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ORIGINAL PAPER

The Social Support Buffering Effect in the Relationship Between Perceived Stress and Alcohol Use Among Brazilian Women

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Abstract
This cross-sectional study interviewed Brazilian women regularly attending primary care to investigate whether the relationship between social support and alcohol use is direct or is mediated by stress, in order to support the development of recommendations related to health prevention and mental health promotion actions. The results suggest that social support affects the outcome alcohol use in the women studied by buffering the effect of stress. Based on these results, recommendations are made for amplifying the social support network that prevents stress-induced alcohol use.

Keywords Alcohol use · Primary health care · Social support · Stress · Women

Introduction

Social support is the material, emotional, and informational resources arising from interpersonal relationships and is an important protective factor for general health (Mezuk et al. 2010). It is associated with lower risk of negative physical and mental health outcomes, with better patterns of health and adoption of healthy life styles in adult populations (Stein and Smith 2015; Evans et al. 2013; Manuel et al. 2012; Cosley et al. 2010; Mezuk et al. 2010; Takizawa et al. 2006). The literature related to social support proposes two main models to explain how the social relationships influence health outcomes (Stein and Smith 2015; Mezuk et al. 2010; Takizawa et al. 2006; Rodriguez and Cohen 1998; Cohen and Wills 1985). The main or direct effect model describes that social support increases the health levels independently of the level of stress to which an individual is exposed (Stein and Smith 2015; Takizawa et al. 2006). The indirect or buffering model describes how social support benefits health through buffering the negatives effects of stress (Stein and Smith 2015; Mezuk et al. 2010; Rodriguez and Cohen 1998; Cohen and Wills 1985).

Many studies have been developed to identify which explanatory models best expound the effect of social support on different health outcomes (Stein and Smith 2015; Manuel et al. 2012; Cosley et al. 2010; Mezuk et al. 2010; Takizawa et al. 2006). Studies identify the buffering social support effect on well-being of adults under high levels of stress (Mezuk et al. 2010), on depressive symptoms among stressed middle-aged people (Takizawa et al. 2006), on trauma symptoms among women who suffered childhood maltreatment (Evans et al. 2013), on physical symptoms in healthy women (Mezuk et al. 2010), and on sense of compassion among stressed women (Cosley et al. 2010). Other studies describe the direct effect of social support on levels of inflammation among patients with sclerosis (Mezuk et al. 2010), and on depression among mothers of young children (Manuel et al. 2012). Taken together, these studies illustrate that the effect of social support is different according to the event studied, and that knowing how social support operates is important in making decisions related to healthcare or health promotion plans.

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Although social support is considered an important protective factor against alcohol use even low risk consumption (Lee et al. 2013), the model that explains this effect among women is yet to be determined. All the patterns of alcohol use should draw the attention of health professionals, because this behaviour is often induced by stress (Spanagel et al. 2014; Becker et al. 2011) and can be an important indication of non-adaptive coping style requiring actions related to mental health promotion. Additionally, even though alcohol use is less among women (Foster et al. 2015; Nelson et al. 1998), some studies have suggested that the gender gap in alcohol use and dependence among adults is narrowing (Foster et al. 2015; Wagoner et al. 2012; Seedat et al. 2009; Wilsnack et al. 2009). It is therefore important to disseminate knowledge that can help women in their decision making related to life style (Wilsnack et al. 2009). Furthermore, investigating women separately can contribute to development of healthcare plans and public health polices based on evidence related to gender issues.

Thus, in this study we analyzed the effect of social support in the relationship between stress and alcohol use among women regularly attending a Brazilian primary care service.

Methods

This is a cross-sectional study developed in a health district of an inner city in São Paulo state, Brazil. In this district the majority of the population are young adults (ranging from 25 to 39 years of age), and some sub-regions have a greater concentration of people who live in vulnerable psychosocial conditions (violence, poverty, and low levels of instruction).

The health unit where this study was done has 14,148 patients registered; 51.4% (7272) of the patients are women and 65.35% (4752) of these women range from 20 to 65 years old. To calculate the sample size we used the following formula for population with known size, described by Agranonik and Hirakata (2011), where p represents the prevalence of the studied event, Z represents the level of significance adopted, and ε refers to acceptable sampling error.

$$n = \frac{p(1-p)Z^2N}{\varepsilon^2(N-1) + Z^2p(1-p)}$$

The parameters used for this calculation were 95% reliability, 10% sampling error, and 38% the prevalence of Brazilian women who consumed any alcohol drink in the last 12 months (Laranjeira et al. 2014). The target sample was 88 women and a non-response rate of 20% was predicted, for a total sample of 113 women.

