



Research article

Effects of social support and depression on problematic drinking among trauma-exposed Chinese adults: A population-based study

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ABSTRACT

Background: Alcohol consumption is prevalent and alcohol-related problems are a considerable social issue in China. Over 17% of Chinese consume alcohol regularly. Exposure to potentially traumatic events (PTE) is associated with increased alcohol-related problems. Social support often buffers this association. This study examined the relationship between exposure to PTE and alcohol misuse and explored the moderating effect of social support on this relationship in a Chinese context.

Methods: Data were collected through face-to-face computer assisted interviews in a stratified cluster sample of 753 Chinese adults living in Guangzhou, China. The Life Events Checklist-5 (LEC-5), World Health Organization Alcohol Use Disorders Identification Test (WHO-AUDIT), and Social Support Rating Scale (SSRS) were used to measure trauma exposure, problematic alcohol use, and social support.

Results: Univariable logistic regression analyses indicated that trauma exposure (OR = 3.18; compared to non-exposure), increased depression (OR = 1.06), and perceived friend support (OR = 1.21), were associated with higher odds of problematic drinking. Multivariable models adjusting for potential confounders demonstrated that PTE and depression were associated with problematic drinking, but this was not the case for perceived friend support. Perceived friend support modified the effect of trauma exposure and was associated with increased odds of problematic drinking among those who reported high levels of depressive symptoms.

Conclusion: Social support may not always be a beneficial resource among those who experienced PTEs in a Chinese context. Further research is needed to better understand the role and function of different types of support, and for whom these associations are beneficial.

1. Introduction

1.1. Stress-buffering of social support

Over the past decades, the buffering effect of social support against alcohol and substance abuse has drawn research and clinical attention. Social support is generally defined as the provision of aid by various social network members. A large body of literature suggests higher level of social support may mitigate or “buffer” the maladaptive behavioral outcomes among individuals exposed to stress, such as alcohol use disorder and substance abuse (Cohen, 2004; Moak and Agrawal, 2010; Tang et al., 2011). This buffering effect, which is known as the stress-buffering hypothesis, has been studied extensively in the Western culture. Current research on social support buffering against negative mental or

behavioral health outcomes has examined the construct from different aspects, including objective (or enacted) support (i.e., instrumental aids that are tangibly received), subjective (or perceived) support (i.e., perceived provision of support that satisfies emotional and other needs), and source of support (e.g., parents, friends, significant other, caregiver, etc.) (Dai et al., 2016; Hall et al., 2016; Ke et al., 2010; Ma et al., 2011). Research findings indicate greater subjective support buffers the negative health outcomes among individuals exposed to traumatic events or greater psychosocial stressors (Mitchell et al., 2014; Mossakowski and Zhang, 2014). In contrast, some studies have found that objective support seems to have no buffering effect or even have negative effect on mental health (Cranford, 2004; Uchino, 2009). Researchers have suggested although objective social support may enhance the coping effect through provision of practical resources, this type of support can also create

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indebtedness and guilt which deteriorates the psychosocial distress of the support receivers and therefore reduces its potential of stress buffering (Bolger and Amarel, 2007; Gleason et al., 2008). In a longitudinal study conducted by Stappenbeck and colleagues (2015), daily associations between greater alcohol consumption and lower subjective social support was found among college women with a history of sexual assault and recent heavy drinking. Another study explored the role of social support in response to posttraumatic stress disorder (PTSD) symptoms and alcohol misuse also found that the type of social support one receives could have different effects on the support recipient's drinking behavior (Bachrach and Read, 2017).

Although perceived social support has been shown to have beneficial effects on substance misuse in some literature, other studies indicated inconsistent results. Aldridge-Gerry et al. (2011) suggested that the stress buffering effects of perceived social support might differ in relation to culture, which could have a strong impact on how people utilize alcohol and how drinking behavior is evaluated in a social context (see Taylor et al., 2004). However, social support may be associated with increased problematic drinking in Western or other cultural settings (Åslund and Nilsson, 2013; Seid et al., 2016; Tutenges and Sandberg, 2013), especially in the context of traumatic exposure (Boscarino et al., 2006; Gros et al., 2016; Ma and Smith, 2017). Trauma survivors might seek social interactions through social drinking (Nie et al., 2018), whereas it is also possible that problematic drinkers tend to have fewer social resources and need to rely on avoidance coping strategy when experiencing psychological distress (Tucker et al., 2005). These findings shed light on the idea that the distress-mitigating function of social support may likely be heavily context-based, and the conditions for the "buffering effect" on alcohol misuse to take place remain undefined.

