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The Effect of Depression and Anxiety on Post-Traumatic Stress Disorder in Security Guards: Mediating Role of Alcohol Abuse

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Abstract: Due to their occupational exposure, Chinese security guards are a vulnerable population prone to stress and mental health disorders, which in turn negatively affect their physical health and job performance. Previous studies have established the causal relationships between depression and alcohol abuse, anxiety and alcohol abuse, and alcohol abuse and PTSD. This study investigates the relationships between depression and PTSD and anxiety and PTSD, with alcohol abuse as a mediator. A total of 2872 Chinese security guards completed an online survey assessing depression, anxiety, PTSD, and alcohol abuse. Mediation analysis examined whether alcohol abuse mediated the relationship between depression and PTSD, and anxiety and PTSD. The results indicate that alcohol abuse acts as a mediator in the relationships between anxiety and PTSD, and both conditions are substantial predictors of PTSD. According to this study, anxiety and PTSD are highly correlated, as is depression with PTSD, and alcohol abuse acts as a mediator in this link. This study emphasizes the value of treating mental health conditions holistically as opposed to concentrating on isolated symptoms, underscoring the need for tailored psychological services and policy measures to support this vulnerable population.

Keywords: Depression, PTSD, Anxiety, Alcohol Abuse, Security Guards.

1. Introduction

Security guards working in China are in charge of a variety tasks, including guarding entrances at the gates, detecting and inspecting entering personnel and vehicles, patrolling specific areas and lots, and safeguarding any ongoing events. Their work locations vary from private areas and housing estates, for example, to public areas, like metro stations. Due to the nature of their job, security guards face a high risk of exposure to physically and psychologically stressful events. In 2023, there were more than 6.76 million incumbent security guards in China. Among them, 715 of them were injured, and 5 lost their lives during duty [1]. Security guards frequently deal with work-related violence, which the European Commission defines as any incident involving mistreatment, threats, or assault that could endanger an employee's safety, well-being, or health either directly or indirectly [2]. Regular exposure to stressful events and workplace violence raises the likelihood of developing mental health problems like depression and substance abuse [3]. A Chinese study in 2017 reported that among 676 security guards surveyed, about 29% exhibited signs of mental health issues, primarily depression

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and anxiety. Additionally, a Canadian study highlighted posttraumatic stress disorder (PTSD) and alcohol use disorder as primary conditions among security guards [4].

The unhealthy mental health status of security guards can lead to negative physical consequences. A study reported a consistent comorbidity between mental health disorders (PTSD, major depressive disorder, generalized anxiety disorder, alcohol use disorder) and chronic pain in the body among safety personnel in Canada [5]. In addition, Researchers discovered a more general pattern indicating that physical and mental health are significantly correlated [6]. When mental health is compromised, it negatively affects the work performance, interpersonal relationships, and physical health of security guards. Even though other mental disorders exist, this article focuses on depression, anxiety, and PTSD.

1.1. Depression/Anxiety and PTSD

According to research, depression is a major contributing factor to the persistence of PTSD and plays a significant role in its onset [7]. Furthermore, depression significantly predicts the severity of PTSD symptoms among women participants [8]. A study conducted by Edmondson and Lei also showed that participants who were currently experiencing depression during the hospitalization tended to report significantly greater PTSD symptoms compared to patients without a depression history or who had a positive depression history [9]. Prior research has demonstrated the predicted connection between PTSD and depression, allowing for the establishment of a direct path between these two variables in this study.

Anxiety can serve as a pathway to PTSD in the relationship to fight-or-flight responses [10]. Among male participants, anxiety significantly predicted PTSD symptoms [8]. Anxiety can lead to anxiety sensitivity, which will extend the fear of harmful consequences, leading to a higher level of PTSD symptoms. Studies have shown that anxiety can serve as a pathway to PTSD and will enhance PTSD symptoms, which allows for the direct path between anxiety and PTSD in this study.

