Effect of Resilience on Stress, Anxiety and Depression in Grass-roots Civil Servants: The Mediating and Moderating Model

Huiling Song

Zhengzhou University

Mengjie Zhang

Zhengzhou University

Yanjie Wang

Zhengzhou University

Liyang Yang

Zhengzhou University

Yanyu Wang

Zhengzhou University

Yan Li (✉ liyanzt@zzu.edu.cn)

Zhengzhou University <https://orcid.org/0000-0002-5237-7569>

Research article

Keywords: gross-roots Civil servants, Stress, Depression, Anxiety, Resilience

Posted Date: November 9th, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-103015/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Version of Record: A version of this preprint was published at BMC Public Health on April 13th, 2021. See the published version at <https://doi.org/10.1186/s12889-021-10710-2>.

Title page

Effect of resilience on stress, anxiety and depression in civil servants: the mediating and moderating model

Huiling Song ^a, Mengjie Zhang ^a, Yanjie Wang ^a, Liying Yang ^a, Yanyu Wang ^b,
Yan Li ^{a,c,*}

a Department of Children, Adolescents and Women Health, College of Public Health, Zhengzhou University, Zhengzhou, Henan, China.

b The First Affiliated Hospital and College of Clinical Medicine of Henan University of Science and Technology, Luoyang, Henan, China. (24 Jinghua Road, Luoyang, 4571003, China)

c School of Physical Education (Main Campus), Zhengzhou University, Zhengzhou, Henan, China

* Corresponding author: Department of Children, Adolescents and Women Health, College of Public Health, Zhengzhou University, 100 Kexue Road, Zhengzhou, 450000, Henan, China

E-mail address: liyanzt@zzu.edu.cn (Yan Li)

Effect of resilience on stress, anxiety and depression in grass-roots civil servants: the mediating and moderating model

Abstract

Background: Civil servants are a special group in China, and there is limited research on how their resilience affects mental health, such as depression and anxiety. Therefore, the aim of the paper is to explore the role of resilience through the relationship between stress, depression and anxiety, and to further provide an explanation for how resilience interacts with stress, depression and anxiety in civil servants.

Method: In a cross-sectional survey, 302 civil servants completed a battery of questionnaires. The Civil Servants Stress Scale (CSSS) was used to assess the stress of civil servants. The depression and anxiety of participants were evaluated by the Self-rating Depression Scale (SDS) and the Self-rating Anxiety Scale (SAS), respectively. The Conner-Davidson Resilience Scale (CD-RISC) was used to assess the stress of civil servants as well. We conducted the moderating and mediating models to the resilience, depression and anxiety in grass-roots civil servants.

Results: The results have shown that resilience was related to stress, depression, and anxiety in civil servants at the basic level. Stress was positively correlated with resilience. On the contrary, stress was negatively

associated with depression and anxiety.

Conclusion: Resilience played the moderating and mediating roles for stress, depression and anxiety. Resilience can moderate the relationship between stress and depression, anxiety as a dynamic moderate mode. Improving resilience and reducing stress play a vital role in preventing depression and anxiety in gross-roots civil servants.

Keywords: gross-roots Civil servants; Stress; Depression; Anxiety; Resilience

1. Background

The goal of building a moderately prosperous society in all respects in China, with the implementation of the accountability system and the reform of rank promotion, led to more rigorous assessment standards and the rare chance of promotion in civil servants[1]. In this case, civil servants constantly faced the pressure of occupation, individual and society[2]. Studies have shown that the special work pressure of civil servants is related to the mental health such as depression and anxiety of civil servants[3-5]. More than 50% of Japanese civil servants have received compensation for mental disorders since 2000[2]. However, the mental health problems of gross-roots civil servants have not fully been explored. What is special about gross-roots civil servants is that many of them are clerks. Moreover, it is difficult for ordinary staff to be promoted, but their mental health condition is rarely reported and paid attention to. This reminded us that paying close attention to the mental health of civil servants is extremely essential.

