of CAMS-R (Feldman et al., 2007). The 9-item CAMS-R-M included three factors, an Attention factor (e.g., "It is easy for me to concentrate on what I am doing"), Awareness factor (e.g., "I can usually describe how I feel at the moment in considerable detail"), and Acceptance factor (e.g., "I am able to accept the thoughts and feelings I have"). All the items were rated using a 4-point Likert scale (1 = *rarely/not at all* to 4 = *almost always*), with higher total scores reflecting

greater mindfulness qualities. In this study, the Cronbach's alpha of the total scale was 0.87, and three-factor structure of CAMS-R-M has been validated by confirmatory factor analysis among PWH (Huang et al., 2021).

HIV stigma was measured by the Myanmar version of the HIV Stigma Scale, which was adapted from Berger's HIV Stigma Scale (Berger et al., 2001; e.g., "I worry people who know I have HIV will tell others") and the Indian HIV Stigma Scale (Steward et al., 2008; e.g., "I feel that I am paying for karma or sins because I have HIV," "I've been refused medical care or denied hospital services because I have HIV"). The Myanmar version of the HIV Stigma Scale consisted of 35 items, including five factors (religious concerns, disclosure concerns, personalized stigma, concern with public attitudes about HIV health care provider's stigma, and negative self-image). A four-point Likert scale (1 = "strongly agree" to 4 = "strongly disagree") was used to rate these items. There are four phases of adapting the HIV stigma scale, which include item exploration, translation, pilot testing, and psychometric testing. In Phase 1, we adapted the 40-item stigma scale from Berger (Berger et al., 2001) and the 7-item stigma scale used in India (Steward et al., 2008). In Phase 2, the research team translated, back-translated, and compared and adapted the scale to fit the local language. In Phase 3, the stigma scale was given to 10 PWH in Myanmar to ensure the readability, comprehensibility, and fluency. In Phase 4, 156 PWH participants completed the REDCap survey. A higher score indicates a higher level of HIV stigma. The overall Cronbach's alpha reliability estimate for this sample was 0.95. The details of the stigma scale analysis were published in another article (Huang et al., 2021).

The severity of stress experienced by PWH during the previous month was measured by the Myanmar version of the Perceived Stress Scale for People Living with HIV/AIDS (PSSHIV-M), which was adapted from the English version of the PSSHIV (Su et al., 2008). Similar to the stigma scale, four phases of scale adaptation were used (Huang et al., In press). The final 31-item PSSHIV-M has five factors (functional problems and medical care, work-related issues, sexual relationships, psychological problems, and social/family issues). All the items were rated using a 5-point Likert scale (1 = *absolutely not stressful* to 5 = *extremely stressful*). The overall Cronbach's alpha reliability estimate for this sample was 0.95. A detail of the PSSHIV-M scale analysis was published in another article (Huang et al., In press).

Demographic variables—participant's age, gender, marital status, ethnicity, education level, employment status, years of living with HIV, type of ART, and recent self-reported $CD4^+$ T-cell count and viral load—were also collected.

Data Analysis

We conducted data analyses using SPSS 24.0 and AMOS 23.0. The data collected met the assumptions of normality (a one-sample Kolmogorov–Smirnov test did not show statistical significance). The continuous variables were expressed as *M* and *SD*. Categorical variables were expressed as proportions or percentages. First, we conducted Pearson correlation analyses to examine the relationships among perceived stress, stigma, and mindfulness. Second, we used the bias-corrected percentile bootstrap method (repeated 5,000 times; Nevitt & Hancock, 2001) to test the mediation analysis to explore the mechanism through which HIV stigma can influence perceived stress with mindfulness as a mediator. A maximum likelihood estimation method was used to evaluate the fit of the hypothesized theoretical model based on the following criteria (Hu & Bentler, 1999): normed chi-square (χ^2/df 1.0 ± 3.0, $p > .05$), root mean square error of approximation (RMSEA <0.08), comparative fit index (CFI >0.9), and Tucker–Lewis Index (TLI >0.9). We handled missing data (5% of all data responses were missing across participants) by using full information maximum likelihood (Lee & Shi, 2021), and $p \leq .05$ was considered significant.

Results

Sample Characteristics

In this sample, the mean years since being diagnosed with HIV was 6.90 years (*SD* = 6.61), whereas the mean age was 28.23 years (*SD* = 17.16). The $CD4^+$ T-cell count mean in this sample was 667.38 (*SD* = 455.84), and the viral load was 615.00 (*SD* = 1,058.55). The sociodemographic data of the samples are presented in Table 1.