1.2. Problematic drinking in China

Alcohol misuse is among the leading causes of disability as well as a major risk factor of noncommunicable diseases in China (Lin et al., 2017; Wu et al., 2018; Yang et al., 2016; Zhao et al., 2017). Over the past three decades, Chinese alcohol consumption has increased remarkably (World Health Organization, 2014). As of 2014, the prevalence of heavy episodic drinking in China was 34.7% for men and 17.8% for women (Im et al., 2019). With a profound history of drinking habits, alcohol plays an important role in Chinese culture. Traditionally, from celebrative to festive drinking to drinking for recreational purposes, use of alcohol is deemed as an essential element in Chinese customs regardless of socio-economic positions (Hao and Young, 2000). In China, consuming alcoholic beverages represents happiness, masculinity, austerity, and good fortune (Hao et al., 2005). Drinking often serves as a social activity in which social messages and sentiments are shared within the group. It is widely accepted in the society and people are encouraged to drink in various social contexts (Cochrane et al., 2003). In recent years, due to the rapid development and urbanization in China (Hall et al., 2019), alcohol consumption has become a major tool to facilitate relationships with commercial partners, supervisors, or colleagues (Hao and Young, 2000). Drinking is often utilized for instrumental purposes in social gatherings and work relationships (Cheng et al., 2017; Liu et al., 2015). According to a previous study, over 65% of Chinese drinkers consume alcohol for social reasons, whereas less than one-third of drinkers drink for psychological reasons, such as coping with distress or restlessness (Hao et al., 2001). The general public even considers moderate drinking to be beneficial to health and an enhancement of social atmosphere (Qian et al., 2015). These findings give insights into the possibility of a bidirectional positive relationship between alcohol consumption and social support in China, in which not only does social support increase alcohol misuse, alcohol may also be utilized as a means to acquire social support in Chinese societies.

1.3. PTE and alcohol consumption

One potential contributing factor of problematic drinking is previous exposure to potentially traumatic event (PTE), which is associated with alcohol use disorder, as evidenced by literature across cultures (Kane et al., 2014; Ruan et al., 2017; Wu et al., 2008). A recent study found childhood traumatic experiences among Chinese are associated with higher level of alcohol consumption as well as depressive symptoms in adulthood (Chang et al., 2019). Unpleasant feelings evoked by stressful situations may be reduced by alcohol consumption, and the pattern of use may be negatively reinforced (Carpenter and Hasin, 1999; Linden et al., 2012; Wiers, 2008).

Although exposure to trauma might have a direct effect on problematic drinking, the relationship may be moderated by certain social determinants. Subjective social support, as opposed to received or objective social support, may buffer against the negative effects of PTE exposure (Santini et al., 2015). Another study conducted by Segrin et al. (2016) using structural equation modeling suggests that subjective friend support helps to abate problematic drinking through reducing psychological distress. Although the social context of alcohol consumption and problematic drinking has been studied extensively in both Western and Chinese cultures (Brooks and Obasi, 2018), the buffering function of social support on adverse effects of traumatic exposure remains unclear in a culture which social support and alcohol consumption may be bidirectionally related.

