



## Original Article

# Gender differences in the association between social support and caregiver alcohol use in posttraumatic stress disorder of east Taiwan adolescents

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## ABSTRACT

**Objectives:** This study investigates traumatic experiences in a sample of high-risk Taiwanese adolescents in rural areas of Taiwan; correlation with psychosocial factors is assessed with focus on social support and caregiver alcohol use. **Materials and Methods:** This was a cross-sectional study using stratified cluster sampling. Structured questionnaires were used to collect demographic characteristics, social support (Taiwan Relationship Inventory for Children and Adolescents), and posttraumatic stress disorder (PTSD) symptoms (Chinese version of UCLA-PTSD Reaction Index) from a sample of 751 adolescents (54.6% females) with 61.2% response rate in high schools in Hualien County, Taiwan. **Results:** Girls with trauma experiences manifested significantly higher PTSD scores, concurrent with higher number of traumatic events (TE), while the likelihood of reporting trauma and subsequent PTSD symptoms was similar in both genders. Increased risk of reported trauma and PTSD in adolescent Taiwanese is strongly associated with caregiver alcohol use and lack of social support, particularly in girls. **Conclusion:** We found that girls reported higher numbers of TE which was concurrent with significantly higher PTSD scores. Early detection of alcohol use disorders among caregivers as well as assessment of quality of family interaction would benefit at risk adolescents through specifically tailored interventions to address these factors.

**KEYWORDS:** Caregiver alcohol use, Posttraumatic stress disorder, Social support, Taiwanese adolescents

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## INTRODUCTION

### Posttraumatic stress disorder and vulnerable groups

There is now an acknowledgment of the complex interplay between demographic characteristics and posttraumatic stress disorder (PTSD) vulnerability among different populations [1]. Studies document a high prevalence of traumatic events (TE) [2] and PTSD in youth [3] which is often chronic, debilitating and leads to suicide in a substantial portion of patients [4]. Furthermore, PTSD rates tend to be higher among females [5]. This may be due to gender differences in number and type of TE experienced [5]. However, females still experience greater PTSD than males for the same TE [6]. Thus, other etiological variables may contribute to observed PTSD gender disparity. Socio-economic resources and social support may partially account for higher PTSD prevalence among females and youth [5,7]. Therefore, research efforts should focus on identifying people most at risk of developing PTSD and directing resources to them.

### Family and peers in adolescent life

Adolescence is a time when family and peer support are of paramount importance [8] particularly in high PTSD risk youth [9]. Family support appears to be a major predictor of adolescent adjustment and protection against PTSD [10], while peer social support seems to mediate between exposure to TE and its negative outcomes in adolescents [11,12].

It has been proposed that social interaction can be positive and negative [13]. Positive social support could provide an individual with sense of being loved, cared for and valued, whereas negative social support usually causes distress or is perceived as problematic [14]. While reduced social support is generally associated with increased PTSD risk [15], there is conflicting evidence of the respective effects of negative and

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positive social support on psychological health [16], suggesting that measures of both positive and negative social supports must be included when investigating the relationship between social support and PTSD. In addition, associations of caregiver alcohol use with psychiatric disorders in youth are well-documented [17]. Caregiver alcohol consumption may lead to a negative support and predispose adolescents to trauma exposure thus increasing risk of PTSD [18].

### Posttraumatic stress disorder in Taiwan adolescents

The few previous studies in Taiwan assessing the role of gender in adolescent PTSD tend to find higher prevalence rates among females [19]. Preliminary studies indicate social support to be especially important for the adaptation of young Taiwanese people to TEs [20]. Regarding alcohol use in the location of this study, the 1-year prevalence of alcohol use disorders (AUD) among adult inpatients of an eastern rural Taiwan Hospital (25.7%) was higher than that of urban Taipei (16.7%) [21]. The majority of research examining the risk of PTSD development in youth have mainly sampled Western populations [6]. This relative scarcity of studies on Taiwanese adolescents impedes, in turn, the development of appropriate interventions to reduce the risk of PTSD. The present study aims to examine the associations of social support and caregiver alcohol consumption with incidence of TEs and PTSD likelihood among Taiwanese male and female adolescents in eastern Taiwan.

### Ethical approval

Ethical approval for this study (approval No.: IRB100-61) was provided by the Institutional Review Board of Hualien Tzu Chi Hospital, Hualien, Taiwan, on September 22, 2011. Informed written consent was obtained from all patients prior to their enrollment in this study.