1.2. Alcohol Abuse and PTSD

The Functional Association Models propose two hypotheses to explain the causal link between alcohol use disorder (AUD) and PTSD. High-Risk hypothesis predicts that AUD increases the likelihood of trauma exposure by reducing the body's capacity to recognize environmental danger cues, which in turn raises the risk for PTSD. The Susceptibility posits that AUD interferes with emotional processing following trauma exposure, increasing the risk for PTSD [11]. AUD patients had a greater probability to be exposed to traumas, which influenced the development of PTSD later on, according to a study that supported the High-Risk theory [12].

1.3. Depression/Anxiety and Alcohol Abuse

Depression in early adulthood has been found to predict the emergence of AUD later in life [13]. It is possible that early heavy drinking behaviors will lead to a higher risk for mood problems due to the reason that their brains are still developing and the increase in environmental stressors brought by alcohol [14].

A longitudinal have found that individuals with severe anxiety disorders are at a higher risk of developing AUD [15]. Epidemiological data indicates that alcohol use as a coping strategy is common among individuals with anxiety, which increases their risk of alcohol dependence [16]. Moreover, Boschloo et al. showed that the initial occurrence of alcohol dependence is highly predicted by both anxiety and depression. [17].

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1.4. The Mediating Role of Alcohol Abuse in the Impact of Depression/Anxiety on PTSD

The causal relationships discussed in the previous points allow for using alcohol abuse as a mediator for the indirect path between depression and PTSD, and anxiety and PTSD. This study aims to investigate the relationship between PTSD, depression, and anxiety, with a focus on alcohol abuse as a mediator among security guards in China. The hypothesis proposed is that the relationship between PTSD, depression, and anxiety among security guards is mediated by alcohol abuse. By examining these common mental health issues identified by previous studies among security guards, the public can better understand the challenges security guards face. This knowledge may also help explain certain workplace incidents and provide policymakers with valuable insights to design support mechanisms for this vulnerable population.

2. Method

2.1. Participants

Anonymized data was gathered through web-based survey techniques. Participants were recruited through large corporations responsible for hiring and managing security guards nationwide. A total of 2872 participants responded to the survey, with a 100% completion rate. All responses were valid and included in the analysis for this study.

2.2. Measures

2.2.1. Depression

Depression was measured using the 9-item Patient Health Questionnaire (PHQ-9) [18]. Participants were considered to have a positive screen for depression if their PHA-9 total score was $\geqslant$ 7 [19]. A 4-point Likert scale is used to answer each question, with 0 denoting not at all and 3 denoting almost every day. An exemplary question from the survey is “Little interest or pleasure in doing things.” In this study, PHQ-9 exhibits internal consistency in this sample (α = 0.93). PHQ-9 has demonstrated strong validity among Chinese citizens [20].

2.2.2. Anxiety

The 7-item Generalized Anxiety Disorder scale (GAD-7) was used to quantify anxiety [21]. Individuals were deemed to have screened positive for anxiety if their GAD-7 score was > 9 [22]. A 4-point Liker Scale (0 = not at all, 3 = almost every day) is used to answer each question. An exemplary question from the survey is “Feeling nervous, anxious, or on edge.” GAD-7 showed a high degree of internal consistency (α = 0.95) in this study. Also, GAD-7 remains valid among Chinese, as a previous study indicated [23].

2.2.3. PTSD

PTSD was measured using the DSM-5 PTSD Checklist [24]. If a individual had a PCL-5 score of $\geqslant$ 32, they were considered to have screened positive for PTSD [25]. A 5-point Likert scale, with 0 denoting not at all and 4 denoting extremely, is used to answer each question. An example question from the survey is “Repeated, disturbing, and unwanted memories of the stressful experience.” Excellent reliability was shown by PCL-5 (α = 0.97).

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2.2.4. Alcohol Abuse

Alcohol abuse was measured using the Alcohol Use Disorders Identification Test (AUDIT)[26]. An alcohol use disorder screen result is positive if the score is >15 [27]. A 5-point Likert scale, with 0 denoting not at all and 4 denoting extremely, is used to answer each question. An exemplary question from the survey is, "How often during the last year have you had a feeling of guilt or remorse after drinking?" AUDIT showed high reliability in this study (α = 0.83). It also seemed to have good convergent validity among the Chinese population [28].

