



The impact of employment stress on college students: psychological well-being during COVID-19 pandemic in China

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Abstract

Employment among final year college students in China has encountered unprecedented difficulties during the Coronavirus disease 2019 (COVID-19) pandemic, the high unemployment rate had led college graduates faced inadvertently mental health issues such as anxiety and depression. This study aims to investigate the impact of employment stress on college students' psychological well-being during the COVID-19 pandemic in China. An online survey consisting of demographic items (i.e., age, gender, subject major, type of university, and perceived severity of the current employment situation), Employment Stress scale, Employment Anxiety Scale, and Patient Health Questionnaire was employed for data collection. A total of 2,627 final year college students were recruited, with participants displayed below moderate levels of employment stress and anxiety. Approximately 13.2% of participants were depressed and 53.3% considered the current employment situation as severe. Female students were stressed by individual factors and anxious, whilst male students were more depressed. Arts students were less depressed and students from comprehensive universities were more depressed and anxious compared to other types of universities. Students who perceived the employment situation as very severe displayed the lowest level of employment stress and anxiety. Gender, university type, family stress, college stress, and individual stress are predictors of psychological well-being among college students. The family environment, female identity, and stress from university play a crucial role in college students' psychological well-being. The government should pay more attention to the psychological well-being of graduate students and develop feasible measures to help them secure a job during this unprecedented time.

Keywords Employment · Psychological well-being · China · College students · COVID-19

Introduction

Background of study

In China, the employment of college students has become one of the main concerns of the government (Communist Party Central Committee, 2021; Di, 2006). The massive expansion of higher education institutions had led to rising unemployment rates in China (Tao, 2020). In 2019, there were 8.34 million college graduates, and the number reached 8.74 million in 2020, indicating an increase of 400,000 within a year (Ministry of Education of China, 2019).

Following this, the total number of national college graduates in 2021 reached 9.09 million, marking a rise of 350,000 from 2020 (Ministry of Education of China, 2020). In 2022, the number of college graduates nationwide is expected to exceed 10 million (Ministry of Education of China, 2021a), with the total number of graduates continuing to climb.

However, the unprecedented global health crisis that emerged in late 2019 due to Coronavirus disease 2019 (COVID-19) has adversely affected social, political, and cultural developments across the world and resulted in various well-being and socioeconomic concerns (John Hopkins University, 2020). The COVID-19 pandemic has caused a large-scale shutdown of work and production worldwide, which further deteriorated the social and economic development, and the overall employment environment (Chen et al., 2020; Fu et al., 2021). The massive shutdown and financial crisis of small and medium-sized enterprises (SME) during the pandemic COVID-19 had led the employers to cut down their operational costs, with their declining labor

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market demand. Data has shown that during the COVID-19 pandemic, approximately 18% of SMEs closed within four months, and 14% of the job was shredded (Dai et al., 2020). Besides, most companies have also postponed and canceled their job offers, with physical recruitment fairs had also being canceled to avoid mass gatherings. The unforeseen shift has led college students or fresh graduates to uncertainty, as they are unsure if they should be waiting for the re-operations of the companies or searching for a new job in the tough job market.

Due to the pandemic, 2020 has become the most difficult employment season in China's history, with corporate recruitment demand for fresh graduates falling by 22% year on year. In 2020, the effective number of fresh graduates is between about 30% and 42% (about 3 million), and the number of unemployed is about 45% (about 4 million) (Mu, 2021; Lang, 2020). The employment situation remains critical until 2021, with an employment rate of only 36.8% (Ren et al., 2021), signifying a huge gap in the active labor supply and available job vacancies during this pandemic.

In response to the impact of COVID-19 on the employment of college graduates, the Chinese government has launched a series of employment stabilization measures such as the Ministry of Education launched a 24.365 full-day online campus employment service platform, extended the deadline for college graduates to register, and settle down, expanded the enrollment scale of students to master programs and the students' course were also upgraded from associate degree to baccalaureate degree (Cao, 2021; Chen et al., 2021). More students also choose to further their studies at graduate school amidst the pandemic (Li, 2021). Data from China's Ministry of Education show that the number of applicants for the national postgraduate entrance examination is estimated to reach 4.57 million in 2022, based on the 3.77 million in 2021, and 3.41 million in 2020 (Ministry of Education of China, 2021b). The rise in the number of graduate students enrollment indirectly reflects the harsh employment environment that college students are facing, which led students to pursue further study rather than entering the workplace.