1.4. Overview of current study

The present study aimed to assess the role of subjective social support on the association between PTE exposure and problematic drinking in China. To our knowledge, most studies in China that examined the relationship between PTE exposure and alcohol use focused on a particular traumatic event (e.g., Wu et al., 2008; Zhao et al., 2009). Research that incorporates other traumatic events like physical assault, fatal illness, or serious accident and its relationship with alcohol misuse in adulthood has not yet been explored. To examine the association between a comprehensive measure of PTE exposures and problematic drinking, we first hypothesized that PTE exposure would be associated with increased alcohol misuse. Second, based on the stress-buffering hypothesis, which states subjective social support would be protective against the effects of traumatic life events, we hypothesized that subjective social support would moderate the association between PTE exposure and alcohol misuse. Research has shown depression, PTE exposure, and alcohol misuse are positively associated, and that higher level of depression is association with greater alcohol consumption among those who are exposed to PTE (Massey et al., 2015; Ruan et al., 2017; Unger et al., 2001). Depression has been shown to moderate the buffering effect of social support on alcohol (e.g., Pauley and Hesse, 2009); yet little is known about this role of depression in the context of Chinese culture. Whether depression triggers the need for social support, or perceived social support is obtained through drinking when depression is present, the role of depression on PTE-related maladaptive health behavior is yet to be explored. Consequently, to investigate the triggering role of depression on the buffering effect, we examined whether higher level of depressive symptoms would reduce the stress buffering role of subjective social support among those who reported trauma exposure.

2. Methods

2.1. Participants and procedure

Data were collected in two districts – Yuexiu and Tianhe – in Guangzhou, China from May 2014 to October 2014 utilizing stratified cluster sampling method. Participants aged from 18 to 59 ($N = 753$;

median = 30, IQR = 16). Data collection involved face-to-face interviews in households, in which the interviewer was assisted by an electronic tablet device when completing the survey. All interviews were conducted in either Cantonese or Mandarin, the two most commonly spoken languages in the region.

Using spatial epidemiological methods, we first utilized geographic information system (GIS) to randomly select a number of locations with the precise longitude and latitude within the two districts in Guangzhou. We used Google Earth to select the nearest residential building for every randomized location. From each selected residential building, only one participant was recruited in order to minimize the potential correlation among participants. For multi-story buildings (with multiple floors and households), the interviewers randomly selected a floor and a household by using a random number generator on their cell phone. In cases which there were more than one person within a household, individuals with the earliest birthday date were selected for the interview. If there was no one in the household, we would make three additional visits before we moved to the next random household. We would proceed to the next random household only if there was no eligible participant in the household or if the eligible participant refused to conduct the interview. Participants were briefed and informed consent was obtained prior to any data collection. Sensitive items such as mental health related questions were completed independently by participants on tablet devices, with the assistance from the interviewers as needed. After completing the interview, the participants were given 50 RMB (\$8 USD) prepaid mobile phone card for remuneration. A total of 753 completed surveys were acquired among the 1215 attempted surveys, with 12 partial completions, 82 uninhabited locations, and 368 refusals, resulting a response rate of 62%. The study protocol was approved by the institutional review board of the University of North Carolina.

3. Measures

3.1. Alcohol consumption and misuse

The Alcohol Use Disorders Identification Test (AUDIT) was used to measure alcohol consumption (Babor et al., 2001). It consists of 10 items measuring three aspects of alcohol consumption: frequency and quantity of alcohol consumption, drinking behavior and alcohol dependence, and harm associated with alcohol consumption. Each item has a response range from 0 to 4. The total score of the scale ranges from 0 to 40. This study used the cutoff score of 8 to identify problematic drinkers as suggested by previous validation studies of the Chinese version of this scale, which had shown excellent psychometric properties (Leung and Arthur, 2000; Tsai et al., 2005).

3.2. Depression

The Patient Health Questionnaire (PHQ-9) is a self-report questionnaire used to assess depressive symptoms (Kroenke et al., 2001). Consisting of nine items rated from 0 (*not at all*) to 3 (*nearly every day*), the total score of the scale ranges from 0 to 27. Higher total score indicates higher depression symptom severity. Depressive symptoms that occurred in the past two weeks were assessed. High internal consistency reliability had been demonstrated for the Chinese version of this scale among the general population in China (Wang et al., 2014). The Cronbach's alpha was 0.87 in the current study.

3.3. Social support

The Social Support Rating Scale (SSRS) is a scale specifically designed to measure social support among the Chinese population (Xiao, 1999). It consists of 10 items that measure three aspects of perceived social support: subjective support (emotional), objective support (instrumental),

and support-seeking behavior. The total score ranges from 12 to 66, with higher scores indicating better perceived social support. In this study, four types of social support were measured using SSRS: subjective family support, objective family support, subjective friend support, and objective friend support. The original scale was developed in Chinese with internal consistency reliability of 0.89 and test-retest reliability of 0.92 (Xiao and Yang, 1987); other studies conducted in China that used the SSRS also demonstrated excellent psychometric properties (Cheng et al., 2008; Xiao and Yang, 1987).

