·论　　著·

The effect of military training on anxiety symptoms in Chinese recruits

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Abstract: Objective To investigate the prevalence of anxiety symptoms in army recruits and the effect of military training on anxiety. **Methods** A cluster sampling of 1431 new army recruits was conducted. The anxiety level of recruits was determined by Beck Anxiety Inventory(BAI) and Adult EPQ questionnaires prior to, one month after, and two months after entering basic military training. Self compiled biographic variables of the recruits were collected before the training. **Results** The highest BAI score (32.71±7.87) was observed 2 days before training, followed by 1 month after training (31.49±7.75) and 2 months after training (29.87±6.95). BAI score before training correlated with neuroticism and extraversion of recruits, the psychological trauma, suicide feeling and frequency of exercise before recruiting. A significant decrease in the percentage of severe symptom of wobbliness in legs, instability to relax, racing heart, dizziness, fear of the worst happening and trembling hands was observed after 1 month and/or 2 months of military training. **Conclusion** A higher BAI score and percentage of severe anxiety symptoms were observed before the training which correlated with psychological characteristics of recruits as well as the psychological experience before entering training. A combination of early psychological interference and physical exercise could reduce the anxiety.

Key words: anxiety; recruit; BAI; military training

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Basic military training is rigorous and stressful for new recruits[1]. At the start of basic army training, recruits undergo dramatic changes externally as well as internally as they transition from life as a civilian to life as a soldier. They have to adapt to a new way of life, which includes mandatory physical training, group living, institutional feeding, intense and continuous supervision, strict discipline, etc[2]. Stress is associated with a greater risk of developing mental illnesses and contributes both to the etiology and the severity of mental diseases[3]. Stressors during early military training were thought to be associated with psychological disorders in new recruits[4]. Indeed, mental disorders represent a large source of morbidity among U. S. military personnel and are a common reason for early separation from the military[5]. For example, Larson et al. study demonstrated that psychological disorders, such as serious anxiety, cause 7% early separation from US Navy[6].

Stress is widely recognized as a risk factor for the development of anxiety disorders [7]. Anxiety was frequently observed during basic military training[1,8], particularly, in male recruits[9]. However, these studies provided no clear evidence on whether recruits were psychologically evaluated before, during, or after new military recruiting. This therefore raises a concern on whether the recruits who developed anxiety disorders during basic military training may have non-healthy psychological characteristics or higher anxiety levels before entering training. Although early detection and turning away unfit military recruits has been a concern of the military for many years, a socially and economically affordable way to screen recruits for possible psychological problems has not yet been developed in China. Particularly, there is currently not enough evidence to support the necessity of such a screening[10-11].

In this study the prevalence of anxiety symptoms was investigated in new army recruits prior to, 1 month after, and 2 months after entering basic military training. The effect of psychological trauma, personality factors, and mental stress before entering into basic training on the development of anxiety symptoms during basic training was analyzed.

1　Materials and Methods

1.1　Participants　A total of 1 431 new male army recruits were randomly recruited with ages ranging from 16 to 23 years old. Recruits with severe physical or mental disorders were excluded. All of the participants were able to finish the questionnaires by themselves.

1.2　Questionnaires　A total of three questionnaires were used in this study.

1.2.1　Basic information questionnaire which collected information including age, sex, education level, injury history, self-evaluation of neuroticism, frequency of exercise, and whether the recruit had previously contemplated suicide, etc.

1.2.2　Beck Anxiety Inventory(BAI) questionnaire. The Chinese version of BAI consists of twenty-one items that were designed to assess the anxiety level of adults within the week prior to taking the questionnaire. Each question has the same set of four possible answer choices, including not at all(1 score), mildly(it did not bother me much; 2 score), moderately(it was very unpleasant, but I could stand it; 3 scores), and severely(I could barely stand it; 4 scores). The BAI has a maximum score of 84. A score greater than 40 suggests anxiety. BAI was implemented 2 days before, 1 month after and 2 months after recruits entered basic military training.

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Table 1 Frequency of severe anxiety symptoms in different training periods[n(%)]

Anxiety symptoms	Before		1 month		2 months	
	No	Severe	No	Severe	No	Severe
Wobbliness in the legs	845(59.3)	25(1.7)	844(61.9)	12(0.9)*	920(68.8)	22(1.6)
Inability to relax	815(57.0)	35(2.6)	916(66.9)	15(1.2)*	956(71.5)	16(1.2)*
Racing heart	936(65.8)	18(1.1)	1 031(76.0)	11(0.8)*	1 099(81.7)	12(0.9)
Trembling hands	1 234(85.6)	7(0.6)	1 174(86.1)	5(0.3)*	1 232(90.4)	0(0.0)#
Dizziness	1 046(73.3)	7(0.6)	1 115(81.0)	6(0.6)	1 195(88.9)	4(0.2)#
Fear of the worst happening	1 179(82.6)	7(0.5)	1 163(85.2)	5(0.4)	1 123(91.0)	5(0.3)*

*: $P<0.05$, vs. before training; #: $P<0.05$, vs. 1 month.