The economic recession brought by the pandemic has decreased the employment chances of college students and affected their mental health, with study found that college students experienced a moderate level of employment stress (Peng & Li, 2020; Ye et al., 2020), which was higher than pre-pandemic (Wei & Yi, 2019). Stress, as a natural human response to threats or challenges to the external environment, can be protective whilst also detrimental to an individual's mental health and well-being (McEwen, 2006). As for college students, they may become vulnerable due to employment stress, making them more susceptible to developing anxiety and depression. This was supported by a study that found student's addictive social media behaviors that

due to employment stress (Mao & Zhao, 2023). It is believed students who experience employment stress repeatedly seek social support on social media, which in turn led to their addictive behaviors (Mao & Zhao, 2023). During the pandemic, the anxiety and depression levels of college students have increased significantly (Levy & Cohen-Louck, 2021; Liyanage et al., 2022; Vujčić et al., 2021; Wang et al., 2020). Studies have reported that 24.9% of college students were afflicted with experienced anxiety during the COVID-19 pandemic (Cao et al., 2020), especially when college students are searching for jobs (Xu et al., 2020).

On top of these, there are several main factors affecting the employment stress of college students, including the fear brought by the pandemic, family support, school employment guidance, social employment policies, and environmental and personal factors (Arias-de et al., 2019). Besides, the universities have been increasingly stratified followed by the massive expansion and reform of higher education in China since the 1980s (Li & Yang, 2014; Yeung, 2013). The higher education institutions were classified by judging their national investment, national requirement, teaching and research level, and so on (Guo, 2012). The government-owned institutions are highly recognized among China public compared to private-owned institutions, and graduates from government-owned institutions are more likely to get hired (Guo, 2012; Shen, 2014). As a result, the disparities in employment opportunities had reflected a fierce employment environment, especially for students from less reputable universities and it is often accompanied by greater distress and mental health issues among job seekers.

On top of this, subject majors also play a crucial role in students' mental health. Amongst various subject majors, education, medical and vocational technology are subject majors that found to have better career development prospects and greater job opportunities (Liu & Gu, 2022; Luo, 2021; "The State Council Information", 2020). In addition, the education, medical and vocational technology industries are having higher labor demands nowadays (Liu et al., 2020; "The State Council Information", 2020). However, the association between these subject majors and psychological well-being remains unclear. Therefore, based on the issues mentioned above, several research questions were raised as listed below in this study. This study hopes to provide insights into the psychological well-being of college students amidst the COVID-19 pandemic and looks forward to the development of strategies to maintain the psychological well-being of college students under the COVID-19 pandemic.

Research questions

1. What is the employment stress level, employment anxiety, and depression of Chinese college students during the COVID-19 pandemic?

2. What are the differences in employment anxiety and depression level across various socio-demographic factors (i.e., gender, subject major, type of university, perceived employment situation) during the COVID-19 pandemic?
3. What is the relationship of family factors, college factors, professional factors, individual factors together with employment anxiety and depression in employment stress during the COVID-19 pandemic?

Research aims

1. To explore the employment stress level, anxiety, and depression of Chinese college students during the COVID-19 pandemic.
2. To compare the differences in employment anxiety and depression across various socio-demographic factors (i.e., gender, subject major, type of university, perceived employment situation) during the COVID-19 pandemic.
3. To investigate the relationship between various socio-demographic factors (i.e., gender, subject major, type of university, perceived employment situation), family factors, college factors, professional factors, individual factors, together with employment anxiety and depression in employment stress during the COVID-19 pandemic.

Hypotheses

H₀: The employment stress, anxiety and depression level of China college students do not increase during the COVID-19 pandemic.

H₁: The employment stress, anxiety and depression level of China college students increase during the COVID-19 pandemic.

H₂: During the COVID-19 pandemic, there are differences in employment anxiety and depression across various socio-demographic factors.

H_{2a}: During the COVID-19 pandemic, male college students are more depressed, female students are more anxious.

H_{2b}: During the COVID-19 pandemic, science students are more depressed than arts students.

H_{2c}: During the COVID-19 pandemic, as compared to students from other types of universities, students from comprehensive universities are more depressed and anxious.

H_{2d}: During the COVID-19 pandemic, students who perceived the employment situation as very severe displayed the highest level of employment stress, anxiety and depression.

H_{3a}: Gender, subject major, type of university, perceived employment situation, family stress, college stress, professional stress and individual stress significantly predict

employment anxiety amongst China college students during the COVID-19 pandemic.

H_{3b}: Gender, subject major, type of university, perceived employment situation, family stress, college stress, professional stress and individual stress significantly predict employment related depression amongst China college students during the COVID-19 pandemic.

