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## Depression and Sexual Risk Behaviors among Rural-to-urban Migrants in China: The Moderating Roles of Acculturation and Social Capital

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## Abstract

Previous studies have documented that depression is positively associated with sexual risk behaviors (SRB) among rural-to-urban migrants. Existing literature has also suggested that acculturation and social capital might moderate this positive relationship. However, data regarding the moderating effects of acculturation and social capital have been inconsistent. The current study aims to examine the relationship between depression and SRB, as well as the moderating roles of acculturation and social capital in this relationship. A sample of 641 young rural-to-urban migrants was recruited through a venue-based sampling approach in Beijing, China. Results indicated that depression was positively associated with SRB. Both acculturation and social capital moderated this relationship, but they showed different moderating effects. Specifically, the level of acculturation was protective against SRB among migrants with a higher level of depression but not among migrants with a lower level of depression. Social capital played a protective role among migrants with a lower level of depression but became a risk factor for those with a higher level of depression. These findings suggested that targeted interventions aiming to reduce depression, improve acculturation stress management skills, and utilize social capital are needed to reduce SRB among rural-to-urban migrants.

## Keywords

Depression; Sexual Risk Behaviors; Acculturation; Social Capital; Migrant; China

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### Abstract

Previous studies have documented that depression is positively associated with sexual risk behaviors (SRB) among rural-to-urban migrants. Existing literature has also suggested that acculturation and social capital might moderate this positive relationship. However, data regarding the moderating effects of acculturation and social capital have been inconsistent. The current study aims to examine the relationship between depression and SRB, as well as the moderating roles of acculturation and social capital in this relationship. A sample of 641 young rural-to-urban migrants was recruited through a venue-based sampling approach in Beijing, China. Results indicated that depression was positively associated with SRB. Both acculturation and social capital moderated this relationship, but they showed different moderating effects. Specifically, the level of acculturation was protective against SRB among migrants with a higher level of depression but not among migrants with a lower level of depression. Social capital played a protective role among migrants with a lower level of depression but became a risk factor for those with a higher level of depression. These findings suggested that targeted interventions aiming to reduce depression, improve acculturation stress management skills, and utilize social capital are needed to reduce SRB among rural-to-urban migrants.

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### Introduction

#### Sexual Risk Behaviors and Depression

Sexual risk behaviors, such as commercial sex, multiple sexual partners, casual sex, and unprotected sexual intercourse, are closely associated with depression, and their relationships have been documented in the literature from both Western and Chinese contexts (Cai et al., 2013; Lehrer et al., 2006). In the United States, sexually active adolescents who had serious depressive symptoms at the baseline were more likely than those with mild depressive symptoms to participate in sexual risk behaviors over the course of one-year

follow-up (Lehrer et al., 2006). Men who have sex with men (MSM) with depressive symptoms were more likely to have more sexual partners in the past six months (Perdue et al., 2003). A similar relationship was found in rural-to-urban migrants. Migration stress was related to involvement in sexual behaviors with high-risk partners (e.g., sex workers, casual partners), and this relationship might be exacerbated by poor mental health (e.g., depression, anxiety) (Yu et al., 2017). However, few studies have investigated factors that could possibly moderate this positive relationship. Research on these moderating factors may provide additional insights into how to develop interventions for reducing sexual risk

behaviors among rural-to-urban migrants in upper- and middle-income countries such as China.

**HIV epidemic in China and association with migration.** China is facing a growing epidemic of HIV/AIDS. The reported cases of people living with HIV/AIDS (PLWH) has continued to increase from 307,000 in 2010 to 820,756 in 2018 (Burki, 2018; National Health and Family Planning Commission of People's Republic of China, 2015). The primary route of HIV infection has shifted from injection drug use and unhygienic blood donation to sexual contacts (Burki, 2018). Of the newly reported diagnoses each year, the percentage of sexually transmitted cases increased from 33.1% in 2006 to 92.2% in 2014 (National Health and Family Planning Commission of People's Republic of China, 2015). The majority of the newly reported cases at high risk were migrants (Kaiser Health News, 2008; Li et al., 2004). For example, among the 5,635 HIV/AIDS cases reported in Beijing in 2008, nearly 75% of them were rural-to-urban migrants, although migrants accounted for only about 27.4% of the population in Beijing in 2008 (Kaiser Health News, 2008).