Table 2 Regression analysis of Anxiety symptoms($\alpha=0.05$)

Factors	RC	Standardized RC	t	P
EPQ neuroticism	0.40	0.42	16.83	0.00
Self-evaluation neuroticism	0.53	0.14	5.74	0.00
Psychological Trauma before recruiting	0.74	−0.08	−3.30	0.00
Suicide feeling before recruiting	0.69	−0.07	−2.92	0.00
Frequent exercise	0.39	0.06	2.73	0.01
EPQ extraversion	0.39	−0.05	−2.30	0.02

RC: Regression Coefficients

1.2.3 Eysenck Personality Questionnaire(EPQ). The Chinese version of the EPQ[15] was used to assess neuroticism(N) and extraversion(E). There is significantly negative correlation between neuroticism and extraversion subscales($r=-0.166$, $P<0.01$).

1.3 Procedure The research team was composed of 10 psychologists. The team members were responsible for explaining the research goal and purposes before participants completed the survey. To increase the accuracy of the questionnaires, all questionnaires were anonymously filled and collected right after interview. To reduce response bias, all of the filled questionnaires were obtained by a face-to-face interview. The interview was performed 2 days before, 1 month after and 2 months after the training.

1.4 Statistic analysis All the obtained information from the questionnaires was inputted into computer according to the serial number of the questionnaire. SPSS 10.0 was used to conduct variance analysis, paired t-test, and multiple regression analysis on the obtained data. A $P<0.05$ was considered statistically significant.

2 Results

2.1 The changes of anxiety symptoms in different training periods. In general, the new recruits were found to be in a good state of mental health(average BAI<40). The highest BAI score(32.71 ± 7.87) was observed 2 days before training, followed by 1 month after training(31.49 ± 7.75) and 2 months after training(29.87 ± 6.95). Variance analysis showed that the average BAI scores of recruits were significantly different between before, 1 and 2 months after military training ($F=39.45$, $P<0.01$). A further application of the Dunnett-t test on any two groups exhibited significant differences between 2 days before training, 1 and 2 months after training($P<0.01$).

2.2 The frequency of severe anxiety symptoms Table 1 shows the percentages of several severe anxiety symptoms that may lead to injury during military training. A significant decrease in the observed percentage of severe symptoms of wobbliness in the legs, instability to relax, racing heart, and trembling hands was observed after 1 month of military training while only the percentage of trembling hands further decreased after 2 months of training. A significant decrease in the percentage of dizziness and fear of the worst case scenario happening were only observed after 2 months of training.

2.3 Regression analysis of anxiety symptoms before military training Table 2 shows the effect of dependent variables on total BAI score. Regression analysis was performed between 15 independent variables, including age, education levels, neuroticism of recruits, et al, whether recruits have moral problems before recruiting, whether recruits have psychological trauma before training, willingness to join the army, exercise frequency, etc. and the dependent variable, the total BAI score. The results demonstrated that the score of EPQ neuroticism and neuroticism subscales, psychological trauma before recruiting, suicide feeling before recruiting, frequent exercise and EPQ extraversion significantly correlated with BAI score before training.

3 Discussion

It is commonly perceived that basic military training is both physically stressful to the new recruits and mentally stressful due to need to adapt to a new environment [1-2]. Rigorous military training is also thought to lead to mental disorders and early separation of the recruits from military[6]. In this study we demonstrated that a higher BAI score and percentage of severe anxiety symptoms were observed before training compared to 1 or 2 months after training. The significantly higher prevalence of anxiety symptoms before training correlated with neuroticism and extraversion of recruits as well as the psychological trauma and previous thoughts of suicide of recruits. Our study suggested that: (1) early detection of psychological abnormalities of recruits could be used to turn away unfit recruits; (2) psychological interference is necessary for new recruits, but it should be given early before training begins; (3)

an advanced military training program could reduce anxiety, and subsequently decrease the early separation of recruits.