2.2.5. Demographic Information

The questionnaire collected data on sex, age, marital status, education level, and years of work experience. Age was classified into seven categories: ≤ 18, 18-25, 26-30, 31-40, 41-50, 51-60, and ≥ 60. Unmarried, Separated/Divorced/Widowed, and Married were the three categories for marital status. Four levels of education were distinguished: high school or below, junior college, college, and postgraduate or above. Four categories were used to classify work experience: ≤ 4 years, 4-9 years, 10-15 years, and ≥ 15 years. Male (85.76%) and individuals that had completed high school or below (73.40%) composed a majority of the participants. Approximately 45.30% of participants had worked as a security guard for ≤ 4 years.

2.3. Data Analysis

For all analyses, RStudio 4.4.1 software was used. Psych package was used to analyze the demographic information, ggcorrplot package was used to conduct the correlational analysis, and mediation package was used to conduct a mediation model. In this study, anxiety and depression were regarded as the independent variables, and PTSD as the dependent variable. Alcohol abuse was examined as a mediating variable.

To investigate the correlations between the study variables (PTSD, depression, anxiety, and alcohol abuse), a Pearson correlation analysis was performed. A mediation model was conducted to assess whether Alcohol mediates the relationship between depression and PTSD, and anxiety and PTSD. The analysis included demographic variables (sex, age, marital status, education, and work experiences) as covariates.

3. Results

3.1. Descriptive Statistics and Analysis of Correlation

Table 1 displays the correlational results of the main variables of this study. There is a significant and positive correlation between depression and PTSD ($r = 0.79$, $p < 0.001$), anxiety ($r = 0.74$, $p < 0.001$), and alcohol abuse ($r = 0.44$, $p < 0.001$). Similarly, depression is positively and significantly correlated with anxiety ($r = 0.85$, $p < 0.001$) and alcohol abuse ($r = 0.43$, $p < 0.001$). Additionally, anxiety is positively and significantly correlated with alcohol abuse ($r = 0.42$, $p < 0.001$). The range of Person's correlation from 0.42 to 0.85 the main variables in this study have moderate to strong correlations with one another, satisfying the prerequisite condition for the planned statistical analysis. Moreover, the results confirm that the variables are relatively independent of each other, supporting the appropriateness of further analysis.

Table 1: Main variable descriptive statistics and Analysis of Correlation (N=2872)

Variables	1	2	3	4	M ± SD
1. Depression	-				1.28 ± 3.04

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Table 1: (continued).

2. Anxiety	0.85**	-			1.99 ± 3.89
3. PTSD	0.79**	0.74**	-		5.22 ± 9.05
4. Alcohol Abuse	0.43**	0.42**	0.44**	-	2.19 ± 3.67

Note: $^{**}p$ <0.01; $^{*}p$ < 0.05.

3.2. Mediation Analyses

3.2.1. The Mediating Function of Alcohol Abuse in the Relationship Between PTSD and Depression

Figure 1 shows that alcohol abuse and depression are positively correlated, meaning that higher levels of depression are associated with an increased likelihood of alcohol abuse ($p < 0.01$). Alcohol Abuse also has a positive prediction on PTSD, implying that alcohol abuse is more likely to cause the onset of PTSD and worsen the PTSD symptoms ($p < 0.01$). There is a significant direct path from depression to PTSD ($p < 0.01$). A significant indirect effect is shown by the Sobel z-test and bootstrap results ($a \times b = 0.72$, $p < 0.01$).

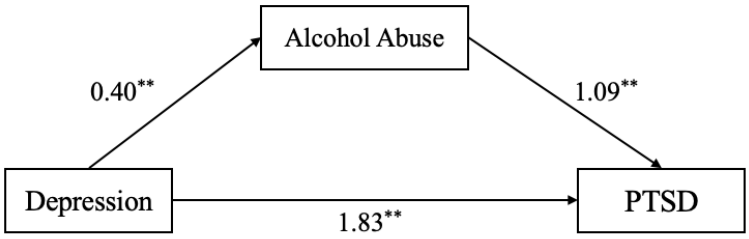


Figure 1: The mediating model of depression.