The eligibility criteria for participation were: being a woman, 20 or more years of age, resident in the region covered by this health service, registered for Primary Care Service. All families registered in this health unit receive at least a monthly home visit of nurses or community health agent, but we considering as additional eligibility criteria having received assistance in this facility last 6 months before data collection. Recruitment was done through posters affixed in the health service and strategic locations in the neighbourhood (headquarters of the residents' association, religious institutions, and local shops). In addition, personal invitations were given during home visits and in the waiting room of the health unit.

The data were collected during a period of 10 months between 2013 and 2014 by specialized nurses with training and experience in data collection. The location of data collection was the woman's house or a private room in the health unit. The time to apply the questionnaires was about 1 h.

The questionnaires used for this study were: (1) questionnaire on sociodemographic information; (2) Perceived Stress Scale (PSS 10); (3) Alcohol, Smoking and Substance Involvement Screening Test (ASSIST); and (4) Social Support Questionnaire by Sarason (SSQ).

The sociodemographic information was obtained based on basic Brazilian social indicators described by the official agency responsible for census taking, the Brazilian Institute of Geography and Statistics (IBGE) (I Instituto Brasileiro de Geografia e Estatística 2010). The questionnaire contained questions about educational level, race and skin colour, work, and income.

The PSS10 is the short version of the Perceived Stress Scale (Cohen et al. 1983). This tool is composed of 10 self-report items about stressful experiences and evaluates global stress, measuring the degree to which an individual's life situation is being perceived as stressful (Cohen et al. 1983). The Likert-type answers range from zero to four points and measure the frequency of certain feelings in the last 30 days (never, hardly never, sometimes, infrequent, very frequent). This tool is sub-divided into two factors; Factor 1 has six items that suggest positivity of the stressful situations (items 1, 2, 3, 6, 9, 10) and Factor 2 has four negative indicator items (items 4, 5, 7, 8) (Reis et al. 2010; Cohen et al. 1983). The minimum and maximum scores possible are, respectively, zero and 34 points. We adopted as cutoff the average of the group (mean = 19.2, median = 20, SD = 7.3), meaning that scores ≤ 19.2 were considered as normal level of stress and above this value, high level of stress.

The Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) is a tool to screen the use of alcohol, tobacco, and other substances. It is composed of eighth questions related to frequency of use, related problems, loss

in the execution of tasks, and unsuccessful attempts to break off or reduce consumption (Henrique et al. 2004).

The Social Support Questionnaire was developed by Irving Sarason (Matsukura et al. 2002; Sarason et al. 1983) to qualify the perceived social support availability and identify the social support network considering the type of relationship between the components (friendship, family, co-workers for example), the number of supporters, and the perceived satisfaction of the participant about the social support. The SSQ has 26 items and two scores, one for social support satisfaction (SSQ-S) and another for number of supporters (SSQ-N). The higher the scores, the higher the satisfaction and the more supporters. In this study we used the number of supporters obtained by SSQ-N score to test the social support buffering effect, as previously described (Sarason 2013; Matsukura et al. 2002; Sarason et al. 1983). High and low scores were defined by number of supporters above and below the median determined for the sample, following Sarason's instructions (Sarason et al. 1983).

The database was elaborated in the software Statistical Package Social Science (SPSS) version 19 for Windows. The Chi Square test was used to identify association between alcohol use or perceived stress and sociodemographic characteristics. The Chi Square test and Cochran's Mantel–Haenszel were used to test the homogeneity of the groups and to identify the effect of social support in the relationship between stress and drug use, considering alcohol use as dependent variable, the level of stress as independent variable, and social support as confounding variable.

The University Ethics Committee, protocol 00876012.2.0000.5393, approved the research. All the participants signed the Consent Form guaranteeing voluntary participation, anonymity, and confidentiality of information.

Results

Most women had family income below five times the Brazilian minimum wage (84.1%), were unemployed or housewives (57.5%), and had high school or less education (86.7%). Their mean age was 43.8 years old ($SD = 14.2$; median = 44; range: 18–65) and 55.8% were white. Alcohol use prevalence was 37.2% and prevalence of high level of stress was 52.1%.

