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Relationship between depression, the family environment, and the coping styles of military recruits
A cross-section study

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Abstract
To understand the self-rated depression scores of military recruits and to analyze the relationship between depression, the family environment, and coping styles.

Multistage stratified cluster random sampling was used to study participants who, in September 2014, had enrolled as military personnel in the Xinjiang military. The participants were requested to complete the Chinese versions of the Self-rated Depression Scale (SDS), the Family Environment Scale (FES-CV), and the Simplified Coping Style Questionnaire (SCSQ). Between-groups comparisons were performed using a t test and Mann–Whitney U test. Correlations were determined utilizing Spearman rank correlation coefficient, and the influencing factors of the SDS scores were analyzed using logistic regression.

The average score of the SDS among the 323 participants was 42.53 ± 8.51. Specifically, the score of the "high school and below" group was higher than that of the "college and above" group [i.e., (43.98 ± 8.30)] vs [$(40.43.98 \pm 8.30)$ vs (37.94 ± 5.50), $P < .05$]. The SDS score of the "nonstudent" (i.e., social status before enlistment) group was higher than that of the "student" group [(i.e., 45.00 ± 7.60) vs (40.42 ± 8.02), $P < .05$] and the SDS score of the "smoking" group was higher than that of the "nonsmoking" group [i.e., (45.33 ± 7.74 vs 40.34 ± 7.58, $P < .05$)]. In addition, the scores related to the entertainment, organization, and controllability of the SDS$\geq$50 group were lower than those observed for the SDS <50 group, (i.e., $Ps < .05$). The SDS score was positively correlated with the SCSQ ($r = 0.30$) negative coping style score ($r = 0.30$), positively correlated with the FES-CV contradiction score ($r = 0.32$), and negatively correlated with the FES-CV knowledge score ($r = -0.43$), entertainment score ($r = -0.42$), organization score ($r = -0.37$), and controllability score ($r = -0.28$), respectively, ($Ps < .05$). The results of the logistic regression analysis showed that entertainment was contained in the final regression equation ($P < .001$) with odds radio (95% confidence interval) of 0.512 (0.319–0.824).

A correlation was found between depression among military personnel and their family environment, and entertainment may be a potential protective factor against depression.

Abbreviations: FES-CV = the Family Environment Scale, SCSQ = the Simplified Coping Style Questionnaire, the SDS = Self-rated Depression Scale.

Keywords: coping style, cross-sectional study, depression, family environment, military personnel

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1. Introduction

Following their enlistment in the army, new recruits must first complete a 3-month recruitment training program. These soldiers must disconnect from their familiar social and family environments, and begin a career that necessitates adherence to strict rules and regulations. This stage of military training is high in content, highly intense, involves the satisfaction of numerous requirements, and requires a high level of discipline, all of which contribute to a high incidence of episodic depressive symptoms and alexithymia among soldiers.[1] It has been demonstrated in several studies that often alexithymic individuals may show significantly higher levels of psychological distress than non-alexithymics and may develop "functional" somatic symptoms and psychiatric symptoms such as anxiety and depression.[2] Depression is a common psychological problem that has a negative impact on an individual's social functioning. Depression, anxiety, a lack of initiative in respect to training, and work and personal issues can lead to suicidal thoughts and behaviors, which seriously affect the morale, security, and stability of the army as well as the effectiveness of military personnel in combat.[3] Family is an important foundation for an individual's growth. The family environment has a profound and significant impact on an individual's psychological developmental level.[4] The recruits' living environment quickly changed from a home to a closed one. Strict military management and long-term inability to communicate with family and friends often produce negative emotional responses to normal nonaversive stimuli.[5] In psychology, "coping" refers to an individual's conscious, purposeful, and flexible behavior that helps them to adapt to changes in the real environment. Its main function is to regulate the role of stressful events by, for example, modifying the individual's appraisal of stressful events, or regulating their physical or emotional reactions to events, etc.[6]

At present, the Symptom Check List 90 (SCL-90),[7] the Eysenek Personality Questionnaire (EPQ),[8] and other tools are commonly used in studies to evaluate the mental health of new recruits. However, the relationship between an individual's family environment, their coping style, and the incidence of depression among young, new military is rarely investigated. Therefore, this study is based on a new army in Xinjiang. The soldiers who enlisted in the army were studied using the Chinese versions of the Self-rated Depression Scale (SDS), the Family Environment Scale (FES-CV), and the Simplified Coping Style Questionnaire (SCSQ) to analyze the relationship between depression, the family environment, and coping styles. From the perspective of the family environment and coping styles, this paper analyzed the main factors that affect the mental health of young military recruits, and offers a theoretical basis by which to enhance the scientific and targeted training of recruits.

