



Assessment and Analysis of Postgraduate Healthy Living Status Taking Southwest Forestry University as an Example

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Abstract. From the perspective of “overall health”, this paper discusses the situation of healthy life of graduate students and its influencing factors. On the basis of reference to existing research and relevant mature scales, an indicator system for evaluating the overall health of graduate students is established. A random sampling survey is conducted with the graduate students of Southwest Forestry University as the research object. The rationality of the health indicator system is verified through exploratory (EFA) and confirmatory (CFA) factor analysis, through the comprehensive scoring method, mean comparison, Pearson correlation analysis and binary logistic regression analysis, it was found that the overall health of the graduate students in this school was basically qualified, and age, marital status and grade had significant effects on the overall health of the graduate students. Therefore, the overall health status of the postgraduate group should be paid attention to by relevant departments and education subjects. Strengthening management education and continuing to improve relevant research will be beneficial to the promotion of the overall health level of the postgraduate group.

Keywords: postgraduate · healthy life · influencing factors

1 Introduction

Most graduate students are in the age range of 22 to 28 years old, playing multiple social roles, and their health status is easy to be affected and not easy to be concerned [1]. The uncertain learning environment and tasks they face may cause fluctuations in their sense of self-efficacy [2]. Research, graduation, employment, marriage, economy [3, 4] and other pressures is important factors affecting the mental health of graduate students. Xu Nanqiang, a scholar, found in the survey that 86% of graduate students live in a sub-health state [5], showing a bad lifestyle and low health behavior level [6, 7]. Irregular life schedule, excessive use of electronic products, weak fitness awareness, physical decline, and psychological vulnerability are common problems among graduate students. Individual differences, lifestyles and behaviors, chronic diseases, etc., which is important factors affecting students' health [8]. This shows that the health problems of postgraduates are not only reflected in psychological aspects, but also closely related to self and society. A more comprehensive overall health of postgraduates should be paid attention to.

In 1948, WHO put forward the concept that health is “a state of physical, mental and social integrity” [9]. Later, some scholars successively put forward the concept that health is an orderly state of body, mind and spirit [10], and put forward the concept of four dimensions of health [11], the concept of overall health [12, 13], the concept of comprehensive health [14], and the concept of comprehensive health [15], which all explained from a certain level that health should be complete health including external and internal health. The overall health problem of graduate students has also been constantly noticed. In China, the overall health level of graduate students has been studied from physical exercise and health [16, 17], overall health [18] and other aspects. In the research on postgraduate health abroad, it is also believed that mental health and physical health should be considered as a unified whole [19], and physiological and psychological health should be recognized as having a very significant internal correlation [20].

The healthy life of postgraduates is the fundamental guarantee for the better progress and development of postgraduates. The existing research does not involve much in the healthy life of postgraduates. There is no unified and authoritative conclusion on the influencing factors of the healthy life of postgraduates, and how to measure the healthy life of postgraduates remains blank, which provides the possibility for this study. Therefore, this research starts from the aspects of mental health, physical health, social health, and so on. With the “overall health” of graduate students as the research core, and with reference to existing scales and research, it conducts research on the overall healthy living standards of graduate students and its influencing factors, so as to provide a relevant basis for promoting the comprehensive high-quality development of graduate students and graduate health education.

2 Research Objects and Methods

2.1 Objects

Based on the self-measured Health Rating Scale (SRHMS), self-rating Psychological Symptoms Scale (SCL-90) and previous studies, the healthy life index scale of graduate students was constructed. The simple random sampling method was used to investigate the graduate students in Southwest Forestry University, and the samples were collected from the graduate students in the categories of liberal arts, engineering, science and management. A total of 319 valid questionnaires was obtained. Southwest Forestry University is an agricultural and forestry university, with relatively strict graduation requirements. The sample includes master's and doctoral students, which has good research representativeness. By the end of 2021, SWFU has 4 first-class doctoral programs and 166 doctoral students. There are 15 master's programs in first-level disciplines, 65 master's programs in second-level disciplines, 15 professional master's programs, and 3300 master's students. Among the interviewed samples, there were 134 boys (42%) and 185 girls (58%); 210 (65.8%) students came from rural areas and 106 (34.2%) from urban areas. There were 222 Han people (69.6%) and 97 ethnic minorities (30.4%). There are 290 postgraduate students (90.9%), accounting for 8.79% of the total number of postgraduate students, and 29 doctoral students (9.09%), accounting for 17.47% of the total number of doctoral students. The sample quantity meets the sampling requirements, and

the samples have good representativeness. The survey meets the requirements, and the respondents give informed consent.