**Health risk among rural-to-urban migrants in China.** The rapid growth in the economy and modernization in China has attracted more than 200 million rural-to-urban migrants (China National Bureau of Statistics [CNBS], 2016; Li et al., 2004). Most of them are low-educated and have limited knowledge of HIV and sexual transmitted infections (STI) (Li et al., 2004). Additionally, many migrant workers experience financial and job-related difficulties, poor living conditions, and feelings of loss in social networks in urban areas (Li & Rose, 2017; Wong et al., 2008). These migration-related stressors may increase the risks of mental health problems and proneness to adopting sexual risk

behaviors to cope with these problems, which may increase their risk of HIV/STI. One study in Jiangsu province found that migrant MSM were more likely to have condomless anal intercourse and report having a higher prevalence of HIV than those from urban areas (Chen et al., 2017).

Depression is one of the most prevalent mental health problems among rural-to-urban migrants (Qiu et al., 2011). Due to the existing household registration system in China, migrant workers have had difficulty obtaining urban household registrations (*hukou*) permanently when moving from rural areas to urban centers (Zhang, 2001). Lacking urban *hukou* often induces discrimination against rural-to-urban migrants and puts them at risk of depression (Goodkind & West, 2002). For example, Wang et al. (2010) found that social stigma and discrimination in daily life were associated with greater levels of mental health problems (e.g., depression and anxiety) among rural-to-urban migrants in China.

Migrant workers also face challenges to adapting to the urban culture and reconstructing their social capital in migration destinations. In addition to urbanicity, as compared to the heritage culture, rural-to-urban migrants need to adapt to urban mainstream culture, such as the dialect, social life, and sexual culture. Reconstructing social capital in migration destinations could increase migrants' social network and social interactions, which may help them adapt to the urban mainstream culture, utilize social resources, and manage their acculturation stress. Based on the social capital theory, social capital refers to the social network possessed by an individual and the set of resources embedded within their network. It could be defined through structural, relational, and cognitive dimensions (Chiu et al., 2006; Nahapiet & Ghoshal, 1998). Social

interaction and ties are used to reflect the structural dimension while social trust is used to reflect the relational dimension (Chiu et al., 2006; Nahapiet & Ghoshal, 1998). The cognitive dimension was manifested as shared social norms and culture.

Existing literature has suggested potentially different roles of acculturation and social capital in moderating the relationship between depression and sexual risk behaviors (Berry, 1997; Lara et al., 2005). On one hand, migrant workers with higher levels of acculturation may have less acculturation stress, which may reduce their risks of mental health problems and sexual risk behaviors (Lara et al., 2005). On the other hand, more acculturated migrants may have worse behavioral outcomes due to the deterioration of original cultural, social, and familial norms, as well as the increased exposure to risk networks in urban areas (Du & Li, 2015; Prado et al., 2009).

### **Research Aims and Hypotheses**

To address the knowledge gaps in literature, this study aims to examine the roles of acculturation and social capital in the relationship between depression and sexual risk behaviors among rural-to-urban migrants in China. We hypothesized that: 1) depression would be positively associated with sexual risk behaviors; 2) both acculturation and social capital could moderate the positive relationship between depression and sexual risk behaviors, but such moderating effects might vary by the levels of depression among migrants. The overall goal of this study is to provide more evidence for developing interventions to reduce mental health problems and sexual risk behaviors among rural-to-urban migrants.

## **Methods**

### **Data Source and Study Sample**

Data for the current study were derived from the baseline survey of a theory-based HIV behavioral intervention project in Beijing, China from 2011 to 2012 (Li et al., 2014). The primary goal of the intervention study was to increase condom use and reduce HIV risk among young rural-to-urban migrants.

The sampling and recruitment procedures are described in detail elsewhere (Li et al., 2014). Briefly, a venue-based sampling approach was employed to recruit young rural-to-urban migrants from the workplaces (e.g., shops, offices, and factories), migrant settlements, streets, and job markets. The inclusion criteria were migrants: a) 18 through 30 years of age; b) without a permanent household registration; c) having been in Beijing for at least 3 months; d) being unmarried or if married, not living with their spouse in Beijing; and e) sexually active (e.g., had one or more sexual partners in Beijing). Exclusion criteria included unwillingness to be randomized to either of the intervention conditions. Initially, a total of 660 rural-to-urban migrants were recruited but 19 of them were excluded from the program evaluation because they reported an age older than 30 years on the survey although they were identified as younger or equal to 30 during the initial screening, resulting in a sample of 641 young migrants in the study.