3.4. Potentially traumatic event

Life Events Checklist-5 (LEC-5) is a self-report questionnaire used to measure the level of exposure to traumatic events (Weathers et al., 2013). The scale consists of 17 items, each of which indicates a specific event, such as natural disaster (e.g., flood, hurricane, tornado, and earthquake), sudden accidental death, or any other traumatic event which was not captured by the given events. Response choices for each item indicate different level of exposure to the event, including "Happened to me," "Witnesses it," "Learned about it," "Part of my job," "Not sure," and "Doesn't apply." In this study, the level of traumatic event exposure was categorized into exposure group and non-exposure group within the last 12 months.

3.5. Demographic characteristics

Some demographic characteristics may also play a role in alcohol consumption. For example, among the Chinese population, males are more likely to have drinking problems compared to females (World Health Organization, 2011). Demographic characteristics including age, sex, marital status, ethnicity, education level, employment status, personal income, and migrant status were obtained.

4. Statistical analysis

Stata software version 15 (Stata Corp, 2017) was used for analysis. Chi-square tests, rank sum tests, and logistic regression were used for univariable analysis. Multivariable adjusted logistic regression analyses were used to explore the relationships and derive the odds ratio associated with each predictors relative to the reference group of non-problematic drinkers: First, demographic characteristics, PTE exposure, and subjective social support were analyzed in Model 1; then the interaction of PTE exposure and subjective social support was added in Model 2; finally, in Model 3, a three-way interaction between PTE exposure, subjective social support, and depression was added.

5. Results

Two participants were removed from analysis due to missing data. Table 1 shows the demographic characteristics of our sample stratified by alcohol use disorder status (cutoff score of 8 on the AUDIT test). Compared to the non-problematic drinking group, there were significantly more men than women ($\chi^2 = 46.40, p < .001$) and more people with past personal exposure to one or more traumas ($\chi^2 = 21.88, p < .001$) in the problematic drinking group. Marital status ($\chi^2 = 7.98, p < .05$) and greater depressive symptoms (Mann-Whitney U = 20193, $p < .05$) were also significantly associated with problematic drinking. Only subjective friend support was significantly positively associated with problematic drinking, $t(751) = 2.24, p < .05$, of all types of social support (all other $ps > .1$).

In order to examine all the potential factors predicting alcohol use disorder, variables with $p < 0.10$ in the bivariate analyses were included in our adjusted logistic regression model as independent variables (Hosmer and Lemeshow, 2000). Demographic variables such as migrant

Table 1. Participant characteristics of problematic and non-problematic drinkers.

	Non-problematic drinkers (n = 683) n (%)	Problematic drinkers (n = 70) n (%)	Total sample N = 753 n (%)
Sex			
Male	313 (45.83)	62 (88.57)	375 (49.80)
Female	370 (54.17)	8 (11.43)	378 (50.20)
Marital status			
Never married	234 (34.72)	29 (41.43)	263 (35.35)
Cohabitate	16 (2.37)	5 (7.14)	21 (2.82)
Married	412 (61.13)	34 (48.57)	446 (59.95)
Divorced/Widowed	12 (1.78)	2 (2.86)	14 (1.88)
Education			
Never attended school	11 (1.61)	0 (0.00)	11 (1.46)
Elementary school	29 (4.25)	1 (1.43)	30 (3.99)
Junior high school	115 (16.86)	12 (17.14)	127 (16.89)
Senior high school	142 (20.82)	20 (28.57)	162 (21.54)
Associate	113 (16.57)	12 (17.14)	125 (16.62)
College degree or higher	272 (39.88)	25 (35.71)	297 (39.49)
Employment status			
Employed	520 (79.88)	61 (89.71)	581 (80.81)
Unemployed	131 (20.12)	7 (10.29)	138 (19.19)
Time living in Guangzhou			
0–3 months	29 (4.25)	6 (8.57)	35 (4.65)
4–6 months	17 (2.49)	2 (2.86)	19 (2.52)
7 months–1 year	36 (5.27)	4 (5.71)	40 (5.31)
1–5 years	173 (25.33)	19 (27.14)	192 (25.50)
More than 5 years	428 (62.66)	39 (55.71)	467 (62.02)
Time living in the neighborhood			
0–3 months	72 (10.54)	8 (11.43)	80 (10.62)
4–6 months	45 (6.59)	6 (8.57)	51 (6.77)
7 months–1 year	79 (11.57)	9 (12.86)	88 (11.69)
1–5 years	217 (31.77)	28 (40.00)	245 (32.45)
More than 5 years	270 (39.53)	19 (27.14)	289 (38.38)
Potentially traumatic event			
Personal exposure	219 (32.06)	42 (60.00)	261 (34.66)
Indirect or no exposure	464 (67.94)	28 (40.00)	492 (65.34)
	<i>M (SD)</i>	<i>M (SD)</i>	
Subjective social support			
Family	4.21 (1.92)	3.97 (1.99)	
Friend	2.19 (1.44)	2.60 (1.55)	
Objective social support			
Family	9.34 (3.99)	8.90 (3.70)	
Friend	5.47 (2.09)	5.89 (2.18)	
PHQ-9	2.94 (3.72)	4.11 (5.04)	