Some sociodemographic characteristics can be associated with perceived stress or alcohol use and could interfere with the analysis of buffering effect of social support. Thus, we employed Chi Square tests to assess the association among these variables before analyzing the effect of social support in the relationship between stress and alcohol use. We also considered the variables tobacco and illicit drug use. As shown in Table 1, there was no association of sociodemographic characteristics with either alcohol use or perceived stress. It was observed that the majority of women who had never used alcohol had also never smoked. Only four women reported using illicit drugs (marijuana or cocaine) and these four had used alcohol at some point in their lives.

As shown in Fig. 1, the number of supporters ranged from 0 to 18 (mean = 3.93, median = 4, SD = 2.61).

Regarding composition of the social support network, 93% of the participants had family and 31% friends as supporters, while just 12.4% had neighbours and 3.5% had an institution as supporters. There was no association between the composition of the social support network and alcohol use or level of perceived stress.

In order to analyze the social support effect, the sample was divided in two groups: 50% of the study participants had four or fewer social supporters, which we considered as a low level of social support, whereas 50% had more than four supporters (score above four in the SSQ-N), which we considered as a high level of social support. We then tested the association between alcohol use and stress in these groups.

As shown in Fig. 2, among women low in social support, the association between stress and alcohol use was significant, with high stress increasing almost three times the risk of using or having used alcohol in this group ($p = 0.041$, odds ratio (OR) 2.83, CI 1.03–7.80). In contrast, for women high in social support, there was no association between stress and alcohol use ($p = 0.691$, OR 1.29, CI 0.36–4.72).

Discussion

This study interviewed Brazilian women regularly attending primary care to investigate whether the relationship between social support and alcohol use is direct or mediated by stress buffering, in order to support the development of recommendations related to health prevention and mental health promotion actions. The results suggest that social support affects the outcome alcohol use in the women studied, by buffering the effect of stress. This result is similar to previous studies, which showed a buffering effect of social support on inflammation among middle-aged (Mezuk et al. 2010) women and physical symptoms (Stein and Smith 2015), depressive symptoms (Takizawa et al. 2006), and trauma (Evans et al. 2013). Regarding alcohol use, a study with US Navy members reported similar results: with higher levels of social support, the association between stress and problematic alcohol use via depressive symptoms decreased (Kelley et al. 2017). In contrast, a study with adult substance abusers showed no evidence that higher levels of social support served to buffer the negative impact of stressful life events on treatment outcomes, failing to support a stress-buffering role (Dobkin et al. 2002), while another study developed

Table 1 Substance use, stress level, and sociodemographic characteristics (n = 113)

Characteristics	Alcohol use—n (%)			Stress level[a]—n (%)		
	Yes	No	p Value	Normal	High	p Value
Sociodemographic						
Age						
20–31 years old	11 (9.7)	18 (15.9)		14 (12.4)	14 (12.4)	0.427
32–44 years old	11 (9.7)	17 (15.0)	0.866	10 (8.8)	18 (15.9)	
45–57 years old	12 (10.6)	17 (15.0)		13 (11.5)	16 (14.1)	
58–65 years old	08 (7.1)	18 (15.9)		15 (13.3)	11 (9.7)	
No informed = 1						
Stable union						
Yes	24 (21.2)	37 (32.7)	0.604	28 (24.8)	33 (29.2)	0.445
No	18 (15.9)	34 (30.1)		25 (22.1)	26 (23.0)	
Level of instruction						
Fundamental	19 (16.8)	29 (25.6)		21 (18.6)	27 (23.9)	
High school	18 (15.9)	32 (28.3)	0.925	25 (22.1)	24 (21.2)	0.761
Higher education	05 (4.4)	09 (7.9)		07 (6.2)	07 (6.2)	
No informed = 1						
Employment status						
Paid work	16 (14.1)	31 (27.4)	0.520	23 (20.3)	24 (21.2)	0.830
Unemployed or housewives	26 (23.0)	39 (34.5)		30 (26.5)	34 (30.1)	
No informed = 2						
Family income[b]						
0–1 Minimum wage	05 (4.4)	11 (9.7)	0.620	09 (8.0)	07 (6.2)	0.707
> 1–2 Minimum wage	07 (6.2)	10 (8.8)		09 (8.0)	08 (7.1)	
> 2–5 Minimum wage	21 (18.6)	41 (36.3)		28 (24.8)	33 (29.2)	
> 5 Minimum wage	08 (7.1)	08 (7.1)		06 (5.3)	10 (8.8)	
No informed = 2						
Substance use						
Tobacco						
Yes	20 (17.7)	14 (12.4)	0.002	13 (11.5)	21 (18.6)	0.306
No	22(19.5)	57 (50.4)		38 (33.6)	40 (35.4)	
Illicit drugs						
Yes	04 (3.5)	0 (0.0)	0.018	02 (1.8)	02 (1.8)	0.968
No	38 (33.6)	70 (61.9)		49 (43.4)	58 (51.3)	