The questionnaire was administered one-on-one or in small migrant groups in private settings in the community. Interviewers began with describing the purpose of the assessment, reassuring confidentiality, and briefly instructing on how to mark answers

on the questionnaire. The interviewers provided assistance during the survey upon request. Upon the completion of the survey, each participant received a small gift equivalent to 2 U.S. dollars as a token of appreciation for their participation. The study protocol was approved by the Institutional Review Boards at both Wayne State University in the United States and Beijing Normal University in China.

## Measures

### **Socio-demographic characteristics.**

Participants provided information on their socio-demographic characteristics including age, gender, ethnicity (Han or non-Han), marital status (unmarried, unmarried but cohabitating, married, and divorced/widowed/separated), years of being migrant workers in Beijing, years of education, monthly income in Chinese currency Yuan (CNY), frequency of home visit (at least once every six months, once a year, once every two years, once every three or more years, and never), and self-reported health status (very good, good, fair, poor, and very poor).

**Sexual risk behaviors.** Sexual risk behaviors were assessed using a checklist of 13 sexual behaviors such as seeking partners online, multiple sexual partners, commercial sex, or sex with casual partners (Li et al., 2004; Wang et al., 2007). Participants reported how often they have engaged in these sexual behaviors in the past six months (0 = never, 1 = occasional, 2 = at least once every month, 3 = at least once every week, 4 = almost every day). The sum of the responses to 13 items ranging from 0-42 was used as a composite score, with a higher score indicating more sexual risk behaviors in the past six months. This checklist had good reliability in the study sample (Cronbach alpha = .97).

**Depression.** Depression was measured using the Chinese version of the Center for Epidemiological Studies Depression Scale (CES-D). The CES-D is a 20-item scale that measures various depressive symptoms (e.g., “bothered by things that don’t usually bother me”, “did not feel like eating”). Participants were asked the frequencies with which they experienced each of the symptoms during the last week. Items were scored from zero (less than one day) to three (five to seven days). The total score ranged from 0 to 60 with a higher score indicating a greater level of depression. The CES-D scale has been widely used with adequate validity and reliability in the Chinese populations (Zhang & Norvilitis, 2002). The Cronbach alpha of the scale for the current study sample was .90.

**Acculturation.** Acculturation was measured using the Sociocultural Adaptation Scale (SCAS). SCAS is a 20-item scale which has been shown to have good validity among Chinese migrants (Du et al., 2015). Rural-to-urban migrants were asked to indicate the levels of difficulty experienced (e.g., “talking about yourself with locals”, “using public transportation”, “looking for job”) when they lived in urban areas, using a five-point scale (1 = not difficult at all; 2 = not difficult; 3 = moderate difficult; 4 = difficult; 5 = extremely difficult). With appropriate recoding, total score was used as a composite score ranging from 1 to 100, with a higher score indicating a greater level of acculturation in Beijing. The Cronbach alpha of the SCAS for the current study sample was .94.

**Social capital.** Social capital was assessed with a 14-item scale in three domains including trust (social trust with local residents), norm (perceived generalized norms and neighborhood connection), and interaction (social interaction with local residents) (Chiu et al., 2006). Four items (Cronbach alpha = .75)

were used to measure trust (e.g., “When you encounter difficulties in Beijing, who is willing to help you?”) on a four-point scale (1 = no friends anywhere; 2 = people from hometown; 3 = migrants from other places; 4 = Beijing local residents). Higher scores on these items indicate more trust in Beijing. The summed score of five items (Cronbach alpha = .63) was used to measure perceived generalized norms and neighborhood connections (e.g., “In your neighborhood, how well do people get along with each other?”) with response options ranging from 1 (not well at all) to 4 (very well). Higher values indicated that migrants tended to conform to the norm of reciprocity and establish more neighborhood connections in Beijing. Social interaction was measured with five items (e.g., “Who is most likely to join you in leisure activities?” Cronbach alpha = .80). Participants answered the items on a five-point scale (1 = never participate in these activities; 2 = family or relatives; 3 = people from hometown; 4 = migrants from other places; 5 = Beijing local residents). Higher values on these items indicated more social interactions in Beijing. The social capital scale and its subscales have shown good validity and reliability among rural-to-urban migrants (Du et al., 2016). The summed score of these three domains ranging from 14 to 61 was used as the composite score of social capital.

