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Social Support and Psychological Capital Mediate the Effect of Personalities on the Mental Health of Professional Staff in China During COVID-19 Pandemic

Yongcheng Yao[1,2], Jie Tang[3], Zhenzhen Li[1], Shuyan Chen[1], Haixia Du[1], Lingeng Lu[4]

[1]School of Mathematics and Statistics, Zhengzhou Normal University, Zhengzhou, Henan, People's Republic of China; [2]WorldPop, School of Geography and Environmental Science, University of Southampton, Southampton, UK; [3]Library, Zhengzhou University of Technology, Zhengzhou, Henan, People's Republic of China; [4]Department of Chronic Disease Epidemiology, Yale School of Public Health, School of Medicine, Yale University, New Haven, CT, USA

Correspondence: Yongcheng Yao, School of Mathematics and Statistics, Zhengzhou Normal University, Zhengzhou, Henan, 450044, People's Republic of China, Email 806306944@qq.com

Objective: COVID-19-related lockdown can lead to mental health problem, which displays heterogeneous between individuals. The aim of this study was to explore the association between mental health, social support and psychological capital state of professional staff with different personalities during the COVID-19 pandemic in China.

Methods: A cross-section study was conducted via online survey using the questionnaires of General Health Questionnaire (GHQ-12), Multidimensional Scale of Perceived Social Support (MSPSS), Psychological Capital Questionnaire (PCQ), Eysenck Personality Questionnaire-Revision Short Scale of China (EPQ-RSC). A total of 626 employees were included. Multiple regression analysis was performed to investigate the association of psychological capital, perceived social support, EPQ-N and EPQ-E and their interactions in general mental health.

Results: About 2.7% of professionals had mental health. The married had a higher mental health score than the single ($P<0.05$). The regular exercising workers had the lowest mental health score ($P<0.05$), and higher psychological capital and social support scores than the non-exercising ones ($P<0.01$). Multivariate analysis showed that the interaction between social support, psychological capital and neuroticism was statistically significant ($\beta=-0.161$, $P<0.001$) in general mental health with neuroticism ranking the top ($\beta=0.352$, $P<0.001$). Mediation analysis showed that social support modified the effect of psychological capital on mental health, accounting for 25.5% of the total effect, and that both social support and psychological capital mediated the effect of neuroticism or extroversion differentially on mental health.

Conclusion: Neuroticism is an influencing factor on mental health of professional staff. Social support and psychological capital played a partial mediating role in the effect of neuroticism or extroversion differentially on mental health in China. The findings suggest that during the COVID-19 pandemic, more social support and psychological capital are needed for the professional individuals with neuroticism to alleviate their stress and improve mental health.

Keywords: professional staff, social support, psychological capital, general mental health

Introduction

The pandemic of Coronavirus-caused Disease 2019 (COVID-19) has assaulted the world for more than 2 years since the outbreak occurred in early 2020, with a dramatic increase in the number of infected patients and the disease-related deaths.[1,2] The estimated infection rate was 6.2% of the total population.[3] The cumulative number of confirmed cases reported globally has been over 541 million with more than 6.3 million deaths as of 26 June 2022.[4] A study conducted in China reported that about 35% of people experienced psychological distress during the COVID-19 pandemic.[5] Similar findings were demonstrated in several other studies in China.[6–8] These psychological issues may also be derived from the

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comprehensive prevention measurements (from lockdown, social distance to vaccination) and altered lifestyle and/or habits as well as daily task.

The growth of positive psychology leads to the awareness of psychological capital.[9] Psychological capital refers to the personal positive psychological condition during an individual's development or growth.[10] Numerous studies show that psychological capital positively affects organizational commitment and intention to stay,[9] and influences an individual's well-being, job satisfaction, and performance.[10] A significantly negative correlation was found between the mental health and positive psychological capital.[11] The reduction in emotional distress in the employees was observed with an increase in the level of various positive psychological constructs. Psychological capital promotes psychological quality, consequently effectively improving individual's job performance, work engagement.[12–15] Psychological capital associates with work happiness over time and the attitude to the difficulties and/or stress. Individuals with positive psychology like to directly face rather than avoid the stress and problem, thereby exposing individuals to the external social environment.[16] Additionally, psychological capital mediated the association between job satisfaction and nursing performance.[17] However, it is still unclear what relationship exists between psychological capital and mental health of employees during the COVID-19.