status, permanent residence registration status (i.e., “Hukou”), and migration reason, etc., were not included into our models (all $ps > 0.10$). Results are displayed in Table 2. In Model 1, being male, cohabitation, and PTE exposure were significantly positively associated with problematic drinking. In Model 2, we tested the stress buffering hypothesis by adding the interaction term PTE \times Subjective friend support to Model 1. The interaction was statistically non-significant. In Model 3, we evaluated a three-way interaction (PTE \times subjective friend support \times depression) to assess whether the level of depression would moderate the stress buffering role of social support for those exposed to trauma. We tested the effect of this interaction due to the potential differential impacts of depression and social support on drinking behavior in different cultural contexts suggested by the literature. The interaction term was found to be statistically significant in this model ($p < .05$). Stratified results (by PTE exposure) demonstrated that among those who had personal exposure to PTE, the subjective friend support \times depression interaction was significant (OR = 1.11, $p < .05$), whereas among those

who did not report PTE, the interaction effect was not significant ($p > .5$). These results indicated that among those who experienced trauma, greater friend support was associated with problematic drinking among participants with greater depressive symptoms (see Figure 1).

6. Discussion

This was among the first studies to assess the associations between personal exposure to PTE, depressive symptoms, and problematic drinking in China (Unger et al., 2001). Our first hypothesis that PTE exposure would be associated with alcohol misuse was supported by our data, in which former exposure to PTE predicted increased alcohol misuse. Our second hypothesis, however, was not supported. The stress-buffering effect from social support did not seem to be present in the current study. This finding might shed light on the importance of cultural context on social support and problematic drinking that the roles of alcohol consumption and social support may function differently in

Table 2. Hierarchical logistic regression models predicting problematic alcohol drinking.

	Model 1			Model 2			Model 3		
	B	SE	OR	B	SE	OR	B	SE	OR
Constant	-5.177***	0.619	0.006	-5.444***	0.693	0.004	-5.939***	0.802	0.003
Sex									
Male (base = Female)	2.116***	0.399	8.301	2.103***	0.399	8.194	2.370***	0.442	10.696
Marital status									
Never married	0.222	0.328	1.248	0.158	0.333	1.171	0.022	0.348	1.022
Cohabitate	1.655*	0.645	5.232	1.596*	0.645	4.935	1.479*	0.666	4.389
Divorced/Widowed (base = Married)	0.902	0.857	2.463	0.946	0.852	2.576	0.949	0.866	2.583
Employment status									
Employed(base = Unemployed)	0.666	0.451	1.947	0.624	0.454	1.867	0.629	0.477	1.876
Time living in Guangzhou									
0–3 months	1.710	0.949	5.531	1.727	0.961	5.622	1.653	0.969	5.224
4–6 months	0.409	0.952	1.506	0.507	0.954	1.661	0.476	0.987	1.610
7 months–1 year	-0.117	0.784	0.890	-0.145	0.791	0.865	-0.322	0.909	0.724
1–5 years (base = >5 years)	-0.025	0.397	0.997	-0.031	0.399	0.970	0.007	0.411	1.007
Time living in the neighborhood									
0–3 months	-1.047	0.856	0.351	-1.132	0.871	0.322	-1.011	0.867	0.364
4–6 months	0.093	0.624	1.097	0.057	0.619	1.059	0.011	0.672	1.011
7 months–1 year	0.037	0.559	1.038	0.021	0.558	1.021	-0.042	0.577	0.959
1–5 years (base = >5 years)	0.387	0.374	1.472	0.374	0.375	1.453	0.356	0.382	1.428
PTE (Personal Exposure)	1.144***	0.281	3.141	1.198*	0.553	3.312	2.077**	0.740	7.980
Friend support				0.145	0.134	1.156	0.205	0.176	1.228
PTE × Friend support				-0.013	0.187	0.987	-0.439	0.259	0.645
Depression							0.090	0.095	1.095
PTE × Depression							-0.259	0.156	0.772
Friend support × Depression							-0.014	0.038	0.987
PTE × Friend support × Depression							0.112*	0.057	1.119