2.2 Methods

(1) Questionnaire. The questionnaire is mainly divided into two parts. The first part is the basic information questionnaire of postgraduates, including the social statistical information such as gender, age, grade, place of origin, marital status and ethnicity. The item “self-overall health evaluation” is added as H0 as the basis for subsequent analysis. The second part is the overall health scale. According to the definition of health by the World Health Organization, the self-measured Health Rating Scale (SRHMS) and the self-Rating Psychological Symptoms Scale (SCL-90) is used as the reference basis for the questionnaire. The healthy living status scale with four dimensions of “life health, mental health, social health and health literacy” was constructed. Life and health dimensions refer to the status quo of life style of graduate students by Yi [21], mental health dimensions refer to Zhou Hua’s [22] research on the mental health of graduate students in agricultural universities, and social health dimensions are abstracted from the empirical problems of comprehensive health of graduate students by Xia Xiangwei [14]. The dimension of health literacy refers to the research of Qiao Yanhua [6] on the health literacy level and influencing factors of university postgraduates. All Likert five-point positive scoring method is adopted. The higher the score, the better the result.

(2) Scale Test. In order to test the usability of the healthy life scale, reliability and the validity test, exploratory factor analysis and confirmatory factor analysis were carried out on the scale part of the study, and finally it was verified that the healthy life scale designed in the study met the requirements of social reality and mathematical statistics, and could be analyzed.

Reliability and the Validity Test. In the reliability and the validity test of the healthy life scale, Cronbac’s $\text{Alpha} = 0.839 > 0.8$ and $\text{KMO} = 0.850 > 0.8$, indicating good reliability and validity of the scale, and further analysis of the questionnaire can be carried out.

Exploratory Factor Analysis (EFA). In SPSS26.0, principal component analysis was used to carry out five orthogonal rotations with the maximum variance method, and variables with factor loading lower than 0.5 were eliminated. Finally, four common factors including Health Habits, Mental Health, Social Health and Health Literacy were extracted, including 18 items, with an intermediate score of 50. A higher total score indicates a better healthy life. The life health factor included 6 items, including body, exercise, life attitude, rest and rest, diet, etc., and the median score was 15.5. The level of mental health mainly involved the psychological pressure of scientific research graduation, economy, employment, marriage and so on, including 4 items, the median score was 10.5 points; Social health mainly includes interpersonal relationship and social adaptability, including 4 items, the median score is 10.5 points; Health literacy is mainly embodied in the understanding and mastery of health knowledge, health behaviors and skills, healthy lifestyle, and health concerns, including 4 items, with an intermediate

score of 10.5. The extracted four principal components are consistent with the initial index system and can be further analyzed and tested.

Confirmatory Factor Analysis (CFA). Based on exploratory factor analysis, with life health, mental health, social health and health literacy as latent variables and measurement indicators as observational variables, Amos26.0 was used to conduct confirmatory factor analysis on the structural equation of postgraduate health indicator system, and the goodness of fit parameter was obtained. After the second revision, the CMIN/DF value was $1.919 < 2$. The model has a good fitting degree. The goodness of fit index (GFI) was 0.934, the adjusted goodness of fit index (AGFI) was 0.903, the root of approximate error (RMSEA) was 0.056 and close to 0, the standard fit index (NFI) was 0.879, the incremental fit index (IFI) was 0.938, and the relative fit index (CFI) was 0.937. Each fitting index is ideal, and the factor loading of each index after standardization is greater than 0.5. Therefore, the index system model has a good goodness of fit, which also indicates that the four latent variables in the scale are important factors affecting the healthy life of graduate students. This index system can be accepted and relevant data can be further analyzed.

2.3 Statistical Methods

SPSS26.0 software was used to process and analyze the data, the comprehensive index method were used to calculate the healthy living standards, and the measurement data was expressed as $(\bar{x} \pm s)$. Univariate ANOVA analysis and T-test were used to compare the mean difference of the health status and each dimension. Pearson correlation was used to analyze and compare living habits, mental health, social ability, health literacy and H0, and to analyze the healthy life of graduate students.