Perceived social support (PSS) is defined as individual subjective perceptions of getting support, respect, and consideration from others in society.[18] It depends on the individual's feelings. PSS is more important in an individual's mental health compared to the actual social support.[19] It has been found that a correlation exists between a higher PSS and a lower psychological distress[20] but a higher self-efficacy.[21] Beneficial effects of PSS was reported on mental and physical health,[22] which can as an essential contextual resource mitigate the degree of one's stress and burnout.[23,24] In the workplace, PSS could moderate the relationship between different types of conflict, such as process and task conflicts.[25] Choi et al reported that PSS moderated the relationship between uncertainty and psychological distress.[26]

Personality is the overall psychological characteristics of an individual in thoughts, feelings and behaviors. Different impacts of different personality types were reported on the degree of mental health. A previous study has reported that different personality characteristics had significantly different performance and outcomes under job-related stress in professional health workers.[27] Individuals with different personalities may have different attitudes in seeking social support and have more psychological capitals. Extravert individuals are more likely to seek and get social support due to their openness and more psychological capitals, whereas those with neuroticism are not since they are more emotion instability with less psychological capital and low social support.[28] However, it is yet to be determined how personality affects the general mental health in the employees who experience non-drug prevention and control measures of COVID-19 in China.

The relationship of social support, psychological capital, personality and mental health is complex and interplay with each other. Social support can enhance psychological capital via fostering self-efficacy, optimism and coping styles, helping introvert individuals to manage mental health challenges more effectively. Those with higher levels of psychological capital are more likely leverage social support effectively and may have an optimistic personality that naturally improves their mental health. For extrovert ones, they may be more likely to seek out and benefit from social support, while those with more psychological capital may better face stress. Social support and psychological capital can act as mediators by helping people cope with stress effectively, reducing the negative impact of neuroticism on mental health, whereas promoting the positive effect of extroversion on mental health.

Although previous studies have indicated the associations between employees' general mental health, psychological capital, perceived social support, and personality, there is a gap in the structural relationships among these variables during the COVID-19 pandemic in China. We recently reported that social supports could improve job commitment in Chinese workers during the COVID-19 pandemic.[29] However, it is yet to be investigated how perceived social support mediates the association between personality, psychological capital and general mental health. In this study, we hypothesized that 1) there were positive correlations between social support, psychological capital and extrovert, whereas negative correlations of social support and psychological capital with neuroticism, 2) there existed an interaction between social support, psychological capital and personality in mental health, 3) that social support could reduce the negative effect of neuroticism, whereas enhance the positive effect of psychological capital on mental health in professional workers in China when they faced the non-drug prevention and control measures of COVID-19 in China. The purpose of

this study was to analyze the associations between employees 'general mental health, psychological capital, perceived social support, and personality types when experiencing the non-drug prevention and control measures of COVID-19.

Participants and Methods

Participants and Procedure

Sample Size

We estimated the sample size (n) in this study based on a single population proportion formula of $N = \left[u_\alpha{}^2 \pi(1-\pi)\right]/\delta^2$, with the assumption of δ= 0.03, α= 0.05, u_α=1.96. Yunitri et al reported 17.52% of professionals with stress symptoms during the COVID-19 epidemic.[30] Thus, a total number of 617 individuals would allow us to have 95% confidence interval of the proportion in professional staff who experienced mental health problem with 3% of margin error.

Participants and Sampling Technique

The convenience sampling method was applied in this study. During the period from October to December 2021, we conducted a cross-section survey on workers using online questionnaires via the platform of "Questionnaire Star", which was advertised through weChat, in Zhengzhou, the capital of Henan Province, China. The inclusion criteria include: working length >1 year, and aged older than 18 years old. The exclusion criteria are clinical mental illness with AMI (Any mental illness) in the past year. For adults aged 18 or older, AMI is a diagnosable mental, behavioral, or emotional disorder with the exclusion of the developmental and substance use disorders based on the diagnostic criteria specified in the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders.[31]

The informed consent was obtained from each participant when they filled the questionnaires online. The Ethics Committee of Zhengzhou Normal University reviewed and approved this study (IRB no. ZZNU-2021-006). All procedures involving the participants are in accordance with the 1964 helsinki declaration and its later amendments or comparable ethical standards.