## MATERIALS AND METHODS

### Sampling and participants

The primary education in Taiwan is 9 years with 6 years of elementary school and 3 years of junior high school. The research sites of this study were junior high schools in Hualien County, Taiwan; potential participants were students of the 7<sup>th</sup> and 8<sup>th</sup> grade, aged between 13–14 years old. In 2011, there were 7,569 students of the 7<sup>th</sup> and 8<sup>th</sup> grade in junior high schools in Hualien County. Considering an estimated prevalence rate of PTSD in adolescents 50% (as recommended when prevalence rate is unknown [22], a confidence interval (CI) of 95% and sampling error  $\pm$  4%, the sample size was estimated at 556 students. Since school size tends to be smaller in rural areas, we used stratified cluster sampling to select a representative sample: schools were first categorized as big and small according to the number of students of the 7<sup>th</sup> and 8<sup>th</sup> grade: “small school” was a school with less than or equal to 100 students, “big school” was a school with more than 100 students. The total number of schools selected was six. One class from the 7<sup>th</sup> and 8<sup>th</sup> grade of each school was randomly selected. The number of potential participants was 1,226. We then visited each selected class to explain the purpose and procedure of the study. Only students and their primary caregivers signing an informed consent would

take part in this study. Consent of their teachers was also sought. This study was approved by REC of Hualien Tzu Chi Hospital (No. IRB100-61).

### Data collection

Data collection was conducted from March to May of 2012. Research assistants went to each selected class to administer questionnaires in students’ usual classrooms with the support of school principals and teachers. Those who did not provide consent would remain in their seats reading. Participants were reminded to check if they missed any item to reduce missing data before handing in questionnaires. Questionnaires with incomplete data would be excluded from the study.

### Research tools

#### Demographic factors

Items such as age, gender, parents’ marital status, type of primary caregivers, their education, and employment status were collected. Primary caregivers were later grouped into two categories: Parents and nonparents (including grandparents and relatives); education was grouped into two categories: Less or up to 9 years of education or more than 9 years of education; due to the nature of job availability in Hualien county and according to the investigators’ experiences, occupation was grouped into two categories: Stable and unstable employment, the latter including short and long-term unemployment. Participants were also asked to rate drinking frequencies of caregivers in the past year. Caregivers drinking more than twice a week would be categorized as regular drinker.

#### Social support

Social support was measured using Taiwan Relationship Inventory for Children and Adolescents [23]. This instrument is a self-report measure consisting of three subscales measuring both positive and negative supports from three sources: Caregivers, teachers, and peers for a total of 52 items using four-point Likert scale, from 1-never to 4-always perceived support. Higher scores denoted greater positive and negative support. It has good reliability reported by Wu *et al.* [23]: its internal consistency (Cronbach’s alpha) was between 0.73 and 0.86; 2-week retest reliability in three subscales is between 0.74 and 0.88.

#### Traumatic experience

Traumatic experience was measured using the Chinese version of UCLA-PTSD Reaction Index [24] adapted from PTSD-RI [25]. It is composed of three parts: the 13-item Past Trauma Experience Survey evaluate incidents of past TE. Events are rated as YES or NO, including natural disaster, accidents, and sexual trauma (a term that encompasses any negative sexual experiences ranging from verbal sexual harassment to rape). Types of trauma experiences are categorized as experiencing (including natural disaster, accident, physical assaulted, sexual trauma, and painful treatment) and witnessing. The second part is a 13-item scale evaluating the impact of events from objective and subjective aspects using YES or NO rating category. The last part is a 22-item checklist of symptoms using a Likert scale ranging from 0–None to 4–Most of the time. A total score  $\geq$ 38 indicates a likely PTSD case. Of 22 items, 5 items measure re-experiencing (Criteria

B), 7 for avoidance/numbing (Criteria C), 5 for hyperarousal (Criteria D). 1 positive response from re-experiencing items was considered meeting Criteria B, 3 items for Criteria C, 2 items for Criteria D. Psychometric examinations of the Chinese version were conducted and demonstrated satisfactory reliability by Chen *et al.* [24]: internal consistency (Cronbach's alpha) 0.92 and retest reliability (Pearson's  $r$ ) 0.80. The Chinese version of UCLA-PTSD-RI has been used in Taiwan since its development [26].