Past research had shown that long-term exposure to stress hormones throughout the lifespan can affect brain structures involved recognition and mental health[6]. Chronic stress may result in the increasing prevalence of mental disorders, chronic diseases[7, 8] and psychological problems are increased[9]. Although the pathogenesis of the depression and anxiety is not clear, some studies have found that there was a strong relationship between stress and depression[10], anxiety[11]. Furthermore, resilience has been found to mediate the associations between stress, depression, and anxiety among adolescents and the pregnant[12, 13]. Also, resilience is an important protective factor that can moderate the development of psychiatric symptoms when an individual encounters some stressful events[14]. Civil servants face enormous pressure in work and life, which causes some psychological problems, such as depression, anxiety[3, 4]. Resilience can be regarded as a protective factor within individuals, which is of great significance to relieve pressure and promote mental health[15, 16]. Hence, we supposed that resilience can potentially improve coping strategies to avoid the negative effects of stress on mental health such as depression, anxiety among civil servants.

To data, the research on the impact of resilience on stress, depression and anxiety mainly focused on the adolescents and college students[17]. Stress and mental health in the civil servants are being increasingly recognized in China[5]. However, many studies provided results only from

qualitative research studies or limited to stress with physical health[18, 19]. Few attention has been given to the interrelationships of mental health problems with stress in the grass-roots civil servants[20].

The purpose of this study was to examine the moderating and mediating effects of resilience between stress and depression and anxiety in civil servants. The hypotheses were as follows: (1) Resilience will mediate the relationship between stress, depression and anxiety, respectively, and that (2) the relationship between stress, depression and anxiety will be modified by resilience. By exploring these hypotheses, we hope to understand the mechanisms of the influence of resilience on stress, depression and anxiety, and to further provide a scientific basis for the development and implementation of mental health improvement strategies for civil servants.

2. Method

2.1 Participants

The cross-sectional study enrolled 350 participants from a county in Henan. The research has been approved by the Science Ethics Committee of Zhengzhou University. Written informed consent was obtained from each participant before starting any investigation related study.

2.2 Demographic data

Demographic characteristics included gender, age, an only child, marital status, degree of education, seniority, position, relationship with colleagues, physical exercise, and monthly income.

2.3 Civil Servants Stress Scale (CSSS)

The CSSS is a 38-item self-report scale, which is divided into 6 dimensions as follows: which are management and development, life relationships, work relationships, health and responsibility, economic stress, and workload. The CSSS is scored on a 10-point with response categories ranging from 1 (no stress) to 10(extremely stress). Total score ranges from 0 to 380 and the higher score indicates higher stress. The Cronbach'S α coefficient and Split-half reliability are 0.960 and 0.976, respectively[21]. The Cronbach'S α coefficients of the 6 dimensions are 0.842 ~ 0.925. The scale with good reliability and validity can be used to evaluate the overall stress situation of civil servants in China.

2.4 Self-rating Depression Scale (SDS)

The SDS[22] is a 20-item self-report scale, which is scored on a 4-point with ranging 1(occasionally) from to 4 (constantly). Then add up the scores of 20 items to get the total rough score, and multiply the total rough score by 1.25 to get the standard score. The higher total standard scores indicate more severity of depression. The Cronbach'S α coefficient and Split-half reliability are 0.784 and 0.92, respectively[23].

2.5 Self-rating Anxiety Scale (SAS)

The SAS[22] is a 20-item self-report scale, which is scored on a 4-point with ranging 1(occasionally) from to 4(constantly). Then add up the scores of 20 items to get the total rough score, and multiply the total rough score by 1.25

to get the standard score. The higher total standard score indicates more severity of anxiety. Cronbach'S α coefficient is 0.767[24].

2.6 Connor-Davidson Resilience Scale (CD-RISC)

The CD-RISC is a 25-item self-report scale, which is scored on a 5-point with ranging 1(never) from to 5(all the time). The higher score reflects greater resilience. The Cronbach'S α coefficient of the English version is 0.89, and the coefficient of retest reliability is 0.87[25]. The CD-RSCI scale with good reliability validity has been widely used in predicting mental resilience.