A total of 626 valid questionnaires were collected. Of them, 183 (29.2%) were men and 443 (70.8%) were women. The age of participants averaged 38.4 years old with the range from 19 to 60 years old. The working length ranged 1 to 45 years with an average of 15.7 years.

Method

General Mental Health

The measurement of general mental health or psychological distress was performed using the 12-item General Health Questionnaire (GHQ-12)[32], each of which assesses the severity of a mental problem over the past few weeks using a four-point scale (from 1 to 4). The sum scores from 12 to 48, with a higher score for a worse condition. Poor mental health is defined as a total score of over 27.[33] GHQ-12 in Chinese version used in this study has been validated. The Cronbach's alpha in this study was 0.826.

Psychological Capital

The Psychological Capital Questionnaire was initiated by Luthans and et al[10] and translated into Chinese by Li et al.[34] This questionnaire consists of 24 items, such as "In my current job, I feel I can handle many things at the same time". There are four dimensions in the items, namely self-efficacy, hope, optimism, and resilience. Each item was rated on 6-point scale, 1 represents "strongly disagree" and 6 "strongly agree". The higher the score is, the higher the level of psychological capital is for individuals, and the more resources can be used to assist their success and improve their performance on the job. The coefficient alpha for the current study was 0.929.

Perceived Social Support

The Multidimensional Scale of Perceived Social Support (MSPSS)[35] contains 12 items, with each item rating on a 7-point Likert-type scale, where 1 indicates "very strongly disagree" and 7 "very strongly agree". The summed score ranges from 12 to 84. A higher score is positively associated with better social support and higher satisfaction. Three dimensions are family support (4 items), friend support (4 items) and other support (eg, relatives and colleagues).

The scale calibrates individual understanding and feelings. The MSPSS in Chinese version has been widely used in China with a good measurement of perceived social support.[36] The Cronbach's alpha in this study was 0.954.

Personality Types

The personality types were determined using the Eysenck Personality Questionnaire (EPQ-RSC) in Chinese version. The version has been shown with good reliability and validity.[37] Two dimensions, introversion-extraversion (E) and neuroticism-emotional stability (N), were used to evaluate the personality types. The neuroticism/stability scale (EPQ-N) was for emotional stability when facing negative factors (eg, depression and anxiety), and the introversion and extraversion vector scale (EPQ-E) for the demand of external stimulation. There are 24 items, each with a score of either 0 or 1. Based on the score cutoffs of 43.3 and 56.7 for the E and N dimensions, respectively, four personality types were defined: stable introvert, stable extravert, unstable introvert, and unstable extravert. The Cronbach's α coefficient of the EPQ-E and EPQ-N in this study was 0.797, and 0.871.

Data Analysis

Statistical analyses were performed using SPSS 18.0 software if not specifically mentioned. Normality test (the absolute values of both Skew and kurtosis less than 1) was performed on the numeric variables for the choice of appropriate statistics and statistical analysis methods. Numerical variables in normality distribution are presented as mean ± standard deviation (SD). Either *t*-test or Analysis of Variance (ANOVA) was used to analyze the differences between the groups. The Bonferroni method was used for the correction of multiple comparisons, and the Dunnett, sT3 method was used when the variance was uneven. Pearson correlation analysis was performed on professionals' psychological capital, perceived social support, general mental health, EPQ-N and EPQ-E. Multiple regression analysis was used to explore the ternary interaction effect of psychological capital, perceived social support, EPQ-N and EPQ-E on general mental health with the covariates of age, sex and working length, and the interaction relationship diagram was constructed according Mod-Graph.[38,39] A two-tailed test yielding $p < 0.05$ was considered statistically significant.

Results

Common-Method Variation Test

Using Harman's single factor method on the common-method variance of variables, we found that 22 factors had eigenvalues greater than 1 with the first factor explaining 25.90% of the variance. This result indicates no severe common-method variance in this study based on the critical threshold of 40%.[40]

Associations of Demographic Characteristics with General Mental Health, Psychological Capital and Perceived Social Support in Professional Personnel