### Analyses

Chi-square analyses were performed on dichotomized variables and ANOVA on continuous variables. Logistic regression was conducted to investigate associated factors for likelihood of encountering trauma and PTSD. Demographic factors, caregiver's drinking status, and social support were first examined in univariable regression. Significant factors found through this process were then added into multivariable logistic regression models to investigate the joint effects. Boys and girls experienced different variations of social support; therefore, subsequent analyses were carried out in the respective subgroups. We used SPSS version 22 to conduct analyses.

### Response rates

There were 1,226 students invited to take part in the study. The number of students giving both consent forms and returning complete questionnaires was 751, higher than the number of the estimated sample size; the response rate was 61.2%. The estimated and the responded samples were further examined. In terms of school size and grades, similar rates were found between the estimated and responded samples: Big school 66.7% versus 68.2%, the 7<sup>th</sup> grade 33.3% versus 31.8%. However, there were more female and less male students in the estimated sample compared to the responded sample: Female 49.2% versus 54.6%, male 50.8% versus 45.4%.

## RESULTS

### Social-demographic characteristics and traumatic experiences of participants

The distribution of social-demographic characteristics of all participants is this following: Of both male and female participants, around 60% of their parents were married (including cohabited), nearly 80% cared by parents. Only 40% of the primary caregivers had higher education levels and around half of them had stable employment. There were no significant gender differences in these factors. However, a significantly higher rate of caregivers engaging in regular drinking was found in boys compared to that in girls (44.3%, 35.1% respectively,  $\chi^2 = 6.549$ ,  $P = 0.010$ ). In terms of social support, boys reported significantly lower negative caregivers' support (mean = 1.99, standard deviation [SD] = 0.56) and positive peer support (mean = 2.84, SD = 0.84), but higher negative peer support (mean = 1.72, SD = 0.57) compared to those of girls (mean = 2.10, SD = 0.63; mean = 3.13, SD = 0.74; mean = 1.63, SD = 0.52, respectively, all  $P < 0.05$ ).

Around 60% of participants have reported experiencing TE, with boys having a slightly higher rate than girls (61.6% vs. 58.0%,  $\chi^2 = 0.96$ ,  $P = 0.333$ ). The overall rate of PTSD likelihood was 5.7%, with boys having a lower rate than

girls (4.7% vs. 6.6%,  $\chi^2 = 1.23$ ,  $P = 0.344$ ). Among participants reporting trauma, boys reported significantly fewer TE than girls (2.69 vs. 3.21,  $F = 11.10$ ,  $P = 0.001$ ) and scored significantly lower on the PTSD symptom scale (15.76 vs. 20.45,  $F = 13.58$ ,  $P < 0.001$ ). In both genders, the most common symptom was Criteria B-reexperiencing (boy 23.3%, girl 49.6%), followed by Criteria D-hyperarousal (boy 22.9%, girl 31.1%), the least common Criteria C-avoidance (boy 14.3%, girl 21.4%). Only the rate of reexperiencing symptom reached significant gender difference ( $\chi^2 = 32.87$ ,  $P < 0.001$ ).

Further examining types and rates of TE, 88.8% of adolescents reported "experiencing events" while 68.3% reported "witnessing events." Boys were much less likely to report witnessing events compared to girls (61.9% vs. 73.9%,  $\chi^2 = 7.47$ ,  $P = 0.006$ ). The most commonly reported events in boys were accidents (49.0%), undergoing painful medical treatment (36.2%), and witnessing family members being physically assaulted (35.7%), whereas the order in girls was witnessing family members being physically assaulted (56.3%), accidents (51.7%), and witnessing others in community being physically assaulted (44.5%).

### Factors associated with traumatic experiences in two genders

#### Reporting trauma

Possible risk factors for encountering trauma are illustrated in Table 1. The only significant demographic factor was type of primary caregiver in boys, with the risk three times higher when non parent was primary caregiver. Regular drinking of and negative social support from caregivers was associated with increased risk of encountering trauma in both genders. However, negative peer support was correlated with increased risk only in girls. In terms of positive social support, support from caregiver, and peer was only found significantly linked to decreased risk of reporting trauma in boys.

#### Posttraumatic stress disorder likelihood

In participants reporting trauma, none of the demographic factors was related to increased PTSD likelihood [Table 2]. Caregiver's drinking and number of TE were associated with increased PTSD likelihood in both genders. In boys, positive peer support to decreased likelihood, whereas in girls, negative social support from caregiver and peer was linked to increased PTSD likelihood.