2. Methods

2.1. Participants

Participants included new military recruits who enlisted in Xinjiang army in September 2014. Multistage stratified cluster random sampling was employed. First of all, the recruits were randomly selected according to the unit at regiment level, and then by reference to the recruits' training task companies. Finally, 50 to 70 recruits were randomly chosen from the selected companies. Inclusion criteria: According to the Chinese People's Liberation Army's physical standards, medical examinations

were carried out with soldiers both before and after their enlistment, the results of which satisfied the requirements for service. Exclusion criteria: recruits who had sustained training injuries or whose immediate relatives had a history of mental illness were excluded from participating in this study. This study was approved by the Medical Ethics Committee of Xinjiang Medical University, which is in line with the latest revision of the Helsinki Declaration. The participants were aware of the nature of the study and its possible consequences, were offered no financial reward, and provided their written informed consent at the time of the investigation. A total of 342 soldiers were included in the study.

2.2. Methods

Before the investigation, the researchers should be professionally trained and the guidelines should be adhered to. The study was conducted in early November 2014, that is, the 10th week of recruitment training, which is the mid-term of military training. Different types of training and assessment projects were comprehensively carried out, and the psychological stress of new recruits was relatively high. The research was conducted at the military sports activity center. Having assembled all of the participants, the researchers explained the purpose, content, and requirements of the survey, and avoided giving hints. Researchers endeavored to gain the trust of the respondents, and emphasized that completion of the questionnaires would be anonymous, which thus encouraged respondents to provide authentic information. The questionnaires were retrieved on-site after completion. Two researchers used EpiData 3.1 software to input the scale and construct the database, which was checked to ensure the accuracy of the input.

2.3. Demographic characteristics

The demographic characteristics of the participants were investigated using a self-report method for items including age (i.e., divided into "<20 years old" group and "≥20 years old" group), educational level (i.e., divided into "high school and below" group and "college and above" group), current smoking status (i.e., defined as smokers who were smoking in the past 30 days at the time of investigation[9]), preenlistment residence (i.e., urban or urban and rural groups according to actual residence). Identity before enlistment (i.e., divided into "student" group and "nonstudent" group), and so on.

2.4. Survey of depression

The SDS was employed in this study. The scale, which was developed by Zung et al in 1965, is one of the scales that is recommended by the US Department of Education, Health, and Welfare for psychopharmacological research. It is easy to use and apply.[10] After the SDS was translated into Chinese in 1985, Chinese scholars applied it to different groups, including Chinese soldiers.[11,12] The scale consists in 20 items, and usually takes 5 to 10 minutes to complete. The items are scored according to a Likert-type scale ranging from 1 to 4. Some items are scored in reverse. According to Chinese norms, an SDS standard score that is greater than or equal to 50 points is taken as an indicator of depression.[13] The internal consistency and reliability of the SDS was measured using Cronbach's alpha, and the coefficient was 0.91.

2.5. Family environment survey

To investigate the family environment, this study used the FES-CV,[14] which contains 90 items and takes approximately 30 minutes to complete. The answer "yes" is attributed 1 point: The answer "no" is assigned 2 points. The scale is divided into 10 subscales that are used to evaluate intimacy, emotional expression, contradiction, success, knowledge, entertainment, morality, organization, control, religious faith, and independence. As both the "independence" and "religious faith" subscales have a poor internal consistency, they are not suitable to evaluate the Chinese population.[15] Thus, the survey adopted the other 8 remaining subscales. Cronbach alpha coefficient of the SDS was 0.74, 0.69, 0.73, 0.66, 0.71, 0.73, 0.72, and 0.64, respectively.

2.6. Survey of simple coping styles

We utilized the SCSQ, which consisted of 20 items and 2 subscales, that is, positive coping style and negative coping style. The "positive coping" dimension consists in 12 items, which mainly reflects the characteristics of positive coping. The "negative coping" dimension consists of 8 items, which mainly reflects the characteristics of negative coping.[16] The scale involves a multilevel scoring method, and it usually takes 10 to 15 minutes to complete. The result represents the average score for the positive and negative coping dimensions. In respect to the Chinese population, the scale has good reliability and validity.[17] Cronbach's alpha for the active and negative coping subscales was 0.87 and 0.81, respectively.