Methodology

Research design/ participants

A cross-sectional study with purposive sampling was conducted. The study included only students who are in their final year of study at the time of data collection. A total of 2,627 students ($M_{age} = 21.11$, $SD = 1.35$) were recruited from four public universities in Hebei Province in China. Four types of universities were included, that are: comprehensive university (North China University of Science and Technology), teacher's university (Tangshan Normal University of Hebei), medical university (School of Medical Science of Tangshan Vocational and Technical College of Hebei) and vocational technology university (Tangshan Industrial Vocational and Technical College of Hebei).

Of the total number of participants, 68.1% were females and 31.9% were males. College employment recruitment is usually in May and June every year before graduation. Therefore, the data collection was conducted through the use of a self-administered online questionnaire from 10 May 2021 to 24 May 2021. This study had obtained approval from the Ethics Committee of North China University of Science and Technology (No.2021037).

Instruments

Socio-demographic section

The questionnaire comprised of a socio-demographic section that included age, gender (i.e., male and female), subject major (i.e., science and arts), the severity of the current employment situation (i.e., very severe, severe, generally, good and unclear) and type of university.

Employment Stress Scale (ESS)

The employment stress scale (ESS) of college students compiled by Liu (2010) is utilized to measure the employment stress level of college students. The ESS consists of 14 questions in Chinese that are categorized into four dimensions: family factors (ESS-F), college factors (ESS-C), professional factors (ESS-P), and individual factors (ESS-I). The Chinese version of ESS demonstrated good reliability and

validity with Cronbach's alpha ranging from 0.82 to 0.87 were reported (Peng & Li, 2020; Ye et al., 2020). Each item was rated on a 5-point Likert-type scale, ranging from 1 (*no stress*) to 5 (*great stress*). A higher score indicates a higher level of employment stress. The score of each item was summed, with a total score ranging from 14 to 70, and the middle score is 42. This scale obtained excellent reliability with a Cronbach's alpha of 0.94 in the present study. The example of the items from the ESS are:

- Parents' social status and my family's interpersonal network have little to do with my job search (ESS-F)
- Schools are ranked relatively low (ESS-C)
- The professional courses of the school do not consistent with social needs, making it difficult for me to find jobs (ESS-P)
- Lack of social practical experience (ESS-I)

Employment Anxiety Scale (EAS)

The Employment Anxiety Scale is a scale compiled by Zhang (2005) that was administered to measure the employment anxiety level of college students. The scale obtained good reliability with Cronbach's alpha ranging from 0.83 to 0.91 (Wang et al., 2022; Xu et al., 2020). The scale is comprised of 30 items in Chinese. Each item was rated on a 4-point Likert-type scale ranging from 1 (*completely disagree*) to 4 (*very agree*). The score of each item was summed, with a total score ranging from 30 to 120, the middle score is 75. A higher score indicates a greater degree of employment anxiety. In this study, the scale demonstrated excellent reliability with the Cronbach's alpha of 0.98. An example of the item of EAS is "Thinking of employment, always think very difficult".

Patient Health Questionnaire-9 (PHQ-9)

The Patient Health Questionnaire (PHQ-9) was used to measure the objectified degree of depression severity (Kroenke et al., 2001). The questionnaire consisted of nine items and was rated on a 4-point Likert scale ranging from 0 (*not at all*) to 3 (*nearly every day*). Participants are asked to reflect on the past two weeks when answering the items. Nine items were summed to generate a total score ranging from 0 to 27, with a higher score indicating a higher level of depressive symptomatology. A score of 10 or more indicates a likelihood of meeting the diagnostic criteria for major depressive disorder. PHQ-9 was translated into Chinese by Yeung et al. (2008). Later, a study had denoted PHQ-9 as a reliable clinical research tool to identify depressive symptoms (Lamela et al., 2020), with Cronbach's alpha of 0.854 was reported among college students in China (Zhang et al., 2013). In this study, the Chinese version of PHQ-9 that was translated by Yeung et al.

(2008) was used. The scales obtained a Cronbach's alpha of 0.89 in this study. An example of an item of PHQ-9 is "Feeling depressed, depressed or desperate".

Procedure

Verbal informed consent of each participant was obtained at the beginning of the self-administered online questionnaire. Participants filled up the demographics (i.e., age, gender, subject major, type of university, perceived current employment situation). Followed by completing the PHQ-9, EAS, and lastly the ESS. At the end of the questionnaire, participants were thanked for their participation. Each participant took approximately 10 to 15 minutes to answer the questionnaire. Their participation was anonymous, with no incentive given upon completion. All participants were given the option to withdraw at any moment.

Data analysis

Descriptive statistics were analyzed for the continuous variables (i.e., age, scores for the employment stress, employment anxiety, and depression) and the categorical variables (i.e., gender, subject major, type of university, and