### Joint effects of social-demographic factors of traumatic experiences

Multivariable logistic regression was performed to examine the joint effects of significant factors found in univariable analyses on reporting trauma and PTSD likelihood. In boys, increased risk of encountering trauma was associated with nonparent as primary caregiver (odds ratio [OR] = 3.43, 95% CI = 1.76–6.69,  $P < 0.001$ ) and negative caregiver support (OR = 2.08, 95% CI = 1.32–3.28,  $P = 0.001$ ), while increased PTSD likelihood was correlated with caregiver's drinking (OR = 6.13, 95% CI = 1.30–28.64,  $P = 0.021$ ) and number of TE (OR = 1.40, 95% CI = 1.02–1.91,  $P = 0.032$ ). In girls, increased risk of encountering trauma was associated with caregiver's drinking (OR = 2.09, 95% CI = 1.34–3.26,

**Table 1: Socialdemographic factors of reporting trauma in two genders in Taiwanese adolescents (univariate logistic regression)**

	Boys (n=341)			Girls (n=410)		
	With trauma (n=210), n (%)	No trauma (n=131), n (%)	OR (95% CI) <sup>†</sup>	With trauma (n=238), n (%)	No trauma (n=172), n (%)	OR (95% CI)
Parents' marital status						
Married/cohabited	132 (62.9)	85 (64.9)	1	146 (61.3)	107 (62.2)	1
Divorced/separated/widowed	78 (37.1)	46 (35.1)	1.09 (0.69-1.72)	92 (38.7)	65 (37.8)	1.03 (0.69-1.55)
Type of primary caregiver						
Parents	153 (72.9)	118 (90.1)	1	191 (80.3)	137 (79.7)	1
Not parents <sup>‡</sup>	57 (27.1)	13 (9.9)	3.38 (1.76-6.46)*	47 (19.7)	35 (20.3)	0.96 (0.59-1.57)
Caregiver's education						
>9 years	106 (50.5)	68 (51.9)	1	113 (47.5)	80 (46.5)	1
≤9 years <sup>§</sup>	104 (49.5)	63 (48.1)	1.05 (0.68-1.63)	125 (52.5)	92 (53.5)	0.96 (0.64-1.42)
Caregiver's employment status						
Stable employment	110 (52.4)	74 (56.5)	1	128 (53.8)	83 (48.3)	1
Unstable employment <sup>  </sup>	100 (47.6)	57 (43.5)	1.18 (0.76-1.83)	110 (46.2)	89 (51.7)	0.80 (0.54-1.18)
Caregiver's drinking						
Irregular	108 (51.4)	82 (62.6)	1	136 (57.1)	130 (75.6)	1
Regular**	102 (48.6)	49 (37.4)	1.58 (1.01-2.46)*	102 (42.9)	42 (24.4)	2.32 (1.50-3.57)*
Social support, mean (SD)						
From caregiver-positive <sup>‡</sup>	2.42 (0.71)	2.62 (0.77)	0.69 (0.51-0.94)*	2.45 (0.69)	2.57 (0.75)	0.78 (0.59-1.03)
From caregiver-negative	2.05 (0.59)	1.90 (0.50)	1.65 (1.10-2.47)*	2.21 (0.62)	1.94 (0.60)	2.02 (1.44-2.82)*
From peer-positive	2.75 (0.85)	2.99 (0.81)	0.69 (0.53-0.91)*	3.16 (0.71)	3.09 (0.78)	1.12 (0.86-1.45)
From peer-negative	1.76 (0.54)	1.66 (0.62)	1.36 (0.92-2.02)	1.69 (0.55)	1.54 (0.46)	1.80 (1.20-2.71)*

\*P<0.05, <sup>†</sup>OR: Odds ratio, CI: Confidence interval, <sup>‡</sup>Including grandparents and relatives, <sup>§</sup>Primary education in Taiwan system, <sup>||</sup>Including seasonal and long-term unemployment, \*\*Drinking more than twice a week in the past year, <sup>‡‡</sup>4-point Likert scale, from 1- never to 4- always perceived support, higher scores denoted greater positive and negative support. SD: Standard deviation

**Table 2: Socialdemographic factors of posttraumatic stress disorder likelihood in two genders in Taiwanese adolescents (univariable logistic regression)**