As shown in Table 2, HIV stigma, perceived HIV stress, and mindfulness were significantly correlated with each other. The results of the mediating effect of mindfulness, after controlling for the effects of demographic variables (gender, ethnicity, marital status, educational level, employment status, health insurance, and $CD4^+$ T-cell cell count), are shown in Table 3 and Figure 2. The path from HIV stigma to perceived HIV stress (direct effect = 0.163, 95% confidence interval [CI]: 0.082–0.135) and the mediating effect of mindfulness were significant (HIV stigma → mindfulness → perceived stress, indirect effect = 0.135, 95% CI: 0.044–0.105). The mediating effect size was an indirect

Table 1. Sociodemographic Characteristics of the Participants (N = 194)

Variables	n (%)
Gender	
Male	124 (63.9)
Female	68 (35.1)
Transgender	2 (1.0)
Ethnicity	
Bamar	152 (78.4)
Chin	3 (1.5)
Kachin	4 (2.1)
Kayin	7 (3.6)
Kayah	1 (0.5)
Mon	9 (4.6)
Rakhine	4 (2.1)
Shan	6 (3.1)
Others (Palaung, Islam, Tamil)	8 (4.1)
Marital status	
Married or steady partner	82 (42.3)
Widowed	20 (10.3)
Separated	9 (4.6)
Divorced	13 (6.7)
Single, never married	70 (36.1)
Educational level	
Middle school graduation	26 (13.4)
High school graduation	79 (40.7)
Professional (vocational) training school graduation	3 (1.0)
Some college but no degree	27 (13.9)
College graduation	54 (27.8)
Post-college graduate	5 (2.6)
Employment status	
No	39 (20.1)
Part time	42 (21.6)
Full time	113 (58.2)
Health insurance	
Not enough	161 (83.0)
Just enough	33(17.0)
$CD4^+$ T-cell count	
<200 cells/mm^3	58 (30.0)
200–499 cells/mm^3	39 (20.0)
≥ 500 cells/mm^3	97 (50.0)

effect, accounting for 45.15% of the total effect. The following fit indices are x2 df 5 28) 5 2.184, p 5 .04, RMSEA 5 0.06 (95% CI: 0.019–0.066), CFI 5 0.95, TLI 5 0.90) which fit well in the final pathway.

Discussion

This is one of the first studies to consider the mediating effects of mindfulness with regards to HIV stigma and perceived stress, especially in Myanmar. Our results show that among PWH in Myanmar, HIV stigma can increase perceived stress and mindfulness can play a crucial role in alleviating that stress. Given the degree of negative consequences of HIV-related perceived stress, increasing attention is being given to investigating mindfulness as a potential buffer against the effects of HIV stigma and perceived stress (Farber et al., 2014). As such, implementing effective strategies in mindfulness could reduce the perceived stress among this population.

As expected, our results feature two significant paths. The first is that HIV stigma has a significantly positive relationship to perceived stress, that is, the higher the perceived stigma, the higher the perceived stress, a finding that is echoed in several other recent studies (Arshi et al., 2020; Zhu et al., 2020). In Myanmar, PWH are challenged by various HIV-related stressors, including socioeconomic disadvantages (Veronese et al., 2020); HIV-related stigma, including being rejected/discriminated against by health care providers or peers (Tun et al., 2019); lack of family support (Aung et al., 2017; Veronese et al., 2020); low ART uptake (Lum et al., 2020); lack of viral load testing (Thinn et al., 2019); and an underfunded and underresourced health care system for HIV care (Aung et al., 2017, Veronese et al., 2020). For example, one study evaluating hospital accessibility in Myanmar found that PWH were relegated to segregated waiting areas and wards after their HIV serostatus was discovered (Tang, 2016). During the

Table 2. Descriptive Statistics and Pearson Bivariate Correlations

	M (*SD*)	Bivariate Correlations		
		Perceived Stigma	HIV Stigma	Mindfulness
Perceived stigma	88.15 (59.31)	—		
HIV stigma	112.21 (33.24)	0.30**	—	
Mindfulness	27.07 (23.58)	0.24**	0.61**	—

Note. *$p < .05$; **$p < .01$

current political and civil unrest in Myanmar, essential HIV services (including HIV testing), delivery of ART, viral load testing, and adherence counseling have been reduced or suspended due to closed facilities and the disappearance of providers throughout Myanmar who are trying to avoid military or police targeting (Aung et al., 2021). This project is one of the first studies on this subject conducted in Myanmar before the recent military coup. The situation in Myanmar is getting worse, and the limited infrastructure of the country has been destroyed during and after acts of civil unrest. All these factors can contribute to perceived stress (Aung, et al., 2021; Tun et al., 2019). Some of these access barriers may also be due to the lack of in-country infrastructure and insufficient personnel in the health care system.

The second path is that mindfulness can mediate the perceived stress created by HIV stigma. In Myanmar, the overwhelming majority (90%) of people are Theravadan Buddhist, and it is often said that "To be Burmese is to be Buddhist." (Braun, 2014). Mindfulness originates from the practices of Buddhism. Our findings preliminarily confirm the positive effect of mindfulness among PWH in a country heavily influenced by Buddhism. As the stress-buffering model (Cohen & Wills, 1985) highlights, this study demonstrates that PWH in Myanmar who face HIV stigma experience higher perceived stress. Mindfulness practice could decrease this perceived stress. In other words, practicing mindfulness would bring peace of mind, equanimity, and also provoke self-compassion and empathy, attributes that have been repeatedly discussed in Buddhist philosophy (Kalra et al., 2018). Future studies should test whether PWH outside of Myanmar who practice mindfulness also show similar results.