Table 1 illustrates the associations of demographic variables with mental health, psychological capital and PSS in professionals. The average scores of psychological capital, social support and mental health in professional staff were 110.76±16.71 vs 65.67±13.38, vs 17.77±4.60, respectively. 2.7% of employees had a mental health score over 27. There were no significant differences in psychological capital, perceived social support and general mental health between either sex, age or working length groups ($p>0.05$). Marital status had significant association with the mental health score with a higher score in the married vs single ($p<0.05$). There was a statistically significant difference in psychological capital, social support and mental health scores between the professionals with different frequencies of physical exercise ($p<0.001$). Further pairwise comparisons showed that frequent physical exercise professionals had the lowest mental health scores ($p<0.05$), followed occasional exercisers, and the sedentary ones (physical inactivity) had the highest mental health scores ($p<0.01$). The scores of psychological capital and social support for those who exercised frequently were higher compared to those who did not exercise ($p<0.01$). Differences in psychological capital, perceived social support and general mental health were statistically significant between the four personality types ($p<0.001$). Post hoc test results showed that the general mental health score of Extravert Stable professionals was the lowest ($p <0.01$), followed Extravert Unstable and Introvert stable employees, while the score of Introvert Unstable professionals was the highest ($p<0.001$). The psychological capital and perceived social support score of Extravert Stable professionals was the

Table 1 Associations of demographic variables with psychological capital, society support and general mental health (mean±SD)

Variable	*n*	General mental Health	Psychological Capital	PSSS
Sex				
Male	183	17.66±4.70	112.17±17.48	66.27±13.74
Female	443	17.81±4.56	110.17±16.36	65.42±13.23
t		–0.394	1.367	0.723
Marital status				
Single	69	16.55±4.57	109.54±17.45	66.35±13.15
Married	557	17.92±4.58	110.91±16.62	65.58±13.42
t		–2.341*	–0.642	0.448
Age				
<35	182	17.36±4.91	110.41±16.97	65.48±13.91
35~	213	18.04±4.49	110.39±17.53	64.41±13.74
41~	231	17.84±4.44	111.36±15.74	66.97±12.52
F		1.112	0.242	2.062
Working Length (yrs)				
<11	204	17.57±5.14	110.22±17.07	64.63±13.61
11~	242	17.53±4.15	111.40±16.83	65.79±13.83
21~	180	18.31±4.49	110.50±16.18	66.67±12.46
F		1.733	0.303	1.124
Physical Exercise				
Frequently	233	16.86±4.62	113.54±15.47	67.94±12.19
Occasionally	283	17.83±4.15	110.37±15.95	65.42±12.50
Little (sedentary)	110	19.52±5.12	105.85±19.78	61.47±16.62
F		13.001***	8.241***	9.057***
Personality type				
Introvert Stable	36	17.56±4.65	106.53±18.10	65.17±13.65
Introvert Unstable	63	23.48±4.92	97.24±17.92	54.10±15.06
Extravert Stable	83	14.49±2.99	123.12±14.50	74.47±11.11
Extravert Unstable	48	17.98±4.32	103.46±16.43	60.90±13.32
F		56.773***	33.100***	30.309***

Notes: *P<0.05, ***P< 0.001.PSSS, Perceived social support scale; t and F: the statistic value of t-test or F-test (ANOVA).

highest (p <0.05), followed Extravert Unstable and Introvert stable employees, while the score of Introvert Unstable professionals was the lowest (p <0.01).

Correlation Between General Mental Health, Psychological Capital, Perceived Social Support, EPQ-N and EPQ-E

Pearson correlation results demonstrated a significantly negative correlation between general mental health and either psychological capital, or perceived social support, or EPQ-E (r = −0.552, r = −0.482, and r = −0.422, respectively, p<0.01). A significantly positive correlation was found between general mental health and EPQ-N (r = 0.491, p<0.01), as well as between psychological capital and either perceived social support or EPQ-E (r = 0.658 and r =0.383, respectively, p<0.01). (Table 2).

Interaction of Psychological Capital, Perceived Social Support, EPQ-N and EPQ-E in General Mental Health

Three different multivariate regression models were constructed to investigate the association of psychological capital, perceived social support, EPQ-N and EPQ-E with and their interaction in general mental health of professional

Table 2 Pearson Correlations of the variables(N=626)

Variable	*M*	*SD*	GMH	PC	PSSS	EPQ-N
GMH	17.77	4.60	1			
PC	110.76	16.71	–0.552**	1		
PSSS	65.67	13.38	–0.482**	0.658**	1	
EPQ-N	4.34	3.60	0.491**	–0.394**	–0.357**	1
EPQ-E	7.81	3.07	–0.422**	0.383**	0.338**	–0.202**

Note: **P< 0.01.