### Data Analysis

First, descriptive statistics were reported on sociodemographic characteristics (e.g., age, gender), sexual risk behaviors, depression, acculturation, and social capital. *Mean* and *standard deviation (SD)* were used to describe continuous variables (e.g., age, years of being migrant workers in Beijing), and *frequencies* and *percentages* were used to describe categorical variables (e.g., gender, health status). In the current

study, missing values were handled by multiple imputation for all variables except the dependent variable (e.g., sexual risk behaviors).

Second, bivariate analyses were performed to examine the associations of sexual risk behaviors with socio-demographic characteristics, depression, acculturation, and social capital. Wilcoxon rank-sum tests were used to examine the relationships between sexual risk behaviors and categorical variables. Spearman correlation analyses were performed to examine the associations between sexual risk behaviors and continuous variables. Correlation analyses were conducted to explore the associations among sexual risk behaviors, depression, acculturation, and social capital.

Third, linear regression analysis was conducted to examine the research hypotheses with sexual risk behaviors as the dependent variable and three key variables (depression, acculturation, and social capital) as independent variables (Baron & Kenny, 1986). Covariates with *p* less than or equal to .20 in bivariate analysis were included in the regression model to adjust for potential confounders. Two-way interaction terms between depression and two potential moderators (i.e., depression × acculturation; depression × social capital) were added to the regression model. These variables were centralized before the creation of interaction terms. For any significant interaction terms, simple slope analyses were performed to interpret the interactions. All of the analyses were performed using SAS software version 9.4 (SAS Institute, Inc., Cary, NC, US).

## Results

### Descriptive Statistics

Participants’ sociodemographic characteristics are shown in Table 1. The average

age of the participants were 24.1 years ( $SD = 3.3$ ) with a range from 17 to 30 years. More than half of the individuals were male (58.7%, 376/641) or unmarried (60.4%, 387/641). The average years of being migrant workers in Beijing and education were 3.6 ( $SD = 2.5$ ) and 10.1 ( $SD = 2.5$ ), respectively. About two-thirds (61.2%, 392/641) of the participants visited their

hometown once a year. More than two-thirds (77.9%, 499/641) of the migrants reported being in good health status. The mean score of sexual risk behaviors was 2.0 ( $SD = 6.0$ ). The mean scores of depression, acculturation, and social capital were 14.8 ( $SD = 7.1$ ), 78.5 ( $SD = 14.4$ ), and 34.4 ( $SD = 6.0$ ), respectively.

Table 1

*Descriptive Statistics and Bivariate Analyses of Sexual Risk Behaviors Among Young Rural-to-urban Migrants*

Variables	Total (%)	SRB		<i>p</i>
		Mean (SD)	<i>r</i>	
Sample size (%)	641 (100.0)	-	-	-
<i>N</i> (%)	620 (96.7)	2.0 (6.0)		-
Age (Mean, SD)	24.1 (3.3)		-.02	.68 <sup>a</sup>
Gender (%)				<.01 <sup>b</sup>
Male	376 (58.7)	2.4 (7.1)		
Female	265 (41.3)	1.3 (3.7)		
Ethnicity (%)				.17 <sup>b</sup>
Han	615 (95.9)	2.0 (6.0)		
Non-Han	26 (4.1)	2.2 (5.2)		
Marital status (%)				.46 <sup>b</sup>
Unmarried	387 (60.4)	1.5 (4.6)		
Unmarried but cohabitating	47 (7.3)	1.8 (3.9)		
Married	205 (32.0)	2.9 (8.2)		
Divorced, widowed, or separated	2 (.3)	0.0 (.0)		
Years of being migrant workers in Beijing (Mean, SD)	3.6 (2.5)		-.02	.66 <sup>a</sup>
Years of education (Mean, SD)	10.1 (2.5)		-.03	.48 <sup>a</sup>
Mean monthly income in CNY (Mean, SD)	2423.5 (1185.8)		.05	.23 <sup>a</sup>
Frequency of home visit (%)				.21 <sup>b</sup>
At least once every 6 months	159 (24.8)	2.1 (5.6)		
Once a year	392 (61.2)	2.1 (6.5)		
Less than once a year	90 (14.0)	1.0 (3.5)		
Health status (%)				.47 <sup>b</sup>
Very good	264 (41.2)	2.4 (6.6)		
Good	235 (36.7)	1.8 (5.8)		
Fair	123 (19.1)	1.5 (4.7)		
Poor or very poor	19 (3.0)	1.8 (6.1)		

Note. SRB: Sexual risk behaviors; <sup>a</sup> Spearman correlation analysis; <sup>b</sup> Wilcoxon rank-sum test; SD: Standard deviation. CNY; Chinese currency Yuan.