	Boys (n=210)			Girls (n=238)		
	Yes <sup>†</sup> (n=16), n (%)	No (n=194), n (%)	OR (95% CI) <sup>‡</sup>	Yes (n=27), n (%)	No (n=211), n (%)	OR (95% CI)
Parents' marital status						
Married/cohabiting	10 (62.5)	122 (62.9)	1	15 (55.6)	131 (62.1)	1
Divorced/separated/widowed	6 (37.5)	72 (37.1)	1.01 (0.35-2.91)	12 (44.4)	80 (37.9)	1.31 (0.58-2.94)
Type of primary caregiver						
Parents	11 (68.8)	142 (73.2)	1	19 (70.4)	172 (81.5)	1
Not parents <sup>§</sup>	5 (31.3)	52 (26.8)	1.24 (0.41-3.74)	8 (29.6)	39 (18.5)	1.85 (0.75-4.55)
Caregiver's education						
>9 years	6 (37.5)	100 (51.5)	1	16 (59.3)	97 (46.0)	1
≤9 years <sup>  </sup>	10 (62.5)	94 (48.5)	1.77 (0.62-5.07)	11 (40.7)	114 (54.0)	0.58 (0.25-1.32)
Caregiver's employment status						
Stable employment	5 (31.3)	105 (54.1)	1	16 (59.3)	112 (53.1)	1
Unstable employment***	11 (68.8)	89 (45.9)	2.59 (0.86-7.75)	11 (40.7)	99 (46.9)	0.77 (0.34-1.75)
Caregiver's drinking						
Irregular	2 (12.5)	106 (54.6)	1	7 (25.9)	129 (61.1)	1
Regular**	14 (87.5)	88 (45.4)	8.43 (1.86-38.10)*	20 (74.1)	82 (38.9)	4.49 (1.82-11.10)*
Social support, mean (SD)						
From caregiver-positive <sup>‡‡</sup>	2.22 (0.61)	2.44 (0.71)	0.63 (0.30-1.33)	2.56 (0.71)	2.43 (0.69)	1.30 (0.73-2.31)
From caregiver- negative	2.31 (0.67)	2.03 (0.58)	2.07 (0.92-4.66)	2.61 (0.59)	2.16 (0.61)	3.04 (1.60-5.77)*
From peer-positive	2.28 (1.06)	2.78 (0.82)	0.51 (0.28-0.92)*	3.03 (0.71)	3.17 (0.71)	0.76 (0.44-1.29)
From peer-negative	1.81 (0.618)	1.76 (0.536)	1.17 (0.46-2.97)	1.91 (0.52)	1.67 (0.55)	1.97 (1.03-3.76)*
Number of traumatic events	3.93 (1.84)	2.59 (1.49)	1.61 (1.19-2.19)*	4.14 (2.05)	3.09 (1.60)	1.38 (1.11-1.71)*

\*P<0.05, <sup>†</sup>PTSD symptom score ≥38 indicating likely PTSD case, <sup>‡</sup>OR: Odds ratio, CI: Confidence interval, <sup>§</sup>Including grandparents and relatives, <sup>||</sup>Primary education in Taiwan system, \*\*\*Including seasonal and long term unemployment, \*\*Drinking more than twice a week in the past year, <sup>‡‡</sup>4-point Likert scale, from 1- never to 4- always perceived support, higher scores denoted greater positive and negative support. PTSD: Posttraumatic stress disorder

P = 0.001) and negative caregiver support (OR = 1.83, 95% CI = 1.29–2.59, P = 0.001), similar patterns were found

with increased PTSD likelihood: for caregiver's drinking, OR = 3.59, 95% CI = 1.41–9.15, P = 0.007; for negative



caregiver support, OR = 2.21, 95% CI = 1.09–4.49,  $P = 0.028$ . However, the number of TE was only marginally associated with increased PTSD likelihood (OR = 1.25, 95% CI = 0.98–1.59,  $P = 0.062$ ).

## DISCUSSION

This study is one of few to examine PTSD likelihood in male and female adolescents who suffered various types of TEs in the socio-cultural environment of Taiwan. The majority of PTSD and social support studies have been conducted in Western countries [27]. As such, the present study adds to and expands beyond previous research by examining PTSD risk modifiers, including social support, in an Asian population.

The main findings of this study were that girls' probability of reporting trauma and PTSD likelihood was not significantly different than boys. However, girls reported higher numbers of TEs which was concurrent with significantly higher PTSD scores and greater criteria B (re-experiencing) symptoms compared to boys. Consonant with the present study, the previous research has also found higher PTSD symptom scores among girls compared with boys [28].