Limitations

However, the limitations of this study should be taken into consideration. First, the results, including the $CD4^+$ T-cell count and viral load, were based on self-report. This could potentially result in recall bias. The small sample size potentially also limits the interpretation of pathways among variables and their generalizability beyond this study. Also, the fact that 5% of all data responses were missing across participants could present an issue with generalizing the analysis to people living with HIV in Myanmar. Second, the nature of cross-sectional surveys limits causal inference. If possible, longitudinal or experimental studies should be designed to test the mediating models and provide a better understanding of these variables. Third, with unstable Wi-Fi connections and a censored internet in Myanmar, online recruitment may have produced selection bias. PWH in Myanmar heavily rely on Facebook to exchange information and seek health resources; however, rural places in Myanmar lack internet connections. Even with

Table 3. Effect Coefficients of the Meditation Model

Endogenous Variables	Predicting Variables	Standardized Direct Effect β/Percentile 95% CI	Standardized Indirect Effect β/Percentile 95% CI	Standardized Total Effect β/Percentile 95% CI
Perceived stress	HIV stigma	.163[a] (.082 to .135)	.135[a] (.044 to .105)	.299[a] (.022 to .049)
	Mindfulness	−.570[a] (−1.197 to −.085)	/	−.570[a] (−1.197 to −.085)
Mindfulness	HIV stigma	−.237[a] (−.066 to −.019)	/	−.237[a] (−.066 to −.019)

[a]$p < .01$.
Note. CI = confidence interval.

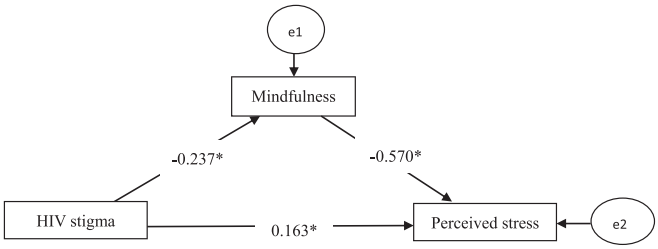

Figure 2. The mediating effect of mindfulness. *$p < .05$.

quasi-random sampling methods via social media, potential study participants who do not have internet access could not share their experiences with researchers.

Implications

The study findings provide preliminary support for mindfulness as a potential strategy for decreasing perceived stress and HIV-related stigma for PWH in Myanmar. For health care providers who are caring for PWH, encouraging them to practice mindfulness could decrease perceived stress. This study finding not only broadens the understanding of the relationship between HIV stigma and perceived stress but also consolidates the stress-coping and stress-buffering model. This article also provides valuable guidance for health care providers in designing a culturally sensitive intervention to reduce HIV stigma and consequently decrease perceived stress. In addition, this project reinforces the potential protective effect of mindfulness for PWH; thus, exploring various practices to enhance mindfulness should be considered in future research. Other factors, in addition to mindfulness practice, should be explored in the future as well.

Conclusion

This exploratory study provides insight into the relationships among HIV stigma, mindfulness, and perceived stress. Specifically, we found HIV stigma increases perceived stress among Myanmar PWH and mindfulness can mediate that stress. Future interventions to reduce HIV stigma and perceived stress among PWH should consider adding mindfulness-based practices particularly in countries heavily influenced by Buddhism.

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Disclosure

We indicate that all the authors had knowledge of and adherence with the Journal's Conflict of Interest policy, and we do not have any conflict of interest in this study.

Authors' Contributions

All authors on this article meet the four criteria for authorship as identified by the International Committee of Medical Journal Editors (ICMJE); all authors have contributed to the conception and design of the study, drafted or have been involved in revising this manuscript, reviewed the final version of this manuscript before submission, and agreed to be accountable for all aspects of the work.

The specific contribution of each author is as follows: Conceptualization & Methodology: F. Huang, W.-T. Chen, T. W. Nwe, Y. T. N. Oo, and H. N. Oo; Data Analysis: F. H. and C. S. Shiu; Data Collection: S. H. Lin and M. S. Tun; Funding acquisition: W.-T. Chen; Writing/Revising: F. Huang, S. H. Lin, M. S. Tun, and W.-T. Chen.

Key Considerations

- HIV stigma increases perceived stress among Myanmar PWH; however, mindfulness can mediate the perceived stress.
- A culturally sensitive intervention that includes mindfulness should be developed to reduce HIV stigma and consequently decrease perceived stress.
- Future interventions to reduce HIV stigma and perceived stress among PWH should consider adding mindfulness-based practice, particularly in countries heavily influenced by Buddhism.

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