3 Results

3.1 Assessment of Healthy Living Standard

According to the test of the Healthy Life Assessment Scale, there are 18 items in 4 dimensions, and the results are evaluated by using the simple comprehensive scoring method. The total score is 90 points. The calculation method is as follows:

$$H = \frac{\sum_{n=1}^{319} \left(\sum_{i=1}^{18} x_i \right)}{n}$$

H represent the health score, i represents the variable, n represents the sample, so x_i represents the variable score. The positive 5-point method is applied to divide health into 5 grades, $0 < H \leq 18$ is very unhealthy (suffering from major diseases, Difficult life to take care of themselves), $19 < H \leq 36$ is unhealthy (suffering from physical and mental diseases), $37 < H \leq 54$ is sub-healthy (the state between health and illness), $55 < H \leq 72$ is basically healthy (the overall situation of daily life is normal), $73 < H \leq 90$ is very healthy (national athlete level).

By calculation, the comprehensive health score is 63.3, which is at the basic health level. With reference to the middle score of the scale, the score of ($x \pm s$) is obtained by single-sample T test as a measure of comprehensive score and score level of each dimension. The results showed that the overall healthy living condition of postgraduates was good, and the comprehensive score was (63.34 ± 7.76) points. The scores of lifestyle factor, social ability factor and health literacy factor were (22.19 ± 3.63) points, (15.53 ± 2.19) points and (14.79 ± 2.69) points. The scores of the three factor dimensions were all above the medium level. The score of mental health factor was (10.54 ± 3.39) points, which was lower than the other three factors, and was at the medium level.

3.2 Analysis of Differences in the Health Status Quo of Graduate Students

According to the analysis results of one-way ANOVA and independent sample T-test (only variables with differences are shown), see Table 1. There were significant differences in life related factors at different ages ($P < 0.05$), and life health scores decreased with the increase of age, but there were no significant differences in gender, marital status and grade ($P > 0.05$). There were significant differences in mental health in gender, marital status and grade ($P < 0.05$), but no significant differences in age ($P > 0.05$). In terms of mental health score, the score of male postgraduates is higher than that of female postgraduates, the score of married postgraduates is higher than that of unmarried postgraduates, and the score of doctoral postgraduates is higher than that of master postgraduates. The mental health score of master postgraduates shows a trend of decreasing with the increase of grade. The social ability factor had significant difference in gender ($P < 0.05$), but no significant difference in marital status, age and grade ($P > 0.05$). The social health score of male graduate students was higher than that of female graduate students. There were no significant differences in gender, marital status, age, grade and origin of health literacy factors ($P > 0.05$). Taking the self-rated health status H0 in the scale as the basis for the overall health examination evaluation of postgraduates, and the comprehensive score as the reference basis, it was found that there were significant differences between H0 and the overall healthy living status in gender ($P < 0.05$), and the health score of male was higher than that of female. The H0 also had significant difference in age ($P < 0.05$), and the overall health score of postgraduates aged 34 and above was the lowest, while the overall score of postgraduates aged 26 to 33 was the highest.

3.3 Correlation Analysis of Influencing Factors of Postgraduate Healthy Life

The Pearson correlation test was conducted between H0 and living habits, psychological stress, social interaction and health literacy. The results showed that the healthy living conditions of graduate students were positively correlated with living habits, psychological stress, social interaction and health literacy at the level of $P < 0.01$, and the correlation coefficients were 0.798, 0.704, 0.685 and 0.364, respectively.

Table 1. Comparison of evaluation scores of various scales for graduate students with different characteristics (n = 319, x ± s) [owner-draw]

