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Social support, mental health needs, and HIV risk behaviors: a gender-specific, correlation study



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Abstract

Background: The HIV/AIDS epidemic continues to threaten the health and wellbeing of millions in the United States and worldwide. Syndemic theory suggests that HIV/AIDS can cooccur with other afflictions. As close to 20% of US adults live with a mental health condition, it is critical to understand the correlation between HIV risk behaviors and mental health needs, as well as protective factors such as social support in intervening the association between mental distress and HIV risk behaviors. Furthermore, as past research has shown mixed results concerning the function of social support on HIV risks by gender, it is important to conduct a gender-specific analysis.

Methods: To assess the relationship between mental health needs, social support, and HIV risk behaviors, and to assess if social support can be a buffer, weakening the effect of mental health needs on HIV risk, in 2018, we analyzed representative, cross-sectional data from 2016 BRFSS collected from 33,705 individuals from four states in the United States, stratified by gender. Weighted logistic regression analyses, adjusted for age, race, marital status, education, and annual income, assessed the correlation between mental health needs, social support, and HIV risk behaviors. Furthermore, interaction analyses were performed to see if social support modifies the slope of mental health needs as a function of HIV risk behaviors.

Results: For both genders, the odds of participating in HIV risk behaviors increase with mental health needs and decrease with the level of social support. Furthermore, social support mitigates the association between mental health needs and HIV risk behavior involvement for males, as males receiving high level of social support have least odds of HIV risk behaviors relative to males receiving low level of social support. Notably, for females, social support does not serve as a buffer against HIV risk behaviors when their mental health needs increase.

Conclusion: The study contributes to the knowledge base of HIV prevention and highlights the important role of mental health and social support against HIV risk behaviors when developing gender-specific prevention strategies.

Keywords: Social support, Mental health, HIV/AIDS, Gender-specific

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Background

The HIV/AIDS epidemic remains a challenge to health-care systems both in the United States and worldwide and has a profound impact on economics, community, family structure and personal wellbeing across different populations and countries [1–8]. In 2015, over 1.1 million Americans were living with HIV, 15% of whom did not know their HIV diagnosis [9].

Given the gravity of the impact of the HIV/AIDS epidemic, scholars have proposed models to examine risk behaviors that lead to HIV infection as well as factors that can prevent and reduce HIV transmission. Syndemic theory posits that HIV/AIDS often coexists and interacts synergistically with one or more afflictions, which contributes to excessive disease burden [10, 11]. According to Mental Health America [12], over 18%, or 44 million of American adults have a mental health condition. There has been a rising interest in understanding the link between mental health problems and HIV risk behaviors. Specifically, mental health problems and HIV risk behaviors are correlated among men who have sex with men [13–20], drug injection users [21, 22], female sex workers [23], immigrants [24, 25], transgender women [26], and in general population [27–29]. Together, these studies indicate that people with mental health needs may have increased vulnerability to HIV risk behaviors.

Mental health needs have been shown to differ by gender. Large-scale studies [e.g., 30, 31] have found that females are prone to experience internalizing mental disorders, while externalizing disorders and substance use disorders are more common among males. However, gender differences are less pronounced in younger cohorts for conditions such as depression and substance use [31] or when mental disorders are combined [30]. Studies have also considered gender differences in the association of mental health needs and HIV infection. Anxiety and depression were more likely to co-occur with HIV among heterosexual males living with HIV, while substance use was more likely to co-occur with HIV among heterosexual females living with HIV [32]. Several studies have indicated that females who had any mood or anxiety disorder [33] or alcohol use [34] were more likely to be involved in high risk sexual behaviors than females with no mental health concerns and alcohol use. Nonetheless, both females and males who had greater mental health needs were more likely to have had HIV risk behaviors, such as having more transactional sex, having more than one sex partner [35–37], and exhibiting needle sharing behaviors in the past 30 days [35].