Abbreviations: GMH, General mental health; PC, Psychological capital; PSSS, Perceived social support scale; EPQ-N, neuroticism/stability; EPQ-E, introversion and extraversion; M: mean, SD, standard deviation.

Table 3 Effect of psychological capital, society support, neuroticism and extroversion on general health

Variable	Model 1		Model 2		Model 3	
	β	*P* value	*β*	*P* value	*β*	*P* value
Psychological capital	-0.270	<0.001	-0.267	<0.001	-0.267	<0.001
Society support	-0.125	0.002	-0.142	0.001	-0.158	<0.001
Neuroticism	0.296	<0.001	0.310	<0.001	0.352	<0.001
Extroversion	-0.216	<0.001	-0.178	<0.001	-0.157	<0.001
Psychological capital×Society support			-0.070	0.039	-0.068	0.043
Psychological capital×Neuroticism			-0.031	0.480	-0.074	0.096
Society support×Neuroticism			0.057	0.192	0.026	0.559
Psychological capital×Extroversion			0.148	0.001	0.134	0.003
Society support×Extroversion			0.017	0.692	-0.002	0.955
Psychological capital×Society support×Neuroticism					-0.161	<0.001
Psychological capital×Society support×Extroversion					-0.084	0.059
Adjusted R^2	0.443		0.462		0.472	
ΔR^2	0.446	<0.001	0.024	<0.001	0.011	0.001

Notes: *β*: regression coefficient; R^2: coefficient of determination; ΔR^2: the change of coefficient of determination obtained in the regression models.

personnel, and the results are illustrated in Table 3. In the model 1, EPQ-N showed a significantly positive association with general mental health (P<0.001), whereas psychological capital, perceived social support and EPQ-E showed significantly negative associations with general mental health (P<0.01), with EPQ-N having the largest weight (β = 0.296). The four variables explained 44.3% of the variance of general mental health. In the model 2 with the term of the 2-way interactions, we found a significant interaction between psychological capital and perceived social support (β = -0.070, p = 0.039), and between psychological capital and EPQ-E (β = 0.148, p = 0.001). In the model 3 of the 3-way interactions, the three-way interaction of psychological capital, perceived social support and EPQ-N in general mental health was found statistically significant (β = -0.161, p< 0.001), which independently explained 1.1% of the variance of general mental health. The main effect of EPQ-N was the greatest with a positive coefficient (β = 0.352, p <0.001).

To better visualize the interaction of psychological capital, perceived social support and EPQ-N in general mental health of professional personnel, We further constructed a three-variable interaction graph for general mental health based on the method described by Dawson and Richter[38] (Figure 1).

Figure 1 shows that with the increase of the psychological capital score, the occupational staff's mental health score decreases. Regardless of the level of psychological capital, the mental health score of occupations with high social support and stable is the lowest, and the mental health score of occupational personnel with low social support and unstable is the highest. With the rising of psychological capital, the mental health scores of high social support and unstable decline the fastest.

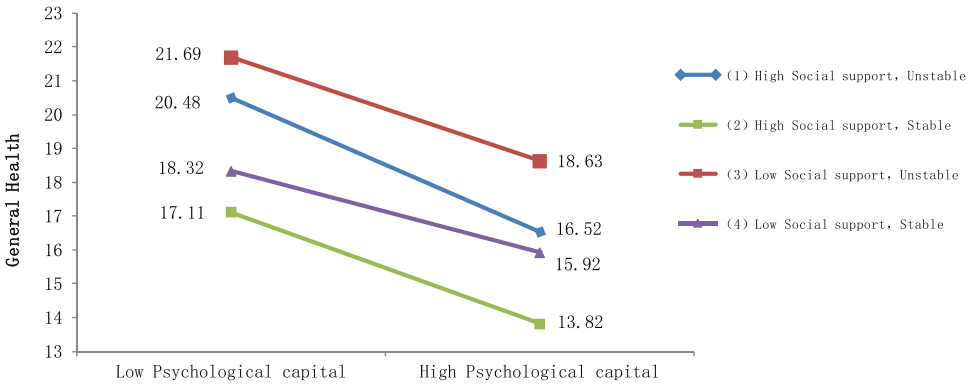

Figure 1 Interaction of psychological capital, perceived social support and EPQ-N in general mental health of professional workers.