## Bivariate Analyses

The bivariate relationships of sexual risk behaviors with sociodemographic characteristics are also shown in Table 1. Results indicated that none of the demographic characteristics was associated with sexual risk behaviors except gender, with male migrants reporting more sexual risk behaviors than their female counterparts. The correlation matrix (Table 2) shows that acculturation was significantly associated with depression ( $r = -.26$ ) and social capital ( $r = .14$ ), while social capital was not significantly related to depression ( $r = .02$ ).

## Regression Analysis

With the inclusion of three covariates (gender, monthly income, ethnicity), the final regression model explained 27.44% of the variance in sexual risk behaviors ( $F [8, 611] = 28.88, p < .001$ ). As shown in Table 3, gender and monthly income were significantly associated with sexual risk behaviors. Depression was positively associated with sexual risk behaviors ( $Std.\beta = .26, p < .001$ ), indicating that migrants with higher level of depression were more likely to participate in sexual risk behaviors.

Table 2

### Correlation Matrix

	SRB	Acculturation	Social capital	Depression
SRB	1.00			
Acculturation	-.21***	1.00		
Social capital	.05	.14***	1.00	
Depression	.21***	-.26***	-.02	1.00

Note. SRB: Sexual risk behaviors; \*\*\*:  $p < .001$ .

Table 3

### Linear Regression of SRB

Variables	$\beta$	95%CI	Std. $\beta$	SE	$p$
Gender	-1.35	-2.18 ~ -.52	-.11	.43	<.01
Monthly income	.51	.11 ~ .92	.09	.21	.01
Ethnicity	-.84	-2.90 ~ 1.22	-.03	1.05	.42
Depression (D)	1.56	1.08 ~ 2.05	.26	.25	<.01
Social capital (S)	.39	-.02 ~ .81	.07	.21	.07
Acculturation (A)	-.79	-1.23 ~ -.34	-.13	.23	<.01
D*S	1.03	.61 ~ 1.44	.17	.21	<.01
D*A	-1.09	-1.46 ~ -.71	-.22	.19	<.01

Note. SRB: Sexual risk behaviors; SE: Standard error; D\*S: Interaction term between depression and social capital; D\*A: Interaction term between depression and acculturation.

Both interaction terms of depression with acculturation and social capital were statistically significant ( $Std.\beta = -.22$ ,  $p < .001$  for acculturation;  $Std.\beta = .17$ ,  $p < .001$  for social capital). Further simple slope analysis indicated that acculturation played a protective role in relation to sexual risk behaviors among migrants with a higher level of depression but such a protective role

was not seen among migrants with a lower level of depression (Figure 1).

Simple slope analysis revealed that social capital played a protective role in relation to sexual risk behaviors among migrants with low levels of depression. However, social capital became a risk factor among migrants with a higher level of depression (Figure 2).

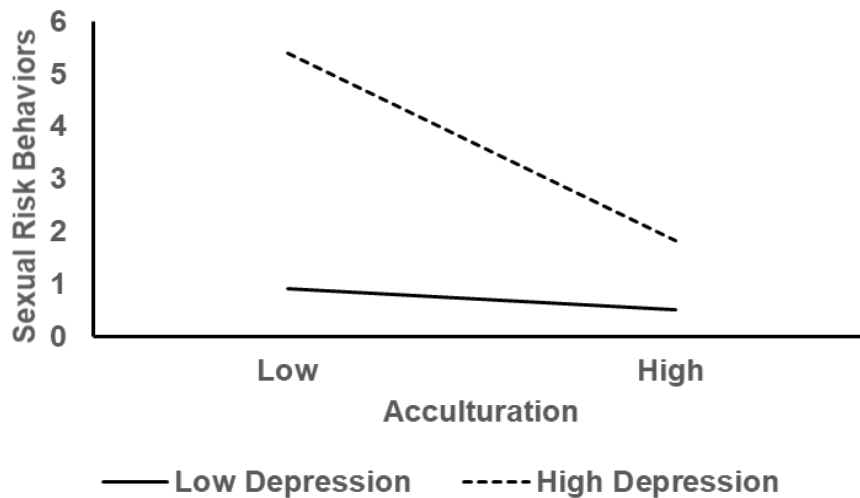


Figure 1. Interaction between depression and acculturation in predicting sexual risk behaviors. Note. Higher and lower are defined as the values above or below the mean, respectively.