2.7. Statistical processing

SPSS19.0 statistical software was used for statistical analysis. The normal distribution was used to test the normality of the data's quantitative characteristics. The normal distribution was expressed by $\overline{\chi} \pm s$. A t test was carried out to compare information relating to the different demographic characteristics of groups. The non-normal distribution was described by M and P_{25} and P_{75}. In respect to the FES-CV and SCSQ scores, the Mann–Whitney U test was used to compare SDS scores that were ≥ 50 (i.e., "depressive symptoms" group) and < 50 (i.e., "nondepressive symptoms" group). Spearman correlation analysis was used to determine the correlation of the SDS, FES-CV, and SCSQ scores. The influencing factors of SDS were determined using logistic regression analysis. The significance level was considered as $\alpha = 0.05$.

3. Results

3.1. Basic information

All participants were male, 342 questionnaires were distributed, and the recovery rate was 100%. Some questionnaires were excluded due to missing data and logical errors. A total of 323 questionnaires were valid, with an effective rate of 94.44% (i.e., 323/342). Information related to the demographic characteristics of participants is shown in Table 1.

3.2. Scores of SDS

In this survey, the average SDS scores of new recruits were 42.53 ± 8.51. The SDS scores of 79 respondents were ≥50 (i.e., 53.96 ± 3.67. 244), which was deemed to indicate depression, and accounted for 24.46% of the total sample. The SDS scores of 244 respondents did not indicate depression as their average SDS score was 38.83 ± 5.94, and accounted for 75.54% of the sample. The SDS scores of the "high school or below education" group were higher than those of the "college or above education" group. Prior to enlistment, the SDS scores of the "student status" group were lower than those of the "nonstudent status" group, and the SDS scores of the "smoking" group were higher than those of the "nonsmoking" group ($P < .05$ was used for all groups). There was no significant difference in the SDS scores of new recruits from different family locations, regardless of whether they were an only child or from different age groups ($P > .05$), as shown in Table 1.

Table 1

The SDS scores of new recruited soldiers by demographic characteristics.

Group	Number	Proportion (%)	Score	t	P
Registered residence				0.11	.917
Urban	85	26.32	42.50 ± 8.10		
Rural	238	73.68	42.22 ± 8.13		
Singe child				0.76	.453
Yes	74	22.91	43.77 ± 7.14		
No	249	77.09	41.84 ± 8.33		
Education level				2.68	.010
High school or above	266	82.35	43.98 ± 8.30		
College or above	57	17.65	37.94 ± 5.50		
Social status before enlisting				−2.15	.036
Student	187	57.89	40.42 ± 8.02		
Not student	136	42.11	45.00 ± 7.60		
Smoker				2.42	.019
Yes	149	46.13	45.33 ± 7.738		
No	174	53.87	40.34 ± 7.580		
Age (y)				−0.65	.519
≥20	86	26.63	41.43 ± 7.668		
<20	237	73.37	42.85 ± 8.363		

SDS = the Self-rated Depression Scale.

Table 2

Comparison of FES-CV and SCSQ scores of new recruited solders against SDS scores [M (P$_{25}$,P$_{75}$)].

Dimension of scale	SDS≥50 group (n=79)	SDS<50 group (n=244)	Z	P
FES-CV				
Intimacy	8.00 (7.00, 9.00)	9.00 (8.00, 9.00)	−1.67	.094
Emotional expression	5.00 (3.25, 6.00)	6.00 (5.00, 7.00)	−1.92	.055
Contradiction	2.00 (2.00, 3.50)	2.00 (1.00, 3.00)	−1.12	.262
Success	5.50 (4.25, 7.00)	7.00 (6.00, 7.00)	−1.66	.097
Intellectual	2.50 (2.00, 4.75)	4.00 (2.00, 6.00)	−1.29	.196
Entertainment	3.50 (2.25, 5.75)	6.00 (5.00, 8.00)	−2.9	.004
Organization	5.50 (4.00, 7.00)	7.00 (6.00, 9.00)	−2.87	.004
Controllability	1.50 (1.00, 4.00)	3.00 (2.00, 5.00)	−2.11	.034
SCSQ				
Positive score	19.00 (18.0, 21.00)	21.00 (18.00, 26.00)	−1.53	.125
Negative score	7.50 (6.25, 11.50)	5.00 (3.00, 8.00)	−1.96	.050

FES-CV = the Family Environment Scale, SCSQ = the Simplified Coping Style Questionnaire, SDS = the Self-rated Depression Scale.

3.3. Comparison of FES-CV and SCSQ scores in respect to depressive symptoms and nondepressive symptoms

The FES-CV and SCSQ scores were not normally distributed. The results of the Mann–Whitney U test showed that the FES-CV scores for "entertainment," "organization," and "control" in the "depression" group were lower than those in the "nondepression" group (P < .05 for all groups). There was no significant difference in "intimacy," "emotional expression," "contradiction," "success," and "knowledge" (P > .05). There was no significant difference in the SCSQ positive coping score and negative coping score between the "depression" group and the "nondepression" group (P > .05), as shown in Table 2.