Group	Options	habits and customs	mental health	Social capacity	Health literacy	H ₀	General situation
Gender	male (n = 134)	22.54 ± 3.74	11.00 ± 3.84	16.16 ± 2.32	14.78 ± 3.17	3.47 ± 0.87	64.49 ± 8.40
	Female (n = 185)	21.93 ± 3.53	10.20 ± 2.98	15.59 ± 2.08	14.79 ± 2.29	3.25 ± 0.79	62.51 ± 7.17
	t/F	1.498	2.013	2.273	−0.017	4.960	2.253
	P	0.135	0.045*	0.024*	0.986	0.027*	0.025*
Marital status	spinsterhood (n = 268)	22.29 ± 3.47	10.28 ± 3.14	15.84 ± 2.16	14.88 ± 2.62	3.50 ± 0.79	63.28 ± 7.50
	married (n = 51)	21.67 ± 4.35	11.90 ± 4.25	15.78 ± 2.37	14.31 ± 3.02	3.31 ± 0.97	63.67 ± 9.09
	t/F	1.121	−2.601	0.165	1.373	2.292	−0.326
	P	0.263	0.012*	0.869	0.171	0.131	0.745
Age	18–25 year (n = 223)	22.43 ± 3.62	10.49 ± 3.39	15.99 ± 2.17	14.80 ± 2.83	3.50 ± 0.84	63.71 ± 7.76
	26–33 year (n = 78)	21.99 ± 3.23	10.33 ± 3.33	15.5 ± 2.17	14.90 ± 2.20	3.55 ± 0.66	62.72 ± 7.38
	≥34 year (n = 18)	19.94 ± 4.61	12 ± 3.43	15.33 ± 2.54	14.17 ± 2.83	2.83 ± 1.04	61.44 ± 9.29
	t/F	4.182	1.854	1.922	0.55	6.075	1.045
	P	0.016*	0.158	0.148	0.58	0.003**	0.353
Grade	First (n = 193)	22.21 ± 3.62	10.49 ± 3.45	15.95 ± 2.12	14.85 ± 2.75	3.49 ± 0.84	63.51 ± 7.90
	second (n = 63)	22.02 ± 2.87	10.30 ± 2.73	15.37 ± 2.16	14.49 ± 2.42	3.52 ± 0.72	62.17 ± 6.48
	third (n = 34)	22.18 ± 3.81	9.44 ± 2.4	15.71 ± 2.22	15.18 ± 2.34	3.44 ± 0.79	62.5 ± 7.38
	doctoral candidate (n = 29)	22.41 ± 4.92	12.62 ± 4.38	16.21 ± 2.64	14.52 ± 3.23	3.28 ± 1.00	65.76 ± 9.43
	t/F	0.087	5.516	1.46	0.627	0.684	1.583
	P	0.967	0.002**	0.226	0.598	0.562	0.193

*p < 0.05 **p < 0.01

3.4 Regression Analysis on Influencing Factors of Postgraduate Healthy Living Conditions

With the median value of H₀ 2.5 as the boundary value, 1–2.5 as the non healthy state, 2.5–5 as the healthy state, and the assigned values of 0 (non healthy state) and 1 (healthy state), binary logistic regression analysis was conducted on the significant variables in one-way ANOVA and T-test analysis, as well as life health score, mental health score, social health score and health literacy score as independent variables. The results showed that among the characteristic variables of postgraduates, age, marital status and grade

Table 2. Binary Logistic regression analysis of factors influencing the overall health level of graduate students (n = 319) [owner-draw]

Variable	B	S.E.	Waldx2	OR (95%CI)	P
Age	−1.921	0.583	10.581	0.146 (0.047–0.459)	0.001
Marital status	−2.426	0.880	7.579	0.088 (0.016–0.496)	0.006
Grade	−1.019	0.369	7.623	0.361 (0.175–0.744)	0.006
Habits and customs	1.982	0.677	8.564	7.256 (1.924–27.365)	0.003
Mental health	1.480	0.605	5.980	4.394 (1.342–14.389)	0.014
Social capacity	0.542	0.259	4.387	1.720 (1.035–2.857)	0.036
Health literacy	1.343	0.252	28.336	3.829 (2.326–6.278)	0.000

had significant reverse changes on the overall health level of postgraduates, while life, psychology, society, health literacy and the overall health level of postgraduates had significant positive changes (Table 2).

4 Conclusion

Taking Southwest Forestry University as an example, this study used ANOVA analysis and Pearson correlation analysis to analyze the influencing factors of healthy life of postgraduates on the basis of factor analysis to check and pass the scale. The research results show that life state, social communication ability and health literacy have a positive impact on the healthy life of graduate students, while psychological pressure has a negative impact on their health. Among them, life state, psychological pressure and social communication ability of graduate students have a significant impact on their healthy life, while health literacy has a slight impact on their health. From the perspective of individual differences, age, exercise frequency and sleep have a certain impact on the health of graduate students, which is worth further exploration. From the observation variables, exercise, sleep quality, academic prospect cognition, employment pressure, scientific research graduation pressure, communication with classmates and friends, social adaptation, etc. Have a greater impact on the healthy life of graduate students.