Table 2 demonstrates that alcohol abuse had a statistically significant indirect impact on the relationship between PTSD and depression. Additionally, the correlation between PTSD and depression remained statistically significant, indicating that even after accounting for the mediation by alcohol abuse, depression still has a substantial direct effect on PTSD. The proportion of the total effect mediated by alcohol abuse is 6.92%, $p < 0.001$, suggesting that alcohol abuse plays a significant mediating role in the connection between PTSD and depression. However, the direct impact of depression on PTSD accounts for 93% of the overall effect, demonstrating the strong independent impact of depression. Together, 63.42% of the variance in PTSD was explained ($F^2 = 1.73$).

Table 2: Meditation analysis for depression and PTSD (N=2872)

Path Effect	B	95% CI	SE	p
indirect effect: depression→ alcohol abuse→ PTSD	0.13	[0.07, 0.19]	0.013	< 0.001
direct effect: depression → PTSD	1.71	[1.52,1.87]	0.029	< 0.001

3.2.2. The Mediating Function of Alcohol Abuse in the Relationship Between PTSD and Anxiety

Figure 2 indicates that anxiety positively predicts alcohol abuse ($p < 0.01$), meaning that a higher level of anxiety will increase the likelihood of alcohol abuse. Alcohol abuse is positively associated with PTSD ($p < 0.01$). Anxiety and PTSD are significantly ($p < 0.01$) directly related. Both Sobel z-test and bootstrap results suggest that there is a significant indirect effect ($a \times b = 0.91$, $p < 0.01$).

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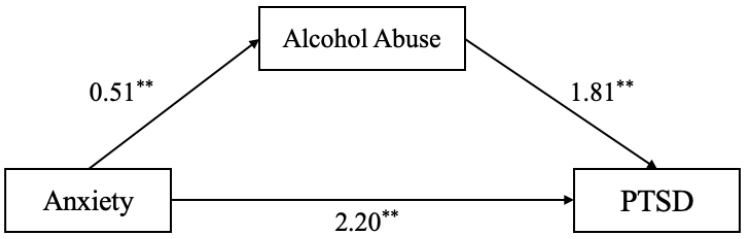


Figure 2: The mediating model of anxiety.

The Table 3 shows that alcohol abuse had a statistically significant indirect impact on the association between anxiety and PTSD. Also, the correlation between anxiety on PTSD remained statistically significant, meaning that after bypassing the mediation by alcohol abuse, anxiety still has a substantial direct effect on PTSD. The proportion of the total effect mediated by alcohol abuse is 9.04%, $p < 0.001$, suggesting that alcohol abuse significantly mediates part of the relationship between anxiety and PTSD. However, the direct impact of anxiety on PTSD accounts for about 90.00% of the overall effect, reflecting anxiety's strong independent impact on PTSD. Together, 56.53% of the variance in PTSD was explained ($F^2 = 1.30$).

Table 3: Meditation Analysis for Anxiety and PTSD (N=2872)

Path Effect	B	95% CI	SE	*p*
anxiety→alcohol abuse →PTSD	0.20	[0.12, 0.29]	0.019	< 0.001
direct effect: anxiety → PTSD	2.00	[1.77, 2.25]	0.040	< 0.001

4. Discussion

The findings revealed strong positive correlations between PTSD, depression, and anxiety, which are in line with the earlier research [29]. Specifically, under the same circumstances, security guards with symptoms of depression or anxiety have a higher likelihood to exhibit higher levels of PTSD symptoms than those who do not. Additionally, alcohol abuse was moderately correlated with PTSD, depression, and anxiety. This aligns with the prior study that demonstrate that alcohol use is positively correlated with PTSD, anxiety, and depressive symptoms [30].