2.7 Statistical analyses

All statistical analyses were performed using the SPSS software, and version 21.0. Descriptive statistics were the mean and standard deviation. T-test and Analysis of Variance (ANOVA) were used to compare the difference stress in the basic demographic data and the differences in stress, depression, anxiety and resilience of civil servants at the basic level in different positions. Pearson correlations were used to explore associations among the main variables in the study. The moderating and mediating roles of resilience were analyzed in PROCESS using least squares regression[26].

Figure1. Mediating effects of resilience in the relationship between stress(short for stress) and depression (solid line), anxiety (dash line) in civil servants (N=302).

Note: * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$.

3. Results

3.1 Demographic characteristics

Table 1 provides descriptive statistics of the detailed demographic of the participants in this study. The participants were aged between 17 and 56 years ($M=30.80$, $SD=7.85$) and 61.3% were male, 38.7% were female, and the sex ratio was close to 6:4. The general demographic of participants mainly included gender, age, home address, the one-child family, marital status, education, physical exercise, somatic diseases and close relative diseases, and job characteristics including seniority, position, relationship with coworkers, monthly income. There were significant differences in gender, education, position, relationship with coworkers, physical exercise and monthly income for

stress ($P<0.05$).

Table 1

The difference in stress in demographic.

Variables		N(%)	Mean $\pm$ SD	t/F	P
Gender	Man	185(61.3)	0.16 $\pm$ 0.89	3.414	0.001
	Female	117(38.7)	-0.25 $\pm$ 1.11		
Age	≤ 30	180(59.6)	-0.01 $\pm$ 0.99	1.295	0.275
	31~50	115(38.1)	0.05 $\pm$ 1.03		
	≥ 51	7(2.3)	-0.57 $\pm$ 0.40		
Home address	City	157(52)	-0.01 $\pm$ 1.04	0.295	0.745
	Town	62(20.5)	0.08 $\pm$ 0.70		
	Village	83(27.5)	-0.04 $\pm$ 1.11		
The one-child	Yes	83(27.5)	0.07 $\pm$ 0.92	0.798	0.426
	No	219(72.5)	-0.03 $\pm$ 1.03		
Marital status	Unmarried	109(36.1)	-0.17 $\pm$ 1.00	2.584	0.077
	Married	191(63.2)	0.10 $\pm$ 0.99		
	Divorce	2(0.7)	0.26 $\pm$ 0.25		
Education	Junior college	140(46.4)	-0.24 $\pm$ 1.05	7.037	<0.0001
	Undergraduate	152(50.3)	0.20 $\pm$ 0.94		
	Postgraduate	10(3.3)	0.35 $\pm$ 0.27		
Seniority (year)	<1	38(12.6)	-0.30 $\pm$ 1.07	2.513	0.059
	1~5	127(42.1)	-0.01 $\pm$ 0.91		
	6~10	61(20.2)	0.25 $\pm$ 0.99		
	>10	76(25.2)	-0.03 $\pm$ 1.09		
Position	Clerk	274(90.7)	0.05 $\pm$ 0.97	2.393	0.024
	cadre	28(9.3)	-0.54 $\pm$ 1.22		
Relationship with coworkers	Good	227(75.2)	-0.13 $\pm$ 1.01	8.053	<0.0001
	Average	73(24.2)	0.37 $\pm$ 0.86		
	Poor	2(0.7)	0.92 $\pm$ 0.30		
Physical exercise	Often	58(19.2)	-0.00 $\pm$ 0.92	3.736	0.012
	By chance	173(57.3)	0.26 $\pm$ 0.96		
	Never	71(23.5)	0.27 $\pm$ 1.00		
Monthly income(CNY)	≤ 1500	21(7.0)	-0.15 $\pm$ 1.25	4.238	0.006
	1501~2499	128(42.4)	-0.18 $\pm$ 1.00		
	2500~3499	75(24.8)	0.02 $\pm$ 0.97		
	≥ 3500	77(25.5)	0.32 $\pm$ 0.87		
Somatic diseases	Yes	18(6.0)	0.13 $\pm$ 1.03	0.559	0.577
	No	284(94.0)	-0.01 $\pm$ 1.00		
Close relative	Yes	50(16.6)	0.20 $\pm$ 0.94	1.567	0.118