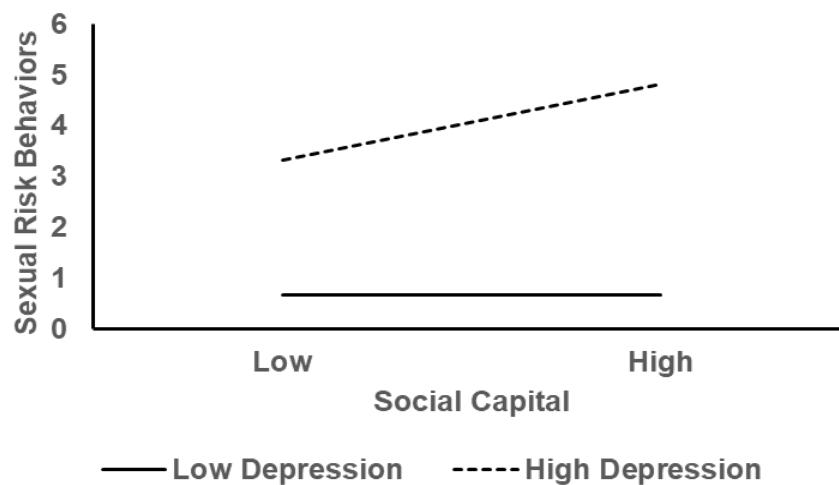


Figure 2. Interaction between depression and social capital in predicting sexual risk behaviors. Note. Higher and lower are defined as the values above or below the mean, respectively.

## Discussion

The current study aims to examine the association between depression and sexual risk behaviors, as well as the moderating effects of acculturation and social capital among young rural-to-urban migrants. Findings of this study showed that depression was positively associated with sexual risk behaviors. Both acculturation and social capital moderated the relationship between depression and sexual risk behaviors but their roles differed by the levels of depression among migrants. Among migrants with low levels of depression, acculturation could not moderate the impact of depression on sexual risk behaviors while social capital could alleviate this relationship. In contrast, among migrants with high levels of depression, acculturation could alleviate the effect of depression on sexual risk behaviors while social capital showed a reverse pattern. To the best of our knowledge, this is one of the first studies to explore the moderating effects of acculturation and social capital and their differential roles in the relationship between depression and sexual risk behaviors among young rural-to-urban migrants. Additionally, the findings in this study support the impacts of depression on risk behaviors in other research areas, such as substance use (Turner et al., 2011).

Depression was positively associated with sexual risk behaviors among rural-to-urban migrants, and this finding was consistent with previous studies (Clum et al., 2009; Lehrer et al., 2006; Perdue et al., 2003). Due to the migration-related stressors and discrimination from household registration status, rural-to-urban migrants suffer from emotional distress and social isolation (Li & Rose, 2017; Wong et al., 2008). Thus, these individuals are more likely to engage in sexual risk activities (Lehrer et al., 2006). Additionally, migrants

who are emotionally distressed and socially isolated may be more likely to participate in substance abuse, which in turn may increase their likelihood of displaying sexual risk behaviors (Lin et al., 2005). An existing study found that compared with non-intoxicated participants, migrants with alcohol intoxication in the last month were more likely to report higher levels of depression and more sexual risk behaviors (e.g., multiple sexual partners, commercial sex) (Lin et al., 2005). Finally, the rural-to-urban migration might also increase the opportunities for partaking in sexual risk behaviors among migrants and confound the findings in this study. Future research is needed to compare the difference in sexual risk behaviors between migrants in urban areas. This difference should be controlled in the data analysis.