### Caregiver and peer social support

It is surprising that a positive social support did not contribute significantly to the results in the present study given the plethora of research touting the benefits of positive social support for health [29]. The effect of peer social support was only significant in univariable models of trauma and PTSD symptoms, but its effect was no longer significant in multivariable analyses. However, multivariable analysis revealed a significant relation between negative family support and increased risk of reporting trauma in both genders, while the relation between family support and an increased risk of PTSD likelihood was only found significant in girls. Consistent with the findings of the present study, researchers found that the higher prevalence of PTSD among females as compared to males was mediated by higher negative social support [30]. Likewise, studies of female trauma survivors have also shown that negative social support is a better indicator of PTSD symptomatology than absence of positive support [31], suggesting that females may be more sensitive to negative social support than males. In accord with the findings of the present study, a previous examination of social support and PTSD in Taiwanese adolescents found negative social support served as a partial mediator of PTSD symptoms but that positive social support did not play a significant role [32]. Negative social support may erode victims' perception of social support leading to increased PTSD risk [11,33]. It is plausible that negative social support may both be a secondary stress exacerbating PTSD symptoms and making it difficult for adolescents to benefit from positive social support. It is worth mentioning that positive social support, especially of peer, seems to be a protective factor for boys, as shown in univariable analyses. This could be explained from the different process of socialization in the two genders: Since both genders rely mainly on support from same sex peers, and girls' socialization is geared often toward empathetic behavior [34], this type of interaction is a constant for girls, while when it occurs in boys it is more

readily recognized as a protective factor, being more uncommon and therefore exceptional.

### Caregiver alcohol consumption

We found that regular caregiver alcohol consumption was a risk factor for PTSD likelihood in both genders and increased reporting trauma in girls. These findings are supported by research suggesting that of myriad factors influencing adolescent health and behavior, the most critical protector from developing psychopathologies, including PTSD, appears to be the role of primary caregiver [35]. Parents facilitate the socialization process, by exemplary behaviors and parenting styles, transmission of genetic material, family and cultural values, as well as organizational patterns of family life which impact psychological and social development [36]. Caregiver alcohol consumption apparently predisposes adolescents to trauma exposure, increasing risk of PTSD [18]. Furthermore, caregiver regular drinking may exacerbate family disruptions, conflicts, reducing family health and support [37], as observed in this study, around half of the girls had reported witnessing family members being physically assaulted and perceived a high level of negative caregiver's support. Subsequent negative family support may result in higher levels of anxiety [38] and increasing adolescent risk of psychopathologies [39].

### Limitations

Our conclusions must be tempered by limitations of the present study. First, the cross-sectional design of the present study precluded hypothesis on causal relations. Second, the low response rate in our study may indicate a nonresponse bias within the sample. While more females than males responded, further analysis revealed similarities in terms of school size and grades in estimates sample and responded sample. Third, it is possible that low socioeconomic status was not significantly related to trauma and PTSD likelihood in the present study because education and employment were not suitable measures of socioeconomic status and that household income may have better captured socioeconomic status [40]. Fourth, the UCLA-PTSD-RI is a measure of PTSD symptoms not a diagnostic tool. Future studies using a diagnostic tool to assess the relationship between social support and caregiver alcohol use with adolescent PTSD would be of great value. Fifth, because data collection relied on self-report recall bias leading to under-or-over reporting trauma could not be ruled out. However, in defense of our data collection methods, adolescents seem to be the best reporters of their own internalizing symptomatology [41].

## CONCLUSION AND IMPLICATIONS

The results of this study indicate that family has important influences on the mental health status of adolescent Taiwanese. Much of the emphasis of mental health interventions for youths has been devoted to school or community centered efforts that focus solely on the knowledge, attitudes, or self-esteem of youths themselves, with only a few programs also involving parents or families [42]. Thus, incorporating primary caregiver support into PTSD prevention and treatment programs for adolescents seems advisable [43]. Alcohol-related problems among caregivers are major public

health problems, and effective preventive programs require consideration of individual, social, and environmental factors that facilitate and prevent alcohol misuse. Because a substantial proportion of Taiwanese caregivers with AUD often seek medical treatment for their physical complications rather than their AUD, prevention among caregivers should focus on early detection and effective management of AUDs among adult outpatients [21,44,45]. Furthermore, a greater emphasis on reducing real or perceived negative social interaction in high-risk PTSD groups may be more effective than increasing positive social support, particularly for females. Future research efforts should focus on the various types of positive and negative social interactions across social domains and that deliberate and comprehensive assessment of both positive and negative social forces in an individual's social networks must be made prior to providing services or designing interventions.

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### Conflicts of interest

There are no conflicts of interest.

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