3.4. Correlation analysis between SDS, FES-CV, and SCSQ scores

Spearman correlation analysis showed that the SDS score was positively correlated with the SCSQ negative total score (r=0.30, P < .05) and FES-CV "contradiction" (r=0.32, P < .05), though was negatively correlated with "knowledge," "entertainment," "organization," and "control" scores (i.e., r=−0.43, r=−0.42, r=−0.037, r=−0.28, P < .01 or P < .05, respectively), as shown in Table 3.

3.5. Logistic regression analysis of depressive symptoms

In respect to the binary logistic regression analysis, the dependent variable was whether or not depression was indicated, and the independent variables included age (<20 years old=1, >20 years old=2), residence before enlistment (city or town=1, rural area=2), educational level (high school or below=1, college or above=2), preenlistment status (student=1, nonstudent=2), current smoking status (yes=1, no=2), SCSQ scores (continuous variables) and FES-CV scores for the corresponding 8 subscales (all continuous variables). The results showed that "entertainment" was relevant in the regression equation (P < .001). The high score of the entertainment subscale may suggest that it is a potential protective factor for depressive symptoms. Odds radio (95% confidence interval) was 0.512 (0.319–0.824) as shown in Table 4.

4. Discussion

Depressive symptoms are a common psychological problem among young recruits, and manifest in the form of low mood, apathy, and mental decline in the surrounding things, which adversely affect their normal training, their capacity to learn, and their life.[18] In particular, there is an increasing evidence that depressive symptoms (e.g., psychological distress, alexithymia)

Table 3

Correlation of SDS score with SCSQ and FES-CV scores of new recruited soldiers (n=323).

Dimension of scale	SDS	Positive score	Negative score	Intimacy	Emotional expression	Contradiction	Success	Knowledge	Entertaining	Organizational
SCSQ										
Positive score	−0.24									
Negative score	0.30*	0.15								
FES-CV										
Intimacy	−0.18	0.19	−0.14							
Emotional expression	−0.14	0.07	−0.08	0.16						
Contradiction	0.32*	−0.01	0.04	−0.23	−0.03					
Success	−0.19	0.05	0.11	0.17	0.13	−0.07				
Informative	−0.43†	0.30*	−0.16	0.2	0.03	−0.06	0.23			
Entertaining	−0.42†	0.19	−0.18	0.13	0.2	0.03	0.32*	0.59†		
Organizational	−.037†	0.2	−0.06	0.43†	0.21	−0.11	0.45†	0.44†	0.34†	
Controllability	−0.28*	0.09	−0.11	0.2	0.03	0.02	0.36†	0.51†	0.41†	0.55†

FES-CV = the Family Environment Scale, SCSQ = the Simplified Coping Style Questionnaire, SDS = the Self-rated Depression Scale.
* P < .05.
† P < .01.

Table 4

Binary logistic regression analysis of SDS (n = 323).

Variables	β	S.E.	Wald	P	OR (95% CI)
Age	−0.062	0.119	0.267	.605	0.940 (0.745–1.187)
Registered residence	0.512	0.371	1.910	.167	1.669 (0.807–3.450)
Education level	0.813	0.601	1.831	.176	2.255 (0.694–7.323)
Social status before enlisting	0.435	0.358	1.476	.224	0.674 (0.321–1.305)
Smoker	0.074	0.372	0.039	.843	0.929 (0.448–1.926)
SCSQ					
Positive score	0.045	0.038	1.345	.246	0.956 (0.887–1.031)
Negative score	0.109	0.052	4.320	.038	1.115 (1.006–1.235)
FES-CV					
Intimacy	0.365	0.417	0.766	.382	0.694 (0.306–1.573)
Emotional expression	0.633	0.352	3.231	.072	1.882 (0.944–3.752)
Contradiction	0.402	0.357	1.273	.259	1.595 (0.743–3.007)
Success	0.118	0.373	0.101	.751	0.888 (0.428–1.845)
Intellectual	0.942	0.471	4.001	.045	0.390 (0.155–0.981)
Entertainment	−0.196	0.104	3.533	.001	0.512 (0.319–0.824)
Organization	0.295	0.387	0.582	.445	1.343 (0.630–2.866)
Controllability	0.494	0.438	1.274	.259	0.610 (0.259–1.439)

CI = confidence interval, FES-CV = the Family Environment Scale, OR = odds radio, S.E. = standard error of partial regression coefficient, SCSQ = the Simplified Coping Style Questionnaire, SDS = the Self-rated Depression Scale.

may be considered risk factors for negative outcomes, even simply increasing the risk of development of suicidal tendencies or perse, which thus threatens the effectiveness of recruits in combat and the morale of the army.[19,20] In the survey, 24.46% of the recruits showed SDS scores ≥ 50, which is similar to the findings of Xiong et al,[21] though higher than the general population in China.[22] This result may be due to tremendous changes that occur in the environment after enlistment, which may be a source of stress for many young soldiers who are new to the barracks, where training is relatively closed, arduous, and demanding. Such factors lead to a higher incidence of depressive symptoms in recruits than among the general population.