Previous studies demonstrated that basic military training is the most stressful period of a military career and anxiety was observed to be significantly higher during week 1 through 8[1]. In this study we analyzed anxiety symptoms during early basic training and compared the results with data before training. We found that the prevalence of severe anxiety symptoms and average BAI score were higher before training and were gradually improved after 1 or 2 months of military training. Our study suggested that basic military training could reduce anxiety symptoms. This is inconsistent with previous reports. The conflict in findings might be caused by different research approaches, such as whether observation in early training was compared to late stage of the training or before the training. The content of the training program might also be a key player in the difference. Psychological interference and physical training might be two crucial elements of the training program that not only affect training efficacy, but also anxiety symptoms. For example, although there is no professional psychological interference during training, political subjects a recruit must learn and the encouragement of instructors could play a similar role. In addition, physical activity has been used as a treatment for psychiatric disorders[12] and has been consistently shown to be associated with improved physical health, satisfaction with life, cognitive functioning, and psychological well-being[13]. Moreover, exercise has been shown to reduce anxiety symptoms among sedentary patients with chronic illnesses, and recruits with low self-esteem and who feel unappreciated by their commander are at a higher dropout risk from a rigorous combat training program[14-15]. Notably, significant improvement in all of the anxiety symptoms was observed after 8 weeks of training. We are not aware of any clinical treatment that could make such dramatic changes. Our finding suggested that a combination of psychological interference and exercise might be most effective in treating anxiety disorder.

This is the first study to explore the role of basic military training on anxiety symptoms before enlisting and after going through basic army training. Important findings included that: (1) Higher prevalence of severe anxiety symptoms and higher average BAI score were observed before training; and (2) The BAI score correlated with neuroticism and extraversion, previous psychological trauma and thoughts of suicide. These findings suggested the necessaries for early disposition of recruits having non-healthy psychological characteristics. However, such a screening was not recommended by other researchers with concerns that there is not enough evidence of its effectiveness, and high socio-economic effect[10-11]. We would instead recommend increasing awareness of the psychological issue among public, so that individuals can self-screen to reduce the socio-economic effect. In addition, the higher BAI score and high frequency of severe anxiety symptoms before training may not only mean non-healthy psychological characteristics or the psychological experiences of the recruits. It may be related to the stresses due to facing the novel external environment of military living, such as new relationships with fellow recruits in the barracks, strict discipline, etc. before training[2]. Therefore, psychological interference early before the training might be necessary. However, these higher BAI score and anxiety symptoms does not mean the mental disease and the need for psychological treatment. Accompanying the continue training and adjustment to the military living, the anxiety symptoms in the new recruits will be reduced. This can also explain why the estimated early separation of the recruits is relatively lower in China land army.

Although the present study presents a large sample size-1 431, it relied on self-assessment measures. Self-report data have been criticized for their potential response bias, such as that recruits may be reluctant to admit that they have psychological problems because of scaring of being separated from military living. However, in this study all of the questionnaires were anonymously filled and all of the participants were face-to-face interviewed. These strategies increase the accuracy of the questionnaires and reduce the response bias. Therefore, the current prevalence of severe anxiety symptoms may be an accurate estimate of anxiety level in army recruits in China. However, the present findings should be replicated in other branches of the military services. In addition, the current study did not include the data from the civilian counterparts. It is not sure whether the anxiety level of recruits before training reflects the actual level of recruits after entering the military, but before military training or the level as civilians. Although it is impossible to investigate the anxiety level of the recruits as civilians, study of an independent sample with matched age, sex, education level, etc. is desirable. Despite its limitation, the present research provides military leaders and mental health care providers with an estimate of the scope of anxiety symptoms among new recruits and suggested the necessary of psychological interference early before the military training.

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参考文献：

[1] Clemons EP. Monitoring anxiety levels and coping skills among military recruits[J]. Mil Med, 1996, 161(1): 18-21.

[2] Lieberman HR, Kellogg MD, Bathalon GP. Female marine recruit training: mood, body composition, and biochemical changes [J]. Med Sci Sports Exerc, 2008, 40(11 Suppl): S671-676.

[3] Zhu X, Peng S, Zhang S, et al. Stress-induced depressive behaviors are correlated with Par-4 and DRD2 expression in rat striatum[J]. Behav Brain Res, 2011, 223(2): 329-335.

[4] Williams RA, Hagerty BM, Yousha SM, et al. Factors associated with depression in navy recruits[J]. J Clin Psychol, 2002, 58(4): 323-337. （下转第 3819 页）

提高可能出现于宫颈恶性转化的早起，可能具有促进这些损伤恶性转化的作用，表明 Slug 表达上调与 CIN、宫颈癌的发生发展有关，有可能作为宫颈癌发生的早期标志物。本研究还发现，Slug 表达水平与宫颈癌的 FIGO 分期、是否有淋巴结转移相关，Ⅱ期相对表达量高于Ⅰ期，淋巴结转移组高于淋巴结未转移组，差异有统计学意义（$P<0.05$），但与年龄、肿瘤大小无关，不能为子宫颈癌的病理类型、分化程度提供依据。说明 Slug 不仅参与了 CIN、宫颈癌的发生、发展，还可能与宫颈癌的侵袭和转移密切相关。

综上所述，Slug 在 CIN、宫颈癌组织中的表达增加，可能通过下调 E-cadherin，诱导 EMT 的发生，参与了宫颈癌的发生、发展及转移。随着对 Slug 基因研究的深入，将有助于阐明宫颈癌发生、发展、侵袭、转移的本质，对临床早期诊断宫颈癌、判断 CIN 的发展及肿瘤侵袭转移也有重要指导意义。

参考文献：

[1] Parkin DM，Bray F. Chapter 2：the burden of HPV related cancers[J]. Vaccine，2006，24(Suppl 3)：11-25.