Studies have examined the role of social support, an important interpersonal factor, in protecting people against HIV risks. A systematic review of 41 studies on social support and HIV risk behaviors concluded that a higher level of social support was associated with fewer HIV risk behaviors among general adults as well as

female sex workers and people living with HIV/AIDS [38]. Furthermore, the buffering hypothesis [39] suggests that emotional support gained from the social networks can serve as a buffer, protecting the individuals in the face of stressful events and increasing coping. In a survey study that involved 157 female sex workers in Croatia, the researchers identified that social support attenuated the association between victimization and HIV risks (i.e., STI diagnosis) and that female sex workers had highest odds of sexual risk when they had little or no social support, compared to those had moderate or high support [23].

Past research has also highlighted the importance of considering gender differences when understanding the role of social support, and in the correlation between social support and HIV risk behaviors. Compared to females, males perceive to have less social support [40] and are less satisfied with their social support [41]. As well, there are mixed findings concerning gender-specific relationship between social support and HIV risks. For example, a study of individuals attending venues serving alcohol in South Africa [42] found that social support was correlated with fewer sexual risk behaviors for females, but not for males. Contrarily, in a study of drug injection users in Sichuan, China [43], the researchers did not observe a relationship between social support and HIV risk behaviors among female users, but identified that decreased social support was correlated with increased HIV risk behaviors among male users. Among adolescents, perceived support from friends was associated with lower sexual risk behaviors among female adolescents, while perceived support from family, not friends, was associated with lower sexual risk behaviors among male adolescents [44]. Lastly, in a study of Latino Immigrants in New Orleans [45], gender difference was not found in the association between social support and HIV risk behaviors in that social support served as a protective factor for both genders.

Indeed, while the current evidence has consistently pointed to a positive relationship between mental health needs and HIV risks, the function of social support on HIV risk behaviors is less clear when stratified by gender. Moreover, the majority of past studies examining the role of social support in mental health and HIV risks have been based on specific community populations [38], and research evidence drawn from population-based data is lacking. Given that HIV/AIDS and mental health are both critical public health issues, it is important to use population-based data to further understand whether these conditions co-occur and whether social support can serve as a buffer. Using a population-based data and gender-specific analysis, the current study will test three hypotheses: 1) mental health needs are positively associated with HIV risk behaviors, 2) social support is negatively correlated with HIV risk behaviors, and 3) social support moderates the association between mental health needs and HIV risk behaviors.

Methods

We analyzed 2016 Behavioral Risk Factor Surveillance System (BRFSS) data from Louisiana, Michigan, Rhode Island, and Tennessee. The BRFSS is a representative, telephone survey of health conditions and behavioral risk factors among adults aged 18 and older who live in the United States. The cross-sectional survey contains core modules as well as optional modules that states can choose to include [46]. The four states this study comprises were the only ones that opted in to use the optional emotional and social support module in 2016. Data from these states reflected a total number of 33,705 individuals.

Measures

Mental health status: Participants were asked, “Now thinking about your mental health, which includes stress, depression and problems with emotions, for how many days during the past 30 days was your mental health not good.” The response was dichotomized as 0 = “none” and 1 = “1 or more days”.

Social support: Participants were asked one question, “how often do you get the social and emotional support you need” and indicated their response on a 5-point Likert scale from “never” to “always”. We recoded the variable into low (1 = “never” or “rarely”), medium (2 = “sometimes” or “usually”), and high (3 = “always”) levels of social support.

HIV risk behaviors: In a single question, participants were asked to indicate if they have engaged in any of the following activities in the past year: “You have used intravenous drugs”, “You have been treated for a sexually transmitted or venereal disease”, “You have given or received money or drugs in exchange for sex”, and “You had anal sex without a condom.” (0 = “No”, 1 = “Yes”).

Demographic information: Participants provided information on age, gender, marital status, education, and annual income.

Statistical analysis

Bivariate analyses were used to examine participants’ descriptive information by gender. Step-wise logistic regressions were used to assess the correlates of HIV risk behaviors. We created gender-specific models to assess the contribution of mental health needs and social support to HIV risk behaviors. Data were weighted using the weight variable designed by BRFSS that took into consideration study designs and population’s demographic information including age, race/ethnicity, sex, marital status, education, ownership of home, and ownership of telephone [47].