Note. SE = standard errors; PTE = potentially traumatic event.
 *p < .05. **p < .01. ***p < .001.

different cultures. Studies conducted in China consistently indicated that friendships and social networks are strengthened through drinking together with friends, which evinces the deeply ingrained social role alcohol plays in traditional Chinese culture (Cheng et al., 2017; Rui and Ji, 2009; Wang et al., 2005; Zhang and Liu, 2008). When the interaction term was added in Model 2, the association between PTE exposure and

problematic drinking remained unchanged. This suggested social support did not buffer the maladaptive behavioral effect of traumatic event exposure on problematic drinking.

The results of Model 3 indicated a three-way interaction between PTE exposure, depression, and social support in predicting problematic drinking, which supported our third hypothesis. In the context of PTE

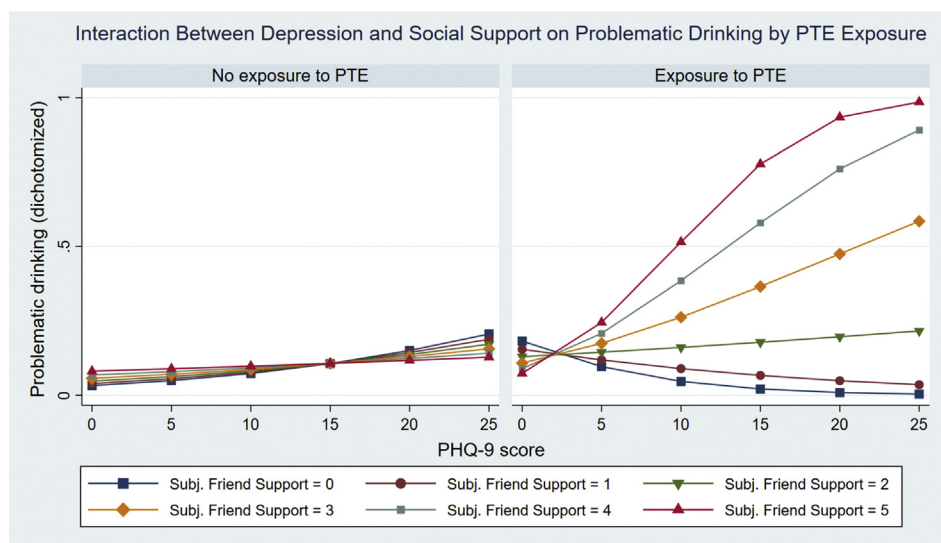


Figure 1. Three-way interaction predicting problematic alcohol drinking.