diseases	No	252(83.4)	-0.04 ± 1.01
----------	----	-----------	--------------

The differences in stress, depression, anxiety and resilience of gross-roots the civil servants in different positions were shown in table 2. There were statistically significant differences on stress ($P = 0.024$) and resilience ($P < 0.0001$). However, although there was no statistical significance in depression ($P = 0.063$) and anxiety ($P = 0.059$) among civil servants of different positions, the P values were all close to 0.05. The results suggested that the stress, depression and anxiety of the clerk were higher than that of the cadres, and the difference was statistically significant. However, the resilience of the clerk was lower than that of the cadres, and difference was also statistically significant.

Table 2

T-test on stress, depression, anxiety and resilience of civil servants at the basic level among different position.

	Position	Mean ± SD	t	P
Stress	Clerk	0.05 ± 0.97	2.393	0.024
	Cadre	-0.54 ± 1.22		
Depression	Clerk	0.03 ± 0.98	1.867	0.063
	Cadre	-0.35 ± 1.13		
Anxiety	Clerk	0.03 ± 1.01	1.898	0.059
	Cadre	-0.35 ± 0.80		
Resilience	Clerk	-0.06 ± 0.97	-3.697	<0.0001
	Cadre	0.68 ± 1.09		

SD: standard deviation.

In table 3, stress was positively correlated with depression and anxiety ($P < 0.001$). Conversely, stress was negatively correlated with resilience

($P<0.001$). Resilience was negatively correlated with depression and anxiety ($P<0.001$).

Table 3

Pearson correlations among the target and the control variables (r)

Variables	Mean±SD	1	2	3
1.stress	149.52±65.89			
2.depression	0.54±0.10	0.212***		
3.anxiety	48.23±11.17	0.444***	0.699***	
4.resilience	48.06±9.32	-0.212***	-0.382***	-0.343***

SD: standard deviation.

Note:* $P<0.05$,** $P<0.01$,*** $P<0.001$

As shown in Table 4, two mediation analyses were performed. The depression (as dependent variable), home address, degree of education, physical exercise, monthly income, oneself has an illness (as covariates), stress (as independent variables), and resilience (as mediation) entered into model 59. The results indicated that resilience partially mediated the relationship between stress and depression. The direct effect is 77.21% and the indirect effect is 22.79%. Secondly, the anxiety (dependent variable), relationship with colleagues, physical exercise, monthly income (covariates), stress (independent variables) and resilience (mediation) were entered. The resilience had made mediation effect between stress and anxiety. The direct effect is 92.23% and the indirect effect is 7.77%.

Table 4

Mediating effects of resilience in the relationship between stress and depression, anxiety

Effect	Depression	Anxiety
--------	------------	---------

	β (SE)	<i>P</i>	95%CI	β (SE)	<i>P</i>	95%CI
a	-0.22(0.57)	<0.001		-0.19 (0.06)	0.001	
b	-0.30 (0.05)	<0.001		-0.21 (0.05)	<0.001	
C'	0.22 (0.05)	<0.001		0.46 (0.05)	<0.001	
a*b	0.06 (0.02)		(0.020,0.115)	0.04 (0.02)		(0.009,0.078)

As presented in table 5, two moderation analyses were performed. The depression (dependent variable), home address, degree of education, physical exercise, monthly income, oneself has an illness (covariates), stress (independent variables) and resilience (moderator) entered into model 59. The interaction effects of stress and resilience on depression were significant ($P<0.001$). Secondly, the anxiety (dependent variable), relationship with colleagues, physical exercise, monthly income (covariates), stress (independent variables) and resilience (moderation) were entered. The interaction effects of stress and resilience on anxiety were significant ($P<0.001$). Thus, the hypotheses that resilience moderate between stress, depression and anxiety is valid.