To evaluate the associations between mental health needs, social support, and HIV behaviors (hypotheses 1 and 2), we entered demographic variables in the first step as controls, and mental health needs and social support in the second step. To assess the moderation role

of social support (hypothesis 3), we included the interaction term of mental health needs X social support in the final step [48]. ModGraph [49] was used to depict the moderation patterns when the interaction term was significant. All analyses were performed in IBM SPSS Statistics 24 [50]. Due to multiple testings, we used Bonferroni correction [51] and adjusted the study’s critical value at 0.0125 (0.05/4).

Results

Table 1 shows the descriptive data of study variables. Weighted estimates suggest that, compared to males, a greater proportion of females are older, not married, received more education, but have lower income (all p ’s < .0001). Females also indicate to have more mental health needs than males (40.3% vs. 29.5%; p < .0001). While a greater percentage of females than males receive medium level of social support, slightly more males consider themselves receiving low level of social support than females (10.8% vs. 7.9%; p < .0001). Over 7% of males had engaged in HIV risk behaviors in the 12 months, higher than 4.8% of females (p ’s < .0001).

Table 2 presents gender-specific associations between mental health needs, perceived social support, and HIV risk behaviors, adjusted for demographic variables. For both genders, HIV risk behaviors are associated with greater mental health needs and lower level of perceived social support. Compared to their counterparts who did not have mental health needs in the past 30 days, males who did have mental health needs have a 49% odds increase (95% CI = 1.24, 1.78, p < .0001) in engaging in HIV risk behaviors, and females have a 93% odds increase (95% CI = 1.55, 2.38, p < .0001). Conversely, for both males and females, those who reported to have medium (males: adjusted odds ratio (AOR) = 0.54, 95% CI = 0.41, 0.70, p < .0001; females: AOR = 0.55, 95% CI, 0.41, 0.75, p < .0001) or high levels of social support (males: AOR = 0.52; 95% CI = 0.41, 0.67, p < .0001; females: AOR = 0.45; 95% CI = 0.33, 0.62, p < .0001) are almost twice less likely to be involved in HIV risk behaviors.

We further tested the moderating role of social support on the association between mental health needs and HIV risk behaviors by introducing the interaction term mental health needs X emotional support in the logistic regression models. While the interaction term was not significant in the model for females, it was significant in male’s model (AOR = 0.70, 95% CI = 0.55, 0.90, p = .006). Shown in Fig. 1, the slope of HIV risk behaviors as a function of mental health needs is the steepest among males who have low social support, followed by those who have medium level of social support, and high level of social support, respectively. In other words, males who have low level of social support have the greater odds of engaging in HIV risk behaviors when

Table 1 Unweighted and weighted data of participant characteristics, mental health needs, social support and HIV risk, stratified by gender (N = 33,705)