[a]One participant did not fill the PSS 10

[b]The monthly minimum wage in Brazil corresponds to around US$ 293.73

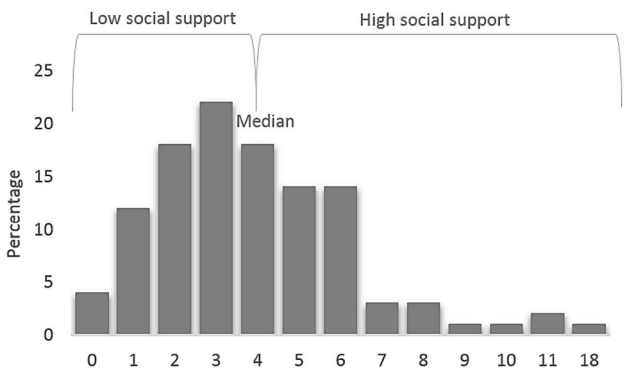

Fig. 1 Number of supporters reported by participants and distribution according to median (n = 113)

on low-income women with drinking problems reported no evidence of this effect in this population (Mulia et al. 2008).

Many aspects could explain the difference of results in these studies. Firstly, they focus on abusive or problematic use of substances, differently from our study that analysed alcohol use in general (independently of the pattern of use), comparing them with abstainers. Secondly, methodological aspects as a way of measuring social support and analysing the buffering effect are relevant to research issues discussed in the social support literature (Mcdowell 2006; Cohen and Wills 1985; Cohen et al. 1983; Sarason et al. 1983). Finally, cultural aspects also can interfere in social support and stress perception as well as in the alcohol use determinants, and

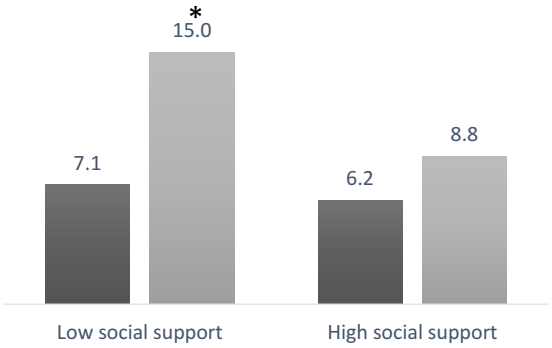

Fig. 2 Percentage of participants who report alcohol use, by number of supporters and level of perceived stress. The bars in light gray correspond to the women who reported a high level of stress and the bars in dark gray to those who reported normal stress (n = 113). *significant association (p = 0.041)

may be considered in these interpretations (Shavitt et al. 2016).

The prevalence of alcohol use in the sample studied (37.2%) was very close to the Brazilian national average (38%) (Laranjeira et al. 2014) and similar to the global prevalence among women (34%) (Rehm et al. 2009). Sociodemographic characteristics showed no association with stress or alcohol use in this study, in contrast with previous studies that described low income and education level as important risk factors for stress and alcohol abuse among women (Lee et al. 2013; Monteiro et al. 2011), differently from our study that worked with alcohol use in general. On the other hand, a systematic review about the influence of socio-economic factors on alcohol use found inconclusive results in studies done in many countries, and the authors proposed that this result reflects the varied outcome and exposure methods used and the broader limitations with the evidence base (Bryden et al. 2013).

The results showed an association between alcohol and tobacco use and also between use of alcohol and illicit drugs, suggesting a possible risk factor for the use of one substance for another, corroborating previous studies (Weinberger et al. 2016; Opaleye et al. 2012).