Acculturation might be a protective factor against sexual risk behaviors among migrants with high levels of depression. When some rural-to-urban migrants suffer from high levels of depression in the urban areas, higher levels of cultural adaptation may assist them in reducing acculturation stress and enable them to have more positive coping strategies (Guilamo-Ramos, Jaccard, Pena, & Goldberg, 2005; Sánchez, Rice, Stein, Milburn, & Rotheram-Borus, 2010; Vega, Zimmerman, Gil, Warheit, & Apospori, 1997). For instance, Sánchez et al (2010) found that HIV positive Latinas with high levels of acculturation but low levels of acculturation stress were less likely to display negative coping behaviors (e.g., sexual risk behaviors, substance use). Instead, they may have more positive coping actions, such as reduction in tobacco or alcohol use. However, for migrants with low levels of depression, the protective role of acculturation in the relationship between depression and sexual risk behaviors was not seen. This might be the result of a reduced need for coping with depression among

these individuals. Future studies are needed to confirm the findings regarding the different roles of acculturation in this relationship among migrants.

Social capital also moderated the positive relationship between depression and sexual risk behaviors. Indeed, it showed a protective role among rural-to-urban migrants with low levels of depression but became a risk factor among migrants with high levels of depression. The most likely reason for this differential effect may be that among migrant workers with low depression, while their needs to cope with depression was low, they may make the effort to utilize social capital in the urban areas to develop more social relationships and interactions with local residents (Chen et al., 2011; Hong et al., 2006). However, for migrants with high levels of depression, these social connections may facilitate the increased engagement in sexual risk behaviors such as commercial sex or casual sex as a means of maladaptive coping with depression (Chen et al., 2011; Hong et al., 2006).

To reduce the sexual risk behaviors among young rural-to-urban migrants, targeted interventions to reduce depression, help them cope with acculturation stress, and teach them to utilize social capital for sexual risk reduction are warranted. Living and working in the urban areas, migrant workers may experience many migration-related stressors as well as discrimination due to their migration status (Zhang, 2001). Additionally, in the process of adapting to the urban culture, migrants may suffer from acculturation stress (Berry, 1997; Lara et al., 2005). All of these stresses may increase the risks of depression. Meanwhile, the levels of depression may affect the roles of acculturation and social capital in the involvement in sexual risk behaviors. Thus, to reduce depression among rural-to-urban migrants, psychological counseling and interventions are needed to help rural-to-

urban migrants cope with stress and integrate into the urban society (Wang et al., 2010). Moreover, to adapt to the urban society, migrants need to reconstruct their social capitals in migration communities (Wang et al., 2010). Migrants with high levels of social capital may have more social relationships and interactions with local residents. Therefore, to reduce their sexual risk behaviors, future intervention strategies should utilize migrants' social capital for better education about HIV/STI, as well as better access to HIV intervention programs, including reduction of sexual risk behaviors and promotion of safe sexual practices (e.g., condom use).

This study has several limitations. First, a causal inference cannot be warranted with the cross-sectional data. Second, all outcome measures were self-reported and might be subjected to the self-reported bias. Third, the measurement of social capital had moderate reliability (Cronbach alpha = .63 for the "perceived generalized norms and neighborhood connections" subscale), which might threaten the internal validity of the findings. Fourth, the data were collected in 2010. Although we do not anticipate significant changes in the underlying relationship among the study variables, caution is needed when interpreting the results from this study. Finally, participants were young and sexually active migrants who were recruited from one urban district in Beijing. Therefore, the participants in this study might not be representative of all migrants in Beijing, nor those from other regions in China. Caution should be taken when generalizing results from the current study to migrants of other age groups or those from other locations.

Despite these limitations, the current study found that depression was positively correlated to sexual risk behaviors. Both acculturation and social capital played moderating roles on this relationship among

rural-to-urban migrants. This study provided an insight into how acculturation and social capital interacted with depression in predicting involvement in sexual risk behaviors, and how the roles of acculturation and social capital varied by the levels of depression among migrants. Targeted interventions that focus on reducing depression, increasing stress management skills, and utilizing social capital are needed to improve mental health and to reduce sexual risk behaviors among rural-to-urban migrants.

### Acknowledgements

The authors wish to thank all participants who gave of their time for the current study, and the reviewers for their helpful comments. This study was supported by the National Institute of Health (NIH) Research Grant R01NR10498 by the National Institute of Nursing Research and National Institute of Mental Health. The authors have no conflicts of interest to report, financial or otherwise.

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