Table 5

Moderating effects of resilience in the relationship between stress and depression, anxiety

Predictors	Depression				Anxiety			
	β (SE)	<i>P</i>	R^2	<i>F</i>	β (SE)	<i>P</i>	R^2	<i>F</i>
Stress	0.23(0.05)	<0.001	0.280	14.271	0.47 (0.05)	<0.001	0.358	23.396
Resilience	-0.34 (0.05)	<0.001			-0.25 (0.05)	<0.001		
Stress×Resilience	-0.13 (0.04)	0.001			-0.13 (0.04)	<0.001		

To further analyze the moderating effect of resilience on the relationship between depression and anxiety, two simple slope analyses were performed. Stress and resilience were classified as high ($M+SD$) and low ($M-SD$). Firstly,

the dependent variable was depression as showing in Fig 2. The estimates of 95% bias-corrected bootstrap CI of M-SD and M+SD, were (0.2231, 0.4936) and (-0.0337, 0.2219), respectively. The difference of 95% bias-corrected bootstrap CI of M-SD and M+SD is (0.2568, 0.2712). There was no zero in the difference of 95% bias-corrected bootstrap CI indicated that resilience has made a moderation effect between stress and depression. Secondly, the dependent variable was anxiety as shown in Fig 3. The estimates of 95% bias-corrected bootstrap CI of M-SD and M+SD, were (0.4754, 0.7337) and (0.2219, 0.4613), respectively. The difference of 95% bias-corrected bootstrap CI of M-SD and M+SD is (0.2535, 0.2724). There is no zero in the difference of 95% bias-corrected bootstrap CI indicated that resilience has made a moderation effect between stress and anxiety.

4. Discussion and Limitations

In this study, we reported that there were statistically differences in gender, education, position, relationship with coworkers, physical exercise and monthly income among for the stress of the gross-roots civil servants. Previous studies have suggested that gender, education, relationship with coworkers, physical exercise and monthly income have an effect on stress in different countries and in different people [27-31]. In China, male generally feel heavy stress than female ones, which conforms to the results of other surveys[32, 33]. Most male civil servants not only have to do well in order to be promoted, but also have to support elderly parents and young children, so they tend to feel more stress. In China, civil servants have a strict promotion system, and education plays an important role in promotion. The high education level of civil servants at basic level has certain advantages in the promotion and social welfare, while those with lower education level has relatively high professional competitive pressure, which

leads to higher depression level[7]. At the gross-roots civil servants, cadres are generally responsible for the assignment and acceptance of tasks, while clerks are responsible for the specific implementation of tasks. Compared with cadres, the general staff not only have the pressure of work but also the pressure of promotion. Civil servants who have a good relationship with their colleagues have lower stress levels than average. Good relationships with colleagues promote better cooperation and make work easier[34]. Some studies have shown a link between physical activity and stress, exercise can reduce stress appropriately[35, 36]. The results were consistent with previous studies, which shown that people who exercise occasionally or never felt more stressed than civil servants who exercise regularly[37]. Their stress is relieved by physical exercise, which is related to the positive impact of exercise on mood states through physiological and biochemical mechanisms[3, 7]. For the gross-roots civil servants, monthly income below 2500 CNY can make their stress relatively higher than average. Perhaps because they work at the gross-roots level, 2500 CNY is enough to cover their daily living expenses.

In this study, we focused on this special group of civil servants. The *P* value of depression and anxiety of different position of the gross-roots civil servants were close to 0.05. That may be because the sample size was relatively small. The *P* value was approach even surpass 0.05 when the sample size was increased. The differences in stress, depression, anxiety

and resilience of the grass-roots civil servants in different positions shown that clerks felt more stress, depression and anxiety than cadres, and their resilience was relatively low. The mental health status of clerk in the grass-roots civil servants is relatively poor and their resilience needs to be improved. At the same time, long-term relatively high stress, depression and anxiety will not only reduce work efficiency but also affect physical health[38, 39]. So the mental health of the grass-roots civil servants needs to be widely concerned and addressed.