The Bootstrap method was used to analyze the mediation effect of perceived social support and psychological capital between extroversion, neuroticism and mental health. The mediating variable played a partial mediating role in the relationship between extroversion and mental health, and the mediating effect is 14.4%, 31.9% of the total effect (ab/c) respectively (Table 4). Similarly, a partial mediating role of social support and psychological capital in the relationship between neuroticism and mental health, the mediating effect is 11.6%, 26.1% of the total effect (ab/c) respectively (Table 5). In addition, Table 6 illustrates the mediating role of PSS in the effect of psychological capital on mental health, with 25.5% of the total effect mediated by PSS.

Table 4 Mediating effect of perceived social support and psychological capital between extroversion and general mental health (Bootstrap)

Mediating Variable	a	b	c	c'	ab (95%CI)
Perceived social support	1.481***	-0.061***	-0.634***	-0.342***	-0.091 (-0.153,-0.039)
Psychological capital	2.080***	-0.097***			-0.202 (-0.281,-0.130)

Notes: ***P<0.001; a, the effect of the extroversion variable on mediating variable; b, the effect of mediating variable on general mental health; c, the total effect of the extroversion variable on general mental health; c', the direct effect of the extroversion variable on general mental health after the introduction of mediating variable; ab, the mediating effect of mediating variable between extroversion and general mental health.
Abbreviation: CI, confidence interval.

Table 5 Mediating effect of perceived social support and psychological capital between neuroticism and general mental health (Bootstrap)

Mediating Variable	a	b	c	c'	ab (95%CI)
Perceived social support	-1.320***	-0.055***	0.632***	0.394***	0.073 (0.029, 0.122)
Psychological capital	-1.814***	-0.091***			0.165 (0.111, 0.223)

Notes: ***P<0.001; a, the effect of the neuroticism variable on mediating variable; b, the effect of mediating variable on general mental health; c, the total effect of the neuroticism variable on general mental health; c', the direct effect of the neuroticism variable on general mental health after the introduction of mediating variable; ab, the mediating effect of mediating variable between neuroticism and general mental health.
Abbreviation: CI, confidence interval.

Table 6 Mediating effect of perceived social support between psychological capital and general mental health in employees (Bootstrap)

Variable	a	b	c	c'	ab (95%CI)
Psychological capital	0.527***	-0.073***	-0.153***	-0.114***	-0.039 (-0.058, -0.020)

Notes: ***p<0.001; a, the effect of psychological capital on social support; b, the effect of social support on general mental health; c, the total effect of psychological capital on general mental health; c', the direct effect of the psychological capital variable on general mental health after the introduction of social support; ab, the mediating effect of social support variable between psychological capital and general mental health.
Abbreviation: CI, confidence interval.

Discussion

The outbreak of the COVID-19 not only causes losses to people's lives and property safety, but also brings varying degrees of psychological pressure on the professional population. This study shows that 2.7% of professional workers have poor mental health in Henan, China. This is much lower than the prevalence of stress reported in previous studies.[30] One possibility is that zero-COVID policy and precision-prevention and control approach were executed, successfully containing the pandemic in China, and COVID-19 was controlled at a relatively very low incidence. Lots of Chinese felt safe and life and job were not affected too much. They were satisfied with the Chinese Government's prevention and control policy and measurements on COVID-19. Stress plays a partial mediating role between social support and mental health.[41] When the stress is too high, it will lead to different degrees of psychological crisis in the professional population, which seriously affects the mental health of the professional population.

As expected, we found positive correlations between social support, psychological capital and extroversion, whereas negative correlations existed between both social support and psychological capital and neuroticism in this study.

Marriage is an important part of the family, and it is also a major factor associating with mental health. Apart from taking care of themselves, married people are also responsible for the lives of their spouse and kids, as well as other family members. More stress burdens are usually on the shoulders in married individuals than the singles. Physical exercise can not only improve physical fitness but also maintain a good attitude. Regular and appropriate physical exercise could promote the mental health of students during the epidemic.[42] Appropriate physical exercise during epidemic isolation could help alleviate individuals' anxiety, depression and loneliness.[43] In this study, professional workers who frequently did physical exercise had higher scores of psychological capital and comprehension of social support, indicating that frequent physical exercise can promote individuals to adopt a positive psychology to experience the environment, to have higher satisfaction with comprehension of external environmental support, and to have better mental health.