The number of supporters of the participants in this study was similar to numbers reported by previous studies with a variety of populations, both female and male, from several countries (Goodman et al. 2017; Souza et al. 2016; Bryden et al. 2013; Leahy-Warren et al. 2012; Monteiro et al. 2011). A study of psychiatric patients in Brazil described an average of four supporters (Souza et al. 2016), among pregnant American women the average observed was 3.5 (Goodman et al. 2017), and among first-time Irish mothers it was 4.9 (Leahy-Warren et al. 2012). On the other hand, there was little diversification in the composition of the social support networks, which mostly included family members. Low diversity in the social support network can imply difficulties in accessing other social support sources, restricting the possibility of expanding the social network (Hanneman and Riddle 2005). Thus, interventions to amplify the social support network, focusing on diversified composition, can be important in terms of health outcomes (Hundt et al. 2013; Lasebikan et al. 2012).

A remarkably low percentage of participants in this study mentioned having institutions as supporters, although they regularly received some assistance from the health facility studied. Other studies emphasized the important role of institutions or formal supporters in health promotion (Bernardes et al. 2017; Illangasekare et al. 2014). According to these studies the benefits attributed to formal supporter are facilitating the identification of needs, improving access to informal resources, and creating strategies to overcome financial, emotional, and structural barriers in different situations (Nguyen et al. 2016). Encouragement, empowerment, and value reinforcement have also been described as effects of formal supporters (Bernardes et al. 2017; Illangasekare et al. 2014). It is noteworthy that the participants failed to recognize their primary care provider as an institutional supporter. This clearly implies the need for a more welcoming posture, which is a core element to characterize a service provider as a supporter (Dutt and Webber 2010; Lin 2001; Lin et al. 2001).

The women studied accumulated a series of vulnerability situations that, in themselves, could be considered psychosocial risk factors, such as low income, low level of education, and the fact that they are women in a country marked by gender violence. Despite this, no association between sociodemographic aspects and alcohol use or stress was observed in this sample, suggesting that other issues may be mediating these events. In this regard, in a pilot intervention study, developed with some of these participants (Souza in press), women mentioned religion and physical activity, actions related to body image and listening to music or watching movies as strategies to cope with stress. We understand that future studies could investigate whether such strategies could interfere with perceived stress and or mediate the association between social support, alcohol and stress.

The fact that the study was developed in a specific region of Brazil reduces the power of generalization of the results and can be considered a limitation in this study. On the other hand, this choice allowed us to focus on a particular psychosocially vulnerable population, raising important discussions related to the influence of these conditions on the interrelationship among stress, social support, and alcohol use, and showing interesting results that contribute to the advancement of research about social support. Additionally, considering that sociodemographic characteristics of our sample reveal a social context of vulnerabilities, we understand that these discussions will be useful in other contexts

around the world, mainly in countries of low and middle income. Reproducing this study in other cultures with a larger and more representative sample is a suggestion to future researchers.

Overall, our findings show some fragility in the structural characteristics of social support networks of the women; however the results suggest that social support affects the outcome alcohol use by buffering the effect of stress in this population. Thus, it has important implications for clinical practice in different healthcare settings, and also for the development of interventions that amplify strategies for women coping with stress, alternative to alcohol use. Firstly, considering gender issues as important determinants of stress in women, we understand that awareness-raising campaigns about gender issues as well as strategies to broaden women's empowerment and social protection mechanisms are important actions that can, indirectly, prevent stress-induced alcohol use in this population (Brady et al. 2016). Secondly, developing strategies for mental health promotion in primary care, such as training in social skills, conflict resolution techniques, and stress management can help amplify and qualify the social support network of women (Enns et al. 2016; Fernandez et al. 2015). All these actions may operate as institutional social support, to improve the strategies for coping with stress, consequently working as a protective factor against alcohol use, as well as against mental health problems in general, as women are also much more vulnerable to the development of certain mental disorders (Steel et al. 2014; Graaf et al. 2012).

Conclusions

Based on the potential buffering effect of social support in the relationship between stress and alcohol use in this population, some actions were highlighted that could both amplify social support and reduce stress. Some of these actions involve increasing mechanisms of social protection, fighting against sexism, and implementing strategies to promote health with a focus on stress management. In particular, professionals from primary care services have an important role to play in deploying such actions, especially in the middle- or low-income countries where the greater part of the population do not have access to specialized mental health professionals. Thus, the importance of social support and its effects on the different health outcomes and strategies to cope with stress should be part of the training to primary care professionals, as this will certainly help broaden the scope of prevention and health promotion actions especially for women who represent the majority of the public served in these settings.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

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