As expected, stress of the grass-roots civil servants is positively correlated with depression and anxiety, while resilience is negatively correlated with stress, depression and anxiety, which indicated that stress in the grass-roots civil servants is a risk factor for depression and anxiety, while resilience is a protective factor for depression and anxiety. This is consistent with previous studies of depression and anxiety[3, 4, 12, 16]. Stress is a risk factor for depression and anxiety. To some extent, stress can cause and aggravate depression and anxiety. It can also be said that the grass-roots civil servants with depression and anxiety, to a certain extent, have relatively low ability to face and negotiate pressure to overcome adverse consequences. Furthermore, resilience is a protective factor for depression and anxiety. The hypothesis that resilience modified the relationship between stress, depression and anxiety has been confirmed. To some extent, resilience can relieve depression and anxiety

caused or aggravated by stress. Interestingly, the gross-roots civil servants with high resilience may have more ability to deal with the stress in life and work than those with low resilience, thereby reducing the risk of depression and anxiety. Previous studies have also found that resilience can partially moderate stress and other psychological and emotional problems[5, 15].

Through moderating and mediating analysis, it is found that stress can not only directly affect mental health, causing depression and anxiety, but also indirectly affect mental health level of the gross-roots civil servants through resilience. Resilience can directly block the negative impact of stress on mental health and thus become a protective factor of mental health under stress. The reason why resilience can be an intrinsic protective factor may be that individuals with higher resilience are better at assessing stressful events in a positive cognitive way in the face of the same stress. They tend to adjust the relationship between the environment and individuals more actively, stimulate and promote their own potential, make full use of various resources, face pressure, and achieve a good state of adaptation and development. This is also consistent with the results of previous resilience model studies[5, 15].

The mediation analysis found that resilience had more than three times of the effect on depression than anxiety, suggesting that resilience was more important than anxiety in explaining depression. The simple slope analysis showed that the effect of stress on depression of the

gross-roots civil servants with higher resilience scores was lower, while those with lower resilience scores were significantly higher in the relationship between stress and depressive. The gross-roots civil servants in the high resilience group scores were lower on the relationship between stress and anxiety than those in the low resilience group. In the present study, resilience accounting for an important part of the variation in anxiety but even larger variations in depression may suggest interventions should target ways to enhance resilience and at the same time minimize the effects of stress. When considering interventions that promote resilience, it may be more relevant to the gross-roots civil servants who show anxiety and depression as a result of the direct effects of stress.

There are some limitations to this study. First, it is a cross-sectional study, which means that causality cannot be determined. Second, because of the self-reporting questionnaire used in the current study, the results may be constrained by memory bias and individual subjective consciousness. Finally, the sample size of this article is too small, with only one county, to represent the gross-roots civil servants all over the country.

5. Conclusion

Resilience can moderate the relationship between stress and depression, anxiety as a dynamic moderate mode. Improving resilience and reducing stress play a vital role in preventing depression and anxiety in the gross-roots civil servants. The next step is to make a cohort-study and

expand the investigation scope to increase the sample representation. The future study can explore how to enhance the resilience of the grass-roots civil servants and the mechanism and process of resilience.

Declarations

Abbreviations

CSSS: Civil Servants Stress Scale; SDS: Self-rating Depression Scale; SAS: Self-rating Anxiety Scale; CD-RISC: Conner-Davidson Resilience Scale; CNY: Chinese yuan.

Ethical approval and consent to participants

The research has been approved by the Life Science Ethics Review Committee of Zhengzhou University.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

All the authors of this paper declare that they have no interests.

Funding

Not applicable.

Authors' contributions

HLS, MJZ, YJW, and YL were involved in the conception and design of the

paper. HLS, MJZ and YL were involved in the data collection and analysis. HLS, MJZ, YJW, LYY, YYW and YL were involved in interpretation of the results. HLS drafted the first version. HLS, MJZ, YJW, LYY, YYW and YL contributed to the writing of the paper and all authors have read and approve this version.

Acknowledgement

The author that all of the participants in the study. Huiling Song ^a, Mengjie Zhang ^a, Yanjie Wang ^a, Liying Yang ^a, Yanyu Wang ^b, Yan Li ^{a,c}. This study was supported by the Department of Children, Adolescents and Women Health, College of Public Health of Zhengzhou University in China. 100 Kexue Road, Zhengzhou, 450000, Henan, China.