[2] 高超，李保玉，曲从玲，等. 子宫颈上皮内瘤样病变 108 例的临床病理分析[J]. 中国肿瘤临床与康复，2000，1(7)：26-27.

[3] Kurrey NK，KA，Bapat SA. Snail and Slug are major determinants of ovarian cancer invasiveness at the transcription level[J]. Gynecol Oncol，2005，97(1)：155-165.

[4] Côme C，Magnino F，Bibeau F，et al. Snail and slug play distinct roles during breast carcinoma progression[J]. Clin Cancer Rer，2006，12(18)：5395-5402.

[5] De Graves FJ，Gao D，Kaltenboeck B. High-sensitivity quantitaive PCR platform [J]. Biotechniques，2003，34(1)：106-110，112-115.

[6] Rajeevan MS，Ranamukhaarachchi DG，Vernon SD，et al. Use of real-time quantitative PCR to validate the results of cDNA array and differential display PCR technologies [J]. Methods，2001，25(4)：443-445.

[7] Bosch FX，Lorincz A，Munoz N，et al. The causal relation between human papillomavirus and cervical cancer[J]. J Clin Pathol，2002，55(4)：244-265.

[8] 钱德英，岑坚，王丁，等. 高危型人乳头状瘤病毒 DNA 检测与细胞学联合检查对子宫颈癌前病变筛查的研究[J]. 中华妇产科杂志，2006，41(1)：34-37.

[9] Thiery JP. Epithelial-mesenchymal transitions in tumour progression[J]. Curr Opin Cell Biol，2003，15(6)：740-746.

[10] Yu J，Ebert MP，Miehlke S，et al. α-Catenin expression is decreased in human gastric cancers and in the gastric mucosa of frist degree relatives[J]. Gut，2000，46(5)：639-644.

[11] Thiery JP. Epithelial-mesenehymal transitions in tumour progression[J]. Nat Rev Cancer，2002，2(6)：442-454.

[12] Chart AO. E-cadherin in gastric cancer[J]. World J Gastroenterol，2006，12(2)：199-203.

[13] Shih JY，Tsai MF，Chang TH，et al. Transcription repressor slug promotes carcinoma invasion and predicts outcome of patients with lung adenocarcinoma[J]. Clin Cancer Res，2005，11(22)：8070-8078.

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[5] Booth-Kewley S，Larson GE. Predictors of psychiatric hospitalization in the Navy[J]. Mil Med，2005，170(1)：87-93.

[6] Larson GE，Booth-Kewley S，Merrill LL，et al. Physical symptoms as indicators of depression and anxiety [J]. Mil Med，2001，166(9)：796-769.

[7] Liston C，McEwen BS，Casey BJ. Psychosocial stress reversibly disrupts prefrontal processing and attentional control [J]. Proc Natl Acad Sci USA，2009，106(3)：912-917.

[8] Collins WE，Schroeder DJ，Nye LG. Relationships of anxiety scores to screening and training status of air traffic controllers [J]. Aviat Space Environ Med，1991，62(3)：236-240.

[9] Kowal DM，Patton JF，Vogel JA. Psychological states and aerobic fitness of male and female recruits before and after basic training [J]. Aviat Space Environ Med，1978，49(4)：603-606.

[10] Stander VA，Merrill LL，Thomsen CJ，et al. Posttraumatic stress symptoms in Navy personnel：prevalence rates among recruits in basic training[J]. J Anxiety Disord，2007，21(6)：860-870.

[11] Rona RJ，Hyams KC，Wessely S. Screening for psychological illness in military personnel [J]. JAMA，2005，293(10)：1257-1260.

[12] Barbour KA，Edenfield TM，Blumenthal JA. Exercise as a treatment for depression and other psychiatric disorders：a review [J]. J Cardiopulm Rehabil Prev，2007，27(6)：359-367.

[13] Carek PJ，Laibstain SE，Carek SM. Exercise for the treatment of depression and anxiety [J]. Int J Psychiatry Med，2011，41(1)：15-28.

[14] Herring MP，O′Connor PJ，Dishman RK. The effect of exercise training on anxiety symptoms among patients：a systematic review [J]. Arch Intern Med，2010，170(4)：321-331.

[15] Moran DS，Evans RK，Arbel Y. Prediction model for attrition from a combat unit training program [J]. J Strength Cond Res，2011，25(11)：2963-2970.

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