	Male			Female		
	Unweighted (n = 14,796)		Weighted	Unweighted (n = 18,909)		Weighted
	n	%	%	n	%	%
Age (years)						
18–24	1098	7.4	13.1	878	4.6	11.9
25–34	1747	11.8	17.9	1739	9.2	16.8
35–44	1860	12.6	16.5	2096	11.1	15.8
45–54	2504	16.9	17.1	3142	16.6	16.6
55–64	3346	22.6	17.0	4320	22.8	17.1
65–99	4241	28.7	18.3	6734	35.6	21.8
Race						
Non-Hispanic White	12,224	84.0	74.7	15,549	83.4	74.5
Hispanic or non-White	2322	16.0	25.3	3104	16.6	25.5
Marital status						
Not married	5681	38.7	42.7	8895	47.4	47.8
Married or common law	9012	61.3	57.3	9884	52.6	52.2
Education						
Less than high school	1060	7.2	14.2	1324	7.0	12.6
High school or GED diploma	4137	28.1	32.5	5124	27.2	29.6
Some college	4084	27.7	29.1	5405	28.7	32.2
College or graduate degree	5463	37.1	24.2	6983	37.1	25.6
Annual income (in US\$)						
< 15,000	903	7.0	8.2	1665	10.7	12.3
15,000 – 24,999	1724	13.4	15.1	2798	18.1	20.5
25,000 – 49,999	3183	24.7	25.9	3959	25.6	25.2
50,000 – 74,999	2263	17.6	16.9	2437	15.7	15.0
> = 75,000	4809	37.3	33.9	4632	29.9	27.0
Current MH needs						
Has need	3841	26.4	29.5	6598	35.5	40.3
No need	10,731	73.6	70.5	11,995	64.5	59.7
Social support						
Low	1211	9.7	10.8	1143	6.9	7.9
Medium	4119	33.1	33.2	6015	36.6	37.4
High	7130	57.2	56.1	9295	56.5	54.7
HIV risk						
Yes	673	4.9	7.4	427	2.4	4.8
No	12,924	95.1	92.6	17,071	97.6	95.2

Note. Weighted analyses suggests that males and females are differed in all demographic variables ($p < .0001$) except for race

comparing with those who have medium or high level of social support.

Discussion

The present study uses retrospective population data to examine the associations between mental health needs,

social support and HIV risk behaviors. Our findings suggest that, compared to males, females have higher mental health needs, have higher perception of social support, and practice lower HIV risk behaviors. Furthermore, regardless of gender, greater mental health needs are associated with elevated HIV risk behaviors. While higher social support is

Table 2 Multiple logistic regression models of mental health needs and social support as a function of HIV risk behaviors, stratified by gender