References

1. Liu, J., *Rank promotion in civil servants promotion*. Forum for party and government officials in China, 2019. **05**: p. 26-29.
2. Zhang, , L., et al., *Correlations among Work Stressors, Work Stress Responses, and Subjective Well-Being of Civil Servants: Empirical Evidence from China*. Iranian journal of public health, 2019. **48**(6): p. 1059-1067.
3. D, N., et al., *Consequences of Job Insecurity on the Psychological and Physical Health of Greek Civil Servants*. BioMed research international, 2015. **2015**: p. 673623.
4. S, G., et al., *Effect of Job Strain on Job Burnout, Mental Fatigue and Chronic Diseases among Civil Servants in the Xinjiang Uygur Autonomous Region of China*. International journal of environmental research and public health, 2017. **14**(8).
5. C, Z., et al., *Relationships of mental health problems with stress among civil servants in Guangzhou, China*. Community mental health journal, 2014. **50**(8): p. 991-6.
6. SJ, L., et al., *Effects of stress throughout the lifespan on the brain, behaviour and cognition*. Nature reviews. Neuroscience, 2009. **10**(6): p. 434-45.
7. K, K., *Measuring the effects of stress on the cardiovascular system during a disaster: the effective use of self-measured blood pressure monitoring*. Journal of hypertension, 2010. **28**(4): p. 657-9.
8. T, T. and S. M., *Job dissatisfaction as a contributor to stress-related mental health problems among Japanese civil servants*. Industrial health, 2013. **51**(3): p. 307-18.

9. H, Y., et al., *The impact of stress on body function: A review*. EXCLI journal, 2017. **16**: p. 1057-1072.
10. R, W., *Can Hostile Attitudes and Hostile Affections Lead to Depressive Symptoms Under Stress? A Study Based on Racial/Ethnic and Gender Differences*. Journal of racial and ethnic health disparities, 2020.
11. CE, H., et al., *The impact of life stress on adult depression and anxiety is dependent on gender and timing of exposure*. Development and psychopathology, 2017. **29**(4): p. 1443-1454.
12. F, A. and H. O., *Adolescent stress and symptoms of anxiety and depression: Resilience explains and differentiates the relationships*. Journal of affective disorders, 2016. **203**: p. 213-220.
13. X, M., et al., *The impact of resilience on prenatal anxiety and depression among pregnant women in Shanghai*. Journal of affective disorders, 2019. **250**: p. 57-64.
14. Hjemdal, O., et al., *Resilience predicting psychiatric symptoms: A prospective study of protective factors and their role in adjustment to stressful life events*. Clinical Psychology & Psychotherapy, 2006. **13**(3): p. 194-201.
15. R, M., et al., *Resilience or hope? Incremental and convergent validity of the resilience scale for adults (RSA) and the Herth hope scale (HHS) in the prediction of anxiety and depression*. BMC psychology, 2017. **5**(1): p. 36.
16. N, O.-B. and M. P., *Psychological resilience and secondary traumatic stress in nurses working with terminally ill patients-The mediating role of job burnout*. Psychological services, 2020.
17. Y, G., et al., *Personality traits and depressive symptoms: The moderating and mediating effects of resilience in Chinese adolescents*. Journal of affective disorders, 2020. **265**: p. 611-617.
18. L, W., *[An investigation of occupational stress, social support, and happiness of junior civil servants]*. Zhonghua lao dong wei sheng zhi ye bing za zhi = Zhonghua laodong weisheng zhiyebing zazhi = Chinese journal of industrial hygiene and occupational diseases, 2015. **33**(10): p. 753-6.
19. PY, L., et al., *Environmental tobacco smoke (ETS) and hyperlipidemia modified by perceived work stress*. PloS one, 2020. **15**(1): p. e0227348.
20. W, K., et al., *Mediating role of occupational stress and job satisfaction on the relationship between neuroticism and quality of life among Chinese civil servants: a structural equation model*. Health and quality of life outcomes, 2020. **18**(1): p. 34.
21. *Development and evaluation of the Civil Servants Stress Scale*.
22. ZUNG, W.W.K., *A Self-Rating Depression Scale*. Archives of General Psychiatry, 1965. **12**(1): p. 63-70.
23. Zhang, M., *Handbook of rating scales in psychiatry*. Hunan science and technology press, 1993: p. 34-41.
24. Zhang, M., *Handbook of rating scales in psychiatry*. Hunan science and technology press, 1998: p. 35-42.
25. Connor, K.M. and J.R. Davidson, *Development of a new resilience scale: the Connor-Davidson Resilience Scale (CD-RISC)*. Depress Anxiety, 2003. **18**(2): p. 76-82.
26. Hayes , A.F., *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression - Based Approach*. Journal of Educational Measurement, 2013. **3**(51): p. 335-337.
27. Ling Zhang , et al., *Correlations among Work Stressors, Work Stress Responses, and Subjective Well-Being of Civil Servants: Empirical Evidence from China*. Iran J Public Health, 2019. **48**: p.