References

1. MENG Y X. On Health Concepts and Behavior of Science and Engineering Postgraduate Students——Case of the University of Chinese Academy of Sciences[J]. Forum on Science and Technology in China, 2015, 1:143–149.
2. DENG X Y, LIU X Y, ZHANG S, LIU Q Z, WANG Z L, WANG J, XIANG L L, ZHOU P. Social anxiety and associated factors among graduate students under the normalization of epidemic prevention and control [J]. Chin J Sch Health, 2022, 43(03):413–416+420.

3. YOU X F, SHI J J, TAN H, XIE J B, WANG L. Study on mental health education of graduates in background of healthy China construction [J]. Jour of Bio-edu, 2020, 8(3): 193–207.
4. ZHANG Y Y, FANG H Z. Research on postgraduate mental health education from the perspective of humanistic care[J]. Our of Bohai University (Philosophy & Social Science Edition), 2020, 4: 131–134.
5. XU N Q, LIU L C. Graduate Student Life Style Mechanism and Health Promotion[J]. Jour of Nanjing Sports Institute, 2010, 9(3): 147–149.
6. QIAO Y H, LI C, HAO J Z, JI A B, GAO S Y. Analysis on status of health literacy and its influence factors among university graduate students in Hebei Province[J]. China J of Health Edu, 2017, 33(04): 291–294.
7. WANG S S. Investigation and Research on the Healthy Lifestyle of Postgraduates in my country's Colleges and Universities[D]. Shandong: Shandong University of Technology Master's Thesis, 2012.
8. HU J R, SUN X Z, JIANG T J, SUN J H. Analysis of Status and influence Factors of Health Literacy of a University Freshmen[J]. Hospital Administration J of Chin People's Liberation Army, 2016, 23(02): 137–141.
9. Constitution of the World Health Organization: Principles [EB/OL]. WHO website, <http://www.who.int/a-bout/Mission/en/>.
10. CHENG H. Human health and ecotourism from the perspective of entropy theory[J]. Tour Res, 2017, 9(06): 11–13.
11. WANG X F, SU J N, WANG H. Research on the Monitoring and Evaluation Framework and Indicator System of Healthy China [J]. Health Economics Res, 2020, 3(395): 4–6.
12. DONG B, WU Y H. Review on the Content and the Research Field of Preventive Medicine of Traditional Chinese Medicine[J]. Chin Archives of Traditional Chin Medicine, 2015, 33(12): 2885–2887.
13. TANG J. Lifestyle and Value Concept on Holistic Health[J]. Jour of Harbin Institute of Tech (Social Sciences Edition), 2020, 22(1): 38–44.
14. XIA X W, SHEN J Z, LIU D. An Empirical Research on the Comprehensive Health of the Graduate Students in China[J]. Jour of National Academy of Edu Administration, 2019–8: 89–95.
15. FU Z H. Positive Effects of Healthy Lifestyle on College Students Health[J]. Jour of Wuhan Institute of Physical Edu, 2012, 46(7): 62–66.
16. XIA X W, HUANG J L, LIU D. Investigation and study of university graduate students' physical exercise behavior affecting factors[J]. Jour of Physical Education, 2018, 25(05): 102–108.
17. XIA X W, SI Y, HAO X, KONG D P, LI X Y, LI L P. Research on Countermeasures for Strengthening Postgraduate Physical Education and Health Education[J]. China Higher Education, 2021(Z2): 61–63.
18. XIA X W, HUANG J L, HAO X, LIU D. Empirical Study on Graduate Student Physical Education and Health Education Effects: Based on Graduate Students' Comprehensive Health Promoting Mechanism by Structural Equation Model Method[J]. Teacher Edu Res, 2018, 30(05): 85–89.
19. McClanahan K K, Huff M B, Omar, H. A. Holistic health: does it really include mental health? [J]. The Scientific World Journal 2006, 6, 2092–2099
20. Vaez M, Laflamme L. First-year university students' health status and socio-demographic determinants of their self-rated health.
21. DA Y, LU M. Study on the current situation of the life style of college postgraduates in Guizhou Province[J]. Jour of Guizhou Normal University (Natural Sciences), 2006(02): 51–55.
22. ZHOU H. Mental Health Status and Countermeasures of Agricultural University Postgraduates[J]. Heilongjiang Res on Higher Edu, 2018, 36(07): 140–145.

23. GUO H M. The Mental Health of Doctoral Graduate and Intervention Suggestions[J]. Heilongjiang Res on Higher Edu,2017(08):111–115.
24. LIU M, QI W F, ZHAO J B. Relationship between resilience and mental health in postgraduates [J]. Occupation and Health,2015,31(22):3114–3116.

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