Consistent with the hypothesis, alcohol abuse mediates the effect anxiety has on PTSD, and depression has on PTSD. The finding suggests that security guards with depression symptoms, such as depressed mood and loss of interest, or anxiety symptoms, such as restlessness, fatigue, and irritability, are more prone to developing alcohol abuse [31]. This result is supported by previous studies, which have indicated causal relationships between depression and alcohol abuse, as well as anxiety and alcohol abuse [14, 15]. Furthermore, the findings imply that alcohol abuse could be a factor in the emergence of PTSD, characterized by symptoms such as involuntary and recurrent distressing memories, avoidance of external reminders, and or feelings of detachment [32]. This finding is consistent with past research that demonstrated alcohol abuse can cause PTSD to develop. [33]. This study offers a unique perspective on the relationship between these four variables (Depression, Anxiety, Alcohol abuse, PTSD). That is, the relationship between anxiety and PTSD, as well as between depression and PTSD, can be mediated by alcohol abuse. The analyses reveal that Chinese security guards with anxiety may be more susceptible to PTSD, partly because they are more prone to abuse alcohol. Similarly, Chinese security guards with depression are more likely to acquire PTSD, partly because the alcohol abuse caused by depression that exacerbates the PTSD symptoms. In addition, there was still a statistically significant direct effect of depression and anxiety on PTSD,

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suggesting that these mental health issues are also independently associated with PTSD, even without the influence of alcohol abuse.

One potential explanation for this mediation effect is the self-medication hypothesis, where people cope with psychological symptoms themselves by using substances like alcohol to alleviate stress or suffering. The self-medication method can lead to dependence on this substance [34]. For example, security guards may consume alcohol to reduce anxiety, which could lead to alcohol dependence and, subsequently, a higher risk of PTSD, as previously discussed [33].

5. Limitations and Implications

The study contains several limitations. First, using self-report measures raises the possibility of response bias because people may overreport or underreport their experiences with trauma [35]. Also, security guards might be reluctant to provide accurate responses to sensitive questions, such as those related to alcohol use, due to concerns about how their answers could impact their job security. Second, the gender disparity in the sample may limit how broadly the results can be applied. With 85.76% of participants being male, the results may not fully represent the experiences of female security guards. Third, the non-random sampling method introduces sample bias, as participants completed the survey based on their access and willingness to participate. Potentially, this could affect how widely the findings can be applied. Furthermore, the results may not be clinically useful due to the very large sample size, which could magnify the disparities [36].

The results highlight the importance of treating mental health problems among Chinese security guards as a comprehensive issue rather than focusing on isolated symptoms. Recognizing this allows for the design and provision of more effective psychological services aimed at improving the overall well-being of security guards in China. The study sheds further light on mental health challenges faced by this population by uncovering the relationship between depression, anxiety, PTSD, and alcohol abuse. Further research should address the limitations in this study, including potential biases, and investigate whether these findings remain consistent and hold clinical implications when using different measures and methodologies.

This study provides overall statistics on PTSD, depression, anxiety, and alcohol use disorder (AUDIT) scores. However, these scores are generally lower than those reported for public safety personnel in Canada, which may be influenced by China's prohibition of gun violence [4]. The reduced likelihood of exposure to traumatic events such as gun shootings may contribute to the lower mental health symptom scores among Chinese security guards. The underlying reasons for these differences are worth exploring in future research. Additionally, there are other potential moderators that should be investigated in the relationships between depression/anxiety and PTSD, as well as in the role of alcohol abuse as a mediator. Factors such as coping styles, family support, and personality traits could offer deeper insights into the mental health and well-being of Chinese security guards. To further comprehend the intricate mechanisms underlying the interaction between alcohol abuse, anxiety, and PTSD, it is imperative to look into why alcohol does not function as a moderator in this relationship.

6. Conclusion

This research contributes to the investigation of an association between depression/anxiety and PTSD among Chinese security guards using a moderated mediation model. The findings suggest that alcohol abuse partially mediated the association between both depression and anxiety with PTSD. In other words, alcohol abuse serves as a pathway through which depression and anxiety exacerbate PTSD symptoms.

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