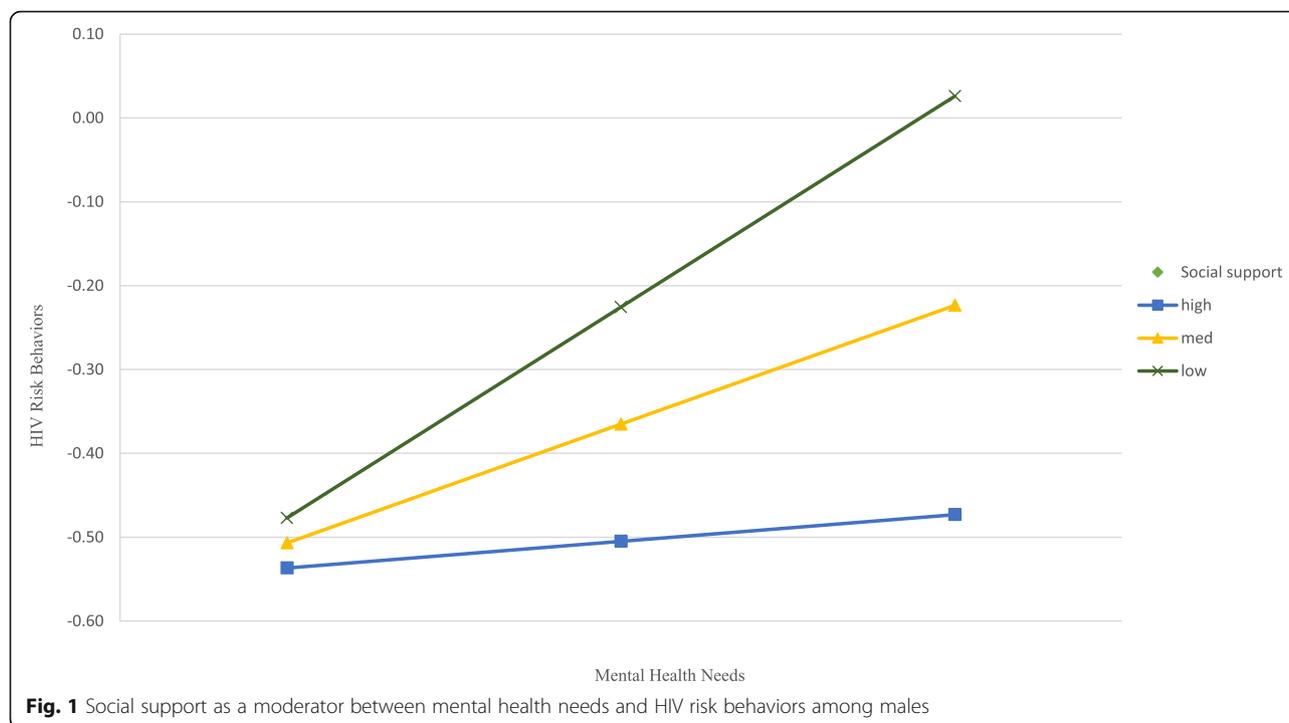
	Male			Female		
	AOR ^a	95% CI	<i>p</i>	AOR	95% CI	<i>p</i>
Age (years)						
18–24	1.00	Ref		1.00	Ref	
25–34	0.92	0.73–1.16	.491	1.02	0.79–1.32	.891
35–44	0.40	0.31–0.53	<.0001	0.44	0.32–0.59	<.0001
45–54	0.15	0.11–0.22	<.0001	0.18	0.12–0.26	<.0001
55–64	0.16	0.11–0.23	<.0001	0.09	0.05–0.14	<.0001
65–99	0.51	0.03–0.09	<.0001	0.05	0.03–0.09	<.0001
Race						
Non-Hispanic White	1.00	Ref		1.00	Ref	
Hispanic or non-White	1.32	1.09–1.60	.005	1.19	0.97–1.47	.103
Marital status						
Not married	1.00	Ref		1.00	Ref	
Married or common law	0.57	0.47–0.70	<.0001	0.43	0.34–0.55	<.0001
Education						
Less than high school	1.00	Ref		1.00	Ref	
High school or GED diploma	0.72	0.56–0.94	.016	1.51	1.07–2.15	.021
Some college	0.80	0.62–1.05	.112	1.14	0.79–1.64	.478
College or graduate degree	0.62	0.45–0.84	.002	0.99	0.66–1.48	.951
Income (US\$)						
< 15,000	1.00	Ref		1.00	Ref	
15,000 – 24,999	1.65	1.15–2.36	.007	0.89	0.66–1.19	.413
25,000 – 49,999	1.37	0.97–1.95	.075	0.80	0.59–1.09	.155
50,000 – 74,999	1.26	0.86–1.86	.239	0.77	0.53–1.11	.163
> = 75,000	1.39	0.97–1.99	.077	0.67	0.46–0.97	.035
Mental health needs						
No	1.00	Ref		1.00	Ref	
Yes	1.49	1.24–1.78	<.0001	1.93	1.55–2.38	<.0001
Emotional support						
Low	1.00	Ref		1.00	Ref	
Medium	0.54	0.41–0.70	<.0001	0.55	0.41–0.75	<.0001
High	0.52	0.41–0.67	<.0001	0.45	0.33–0.62	<.0001

Note: Both models were adjusted for participant age, race, income, educational level, marital status. The Bonferroni-corrected *p* value is set at .025

^aAOR, adjusted odds ratio

connected with fewer HIV risk behaviors for both genders, social support only functions as a moderator between mental health needs and HIV risk behaviors among males, but not among females. Study results contribute to the body of knowledge on the roles of mental health needs and social support related to HIV risk behaviors, underscoring the need to tailor HIV prevention programs with enhancing social support elements for males with mental health needs, as well as the need to continue exploring other mechanisms that can intervene the association between mental health needs and risky sexual behaviors for females.

More females report current mental health needs than males in our study. While this finding corroborates those of previous studies [52, 53], literature also suggests that males are less likely than females to recognize and report their mental health needs and, as a result, rarely access mental health services and treatment [54–56]. It is critical to further understand gender-specific mental health needs as well as help-seeking patterns and decision process, so that targeted strategies that encourage service utilization can be developed.