exposure, those with more severe depressive symptoms who also reported greater social support from friends were more likely to engage in problematic drinking. Social support is hypothesized to buffer the relationship between PTE exposure and psychological distress, and therefore reduces the need to misuse alcohol. In our study, however, social support is associated with greater engagement in problematic drinking among people exposed to PTE as the severity of their depressive symptoms increases. Our results showed among those who perceived themselves as having low friend support, level of depression was not associated with problematic drinking, whether or not there had been former exposure to PTE. This finding is particularly important because it highlights the significance of contexts in which social support is provided on harmful drinking. One possible explanation for the mechanism here may be the urge for social environments as a coping strategy when depression is present. As depressive symptoms occur, the perception of having friend support predicts problematic drinking behavior. In China, social support might be perceived to be provided in drinking contexts when support receivers are experiencing depressive symptoms. Our results showed this relationship modification only appears among those who have had exposure to PTE. The modification effect was absent among those without personal exposure to PTE, in which even when level of depression varied, the relationship between subjective friend support and alcohol misuse remained null. This differential effect of PTE exposure on the buffering function of social support might give insights into how traumatic experience could change the role of depression. Among PTE-exposed Chinese adults, as depressive symptoms increase, the more support from friend one thinks he or she has, the more likely they engage in problematic drinking. In the absence of depressive symptoms, on the other hand, there seems to be no association between subjective social support and problematic drinking, regardless of traumatic event exposure.

The function of subjective social support may be deemed as a risk factor against psychological distress, and may function as a catalyst to alcohol misuse in China. Although contradictory findings might be attributed to different age groups and the variety of instruments used for measures across the studies, Chinese unique drinking culture seems to perpetuate negative drinking behaviors, which contradicts previous results found in Western cultural settings (Mohr et al., 2001). Studies conducted in Western, individualistic cultural contexts mostly suggest that people with depression tend to engage in heavy alcohol use regardless of whether their friends drink (Christiansen et al., 2002). Asian regular drinkers also tend to think they have more friend support than non-regular drinkers (Yoshihara and Shimizu, 2005), and expect greater tension reduction from drinking compared to non-Chinese (O'Hare, 1995). Research also suggests even in a western cultural context, a positive association between social support and alcohol consumption is found among Asian Americans but not among White and African Americans (Aldridge-Gerry et al., 2011). Problematic drinking with peers may be a sign of severe depression in the Chinese context among those who have been exposed to trauma. These ideas need to be empirically tested. Further research is needed to explore the role of social support in the context of depression in the general Chinese population.

6.1. Limitations and strengths

Several limitations of the study should be mentioned. First, no definite evidence of casual relation between PTE exposure and problematic drinking can be concluded due to the cross-sectional nature of the study design, which may also raise the question of the direction of the relationship. Second, this study only measured the number of PTE participants experienced, and did not specifically address certain trauma types, which may evoke different behavioral and mental health reactions. Lack of assessment of certain constructs, such as PTSD, social drinking, and drinking motives, is also a limitation. Alcohol consumption may be only one of the coping strategies associated with stress and depression. Individuals exposed to PTE and experience depression may find other

strategies to cope with their daily stress and depressive symptoms instead of consuming alcohol. Future studies should be conducted within trauma exposed Chinese samples to identify a more complete range of coping behaviors. Finally, participants of the current study were recruited from two locations in a south China city; therefore, the study population does not fully represent the entire Chinese population. It is recommended that future investigators should attempt to obtain samples from multiple locations across provinces for comparisons.

Strengths of the study include the spatial epidemiological methods and stratified household random sampling in two of the densest districts in Guangzhou, a southern Chinese metropolis, which resulted in a large and representative sample. This is also among the first studies to investigate whether social support would serve as a buffer in mitigating the effect from PTE exposure to alcohol misuse among Chinese participants.

7. Conclusion

Our study aimed to investigate the relationship between trauma exposure and alcohol misuse in Guangzhou, China. We used spatial epidemiological methods in selecting our potential participants within two districts in Guangzhou. Our results showed that personal exposure to trauma was associated with problematic drinking. Social support from friends modified this effect in the presence of depressive symptoms. The three-way interaction revealed that greater depression and subjective friend support were significantly positively associated with alcohol misuse among participants exposed to trauma. This study provided supportive evidence for the relationship between trauma exposure and alcohol misuse in China. The effect which various types of social support could have on buffering (or exacerbating) effect on drinking behavior should be further investigated within the Chinese population.

Declarations

Author contribution statement

Edward W.W. Chan, Isaac C. N. Ip: Analyzed and interpreted the data; Wrote the paper.

Wen Chen: Conceived and designed the experiments; Performed the experiments.

Brian Hall: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data.

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Competing interest statement

The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

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