In the face of the largest global pandemic in history, everyone is fighting silently in their own positions. This study shows that there is no difference in the psychological capital and mental health of professionals in terms of gender, age and the length of service. However, for each individual, due to the characteristics of personality, there is still a big difference in positive mental state and mental health. The survey shows that the positive psychological state, the understanding of social support, and the mental health of extroverted and stable professionals are better. Outgoing and stable professionals may have a wide range of social networks at work, like to communicate with different people, rich in network resources, and strong psychological resistance. When facing with stress, they will challenge it calmly and take appropriate measures to solve the problem. In contrast, Introverted and unstable professionals may experience anxiety and impatience when encountering difficulties, which is not conducive to solving the problem, but also harmful to their own mental health.

This study also found that mental health was negatively correlated with psychological capital and social support, which was consistent with Cui's findings.[44] Psychological capital refers to the dynamic psychological resources that individuals can accumulate and develop under certain circumstances. Social support is an individual's subjective feeling, emotional experience and satisfaction with the support of the external environment. As an effective coping resource for individuals, it plays an important role in alleviating work stress and combating work stress.[45] The interaction showed that with the increase of psychological capital score, the mental health status of professional staff improved, and the mental health status with high social support and emotional stability was the best. It is suggested that the training of psychological capital should be strengthened in the training of professional personnel, the tenacity and optimistic spirit of professional personnel should be cultivated, and self-efficacy should be improved, so that professional personnel can establish hope and confidence in making progress and flourishing.

Social support was significantly negatively correlated with mental health, and significantly positively correlated with psychological capital, so social support met the conditions of mediating variables. The results of the Bootstrap method suggest that the mediating effect of social support in the relationship between psychological capital and mental health is statistically significant. Both psychological capital and social support differentially mediated the effect of extroversion or neuroticism on general mental health, with relatively higher mediating effects for extrovert individuals compared to those with neuroticism personality. Therefore, by increasing the stock of social support, the impact of psychological capital on mental health can be effectively improved. Increase the allocation of public facilities and resources, and improve the intensity

and perception of social support. At the same time, according to the personality characteristics of professional personnel, pay attention to professional personnel with unstable personality, and promote the healthy development of professional personnel.

Limitations, however, exist in this study. The mediation effects are detectable and significant though, they are small in the models. This study is cross-sectionally designed with one time point measurement only, longitudinal measurements would be helpful in better understanding the relationships between social support, psychological capital, personality and mental health, and the mediation effect of social support on the association of neuroticism and mental health. Second, since the participants were recruited through convenience sampling, and all participants of professional workers are from Henan province, cluster effect may exist in social support and psychological capital. The bias may exist in the representative of participants. Thus, the interpretation of results should be cautious. Moreover, although over 600 professional workers were included in this study, the sample size is still relatively small. Independent studies with a relatively large sample size are warranted to validate the findings. It will be interesting to further investigate the mediation effect of social support, psychological capital in the association between personality and mental health when facing a public health problem of COVID-19.

Conclusion

In summary, this study shows that marriage, physical exercise and personality type are the influencing factors of occupational mental health. There is an interaction between psychological capital, social support and neuroticism in mental health, and social support modifies the effect of psychological capital on mental health in professional personnel during the COVID-19 pandemic. Professionals with high social support and emotional stability have the best mental health status. The findings provide knowledge for the administrators how to improve and maintain professionals' mental health during the period of COVID-19 pandemic. More social support and psychological capital are needed for individuals with neuroticism to alleviate their stress and gain better health. Thus, a comprehensive precision (at-risk individuals based on personality) intervention measure targeting social support and psychological capital is warranted after more validations in the future studies.

Abbreviations

COVID-19, Coronavirus Disease 2019; PSS, Perceived social support; MSPSS, Multidimensional Scale of Perceived Social Support; EPQ-RSC, Eysenck Personality Questionnaire; N, Neuroticism; E, Extroversion; CMV, Common-method variance; AMI, Any mental illness.

Data Sharing Statement

The dataset supporting the conclusions of this article can be shared with the corresponding author by email.

Ethical Approval

The procedures followed were in accordance with the ethical standards of the Committee on Zhengzhou Normal University (IRB. no. ZZNU-2021-006). The questionnaire had an introductory paragraph explaining the purpose of the survey and the name of the research center undertaking the research, and that responses were anonymous. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all patients for being included in the study.

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Disclosure

All the authors listed declare that they have no conflicts of interest.

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