Furthermore, although females report greater mental health needs than males, individuals with poorer mental health status, regardless of gender, have increased HIV risk behaviors compared to those without. The results further demonstrate the co-occurrence of mental health issues and HIV risk behaviors and are consistent with those of prior studies [21, 44, 57–61]. The most commonly reported mental health needs among people living with HIV are depression or depressive symptoms, anxiety, and suicidal attempts [62, 63]. It is possible that mental health issues can interfere with the individual's cognitive functioning and affect the decision to practice safer sexual behaviors [60].

The present results show that a higher level of perceived social support is associated with fewer HIV risk behaviors. In addition, perceived social support significantly moderates the relationships between mental health needs and HIV risk behaviors for males, where the relationship between mental health status and HIV risk behaviors is the strongest among males reporting the lowest level of social support, and the weakest among males reporting the highest level of social support. These findings lend support to previous literature in that, when faced with limited social support, males who are psychologically vulnerable may engage in HIV risk behaviors in order to obtain immediate physical intimacy or emotional gratification [64]. Traditional masculine gender roles, such as those emphasizing achievement, autonomy, and emotional control, can not only diminish males' perception of their mental health needs and inhibit help-seeking behaviors and social support, but also increase risk-taking behaviors [65, 66]. To decrease males' mental

health needs and HIV risk behaviours, prevention programs and services targeting males should consider ways to encourage social and emotional support.

To our surprise, social support does not show to affect the interplay between mental health and HIV risks for females in the same way it did for males. That social support does not show to have a buffering role in HIV vulnerability among females is contradictory to findings from past studies. As these studies (e.g., [23, 67]) focused on female sex workers, rather than females drawn from a general population, the difference in results may be attributed to the variation of study samples. Literature has also suggested that varied sources of social and emotional support (e.g., informal vs. formal) and types of social networks (e.g., family, partners, friends) can result in different effect on HIV risk behaviors for females [38]. Furthermore, there needs to be a distinction concerning the quality of social relationships, as a supportive relationship can generate different outcomes compared to a toxic one.

The study has several limitations. Due to the cross-sectional nature of BRFSS, study results are only correlational. In addition, as indicated earlier, key study variables were measured with a single item, which lacks specificity. While the brevity increases the ease of administration for a large health surveillance survey, it nevertheless constrains the interpretation of study results. Future population-based studies should further unpack these constructs to encourage more comprehensive analyses. Lastly, while BRFSS provided population-based, representative data, only four states that used the

emotional and social support module were included in this study. As a result, study findings cannot be generalized to the entire population in the United States.

Conclusion

To our knowledge, this study is among the few studies that use representative, population-based data to test buffering hypothesis in the context of HIV risks. The study discerns gender-specific mechanisms between mental health needs and HIV risks, providing empirical evidence of the role of mental health needs and social support in HIV risk behaviors. HIV prevention should consider gender differences, look into how to support people with mental health needs, and explore ways to strengthen social support for those who are at risk for HIV infections.

Abbreviations

AIDS: Acquired Immune Deficiency Syndrome; AOR: Adjusted odds ratio; BRFSS: The Behavioral Risk Factor Surveillance System; HIV: Human Immunodeficiency Virus; IBM: International Business Machines; SPSS: Statistical Package for the Social Sciences; STI: Sexually Transmitted Infection

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Availability of data and materials

The 2016 BRFSS dataset and codebook are available at CDC's website (https://www.cdc.gov/brfss/annual_data/annual_2016.html).

Authors' contributions

LF conceived the study and contributed to the writing of literature review, data analysis, discussion, and conclusion. DC contributed to the writing of literature review and discussion. MA contributed to the writing of study methods and the drafting of the manuscript. All authors have read and approved the manuscript.

Ethics approval and consent to participate

As data used for the study were solely obtained from the publicly available, 2016 BRFSS dataset and no individuals can be identified from the dataset, the study was exempt from the university's ethics review.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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