1059-1067.

28. Timmins, F. and M. Kaliszer, *Aspects of nurse education programmes that frequently cause stress to nursing students -- fact-finding sample survey*. Nurse education today, 2002. **22**(3): p. 203-11.
29. Andrew W Manigault , et al., *Education Is Associated with the Magnitude of Cortisol Responses to Psychosocial Stress in College Students*. Int J Behav Med, 2018. **25**: p. 532-539.
30. Emmanuel Kokoroko and M.A. Sanda, *Effect of Workload on Job Stress of Ghanaian OPD Nurses: The Role of Coworker Support*. Saf Health Work, 2019. **10**(3): p. 341-346.
31. Ang Li , et al., *Enhancement of Hippocampal Plasticity by Physical Exercise as a Polypill for Stress and Depression: A Review*. CNS Neurol Disord Drug Targets, 2019. **18**(4): p. 294-306.
32. Yuhua Li , et al., *The Status of Occupational Stress and Its Influence the Quality of Life of Copper-Nickel Miners in Xinjiang, China*. Int J Environ Res Public Health, 2019. **16**(3): p. 353.
33. Xin Wei Yang , Zhi-Ming Wang, and T.Y. Jin, *Appraisal of occupational stress in different gender, age, work duration, educational level and marital status groups*. Wei Sheng Yan Jiu, 2006. **35**(3): p. 268-271.
34. Sophie Schön Persson , et al., *Workplace relationships impact self-rated health: A survey of Swedish municipal health care employees*. Work, 2018. **60**(1): p. 85-94.
35. Nicole A Vankim and T.F. Nelson, *Vigorous physical activity, mental health, perceived stress, and socializing among college students*. Am J Health Promot, 2013. **28**(1): p. 7-15.
36. Jian-Ping He , Diana Paksarian , and K.R. Merikangas, *Physical Activity and Mental Disorder Among Adolescents in the United States*. J Adolesc Health, 2018. **63**(5): p. 628-635.
37. Lijun Sun , et al., *Physical activity level and associated factors among civil servants in Xi'an, China*. J Sci Med Sport, 2016. **19**(8): p. 647-653.
38. Teris Cheung, et al., *Depression, Anxiety and Symptoms of Stress among Baccalaureate Nursing Students in Hong Kong: A Cross-Sectional Study*. Int J Environ Res Public Health, 2016. **13**(8): p. 779.
39. Kyung-Won Song, et al., *Correlation of occupational stress with depression, anxiety, and sleep in Korean dentists: cross-sectional study*. BMC Psychiatry, 2017. **17**(1): p. 398.

Figures

Figure 1

Mediating effects of resilience in the relationship between stress(short for stress) and depression (solid line), anxiety (dash line) in civil servants (N=302). Note: * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$.

Figure 2

Standardized simple regression lines for the association between stress and depression at low (one SD below the mean) and high resilience (one SD high the mean).

Figure 3

Standardized simple regression lines for the association between stress and anxiety at low (one SD below the mean) and high resilience (one SD high the mean).