Different demographic characteristics are associated with different SDS scores among the respondents. First, the educational level. The SDS score of the "college or above educational level" group is lower than that of the "high school or below" group. It is speculated that a high educational level may contribute to a better capacity to cope with difficulties and setbacks, higher levels of optimism, and greater effectiveness among recruits in terms of adjusting their negative emotions. Second, in respect to their status prior to enlistment, the SDS score of respondents in the "student status" group was lower than that of respondents in the "nonstudent status" group. Before enlistment, these students may have received a formal education at school, and their interpersonal relationships and motivations were relatively simple. They have a stronger sense of obedience and can more easily adapt to the army's tense and disciplined life. People who have been working or unemployed prior to enlistment have relatively complex contact groups and different experiences, and their motivations to enlist motivation are diversified. Similarly, when confronted with army life, which is stressful and demanding, their perspectives and positions may affect their depressive symptoms. Last but not the least, is smoking. The SDS score of "smoking" group was higher than that of the "nonsmoking" group. Unhealthy lifestyle habits such as smoking are a noteworthy phenomenon in the army. Studies of foreign soldiers show that the proportion of mental health disorders among the tobacco-dependent population is higher,[23] which is similar to the findings in this study.

The causes of depressive symptoms are highly complex.[24] Factors related to the family environment cannot be ignored. Family is an important unit of society, but it also offers the initial and key environment for an individual's development, which has an important impact on mental health.[25] In respect to the family enviroment, the results showed that the scores for "entertainment," "organization," and "control" in the SDS(≥ 50) group were lower than those in the SDS < 50 group. Spearman correlation analysis showed that the SDS score was positively correlated with "contradiction" and negatively correlated with "knowledge," "entertainment," "organization," and "control," respectively. The results of the other groups were similar.[26] Further logistic regression analysis showed that "entertainment" might be a potential protective factor against depressive symptoms.

This study also found that the SDS score was positively correlated with the SCSQ negative coping score. After new recruits enter the new military camp environment, the "depressive symptoms" group may adopt more negative coping styles than the "nondepressive symptoms" group. Negative coping styles have certain effects on depressive symptoms. When new recruits are confronted with the difficulties and problems that arise during military training, and if they adopt positive coping styles, such as seeking help by actively communicating with superiors and fellow soldiers, it is easy to eliminate stress and improve depressive symptoms. On the contrary, if a negative coping style is adopted, problems and difficulties may not be resolved effectively, which may easily lead to the onset of depressive symptoms. The results of this study elaborate upon the factors associated with depressive symptoms among new recruits, and although the family environment cannot be changed, depressive symptoms can be alleviated by avoiding a negative personal coping style.[27]

The limitations of this study can be considered in terms of the following: First, as this study utilized a cross-sectional design, we cannot establish the exact causal relationship nor the mechanism underlying the relationship between depressive symptoms, the family environment, and coping style. Second, participants included young men aged approximately 20 years old who

enlisted in a military unit in Xinjiang and who were recruited from only some of the provinces, which is not representative of recruits from all provinces. Participants also showed substantial differences in respect to the demographic characteristics of the general population. Finally, the SDS scale, FES-CV scale, and SCSQ scale scores did not have a clinical diagnostic value.

As there are many factors affecting depressive symptoms, and as the relationship between them is complex, the factors related to depressive symptoms among new recruits involve far more than the family environment and coping styles. Future research may seek to actively explore other significant factors and further investigate their influencing mechanism. In terms of research methods, structural equations and other more effective intermediary evaluation models can be used to explore the relationship between the factors. In addition, personalized and targeted psychological intervention should be carried out by referring to the symptoms of depressive mood among new recruits to alleviate their depressive symptoms.

5. Conclusion

This study investigated the depression of recruits in a Xinjiang army. The results showed that the depression level of new recruits was higher than that of the general population in China. What's more, the education level, preenlisted status, and smoking were the main factors affecting the depression symptoms. Depression symptoms are closely related to negative coping, and entertainment in family environment is a potential protective factor for depression symptoms.

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Author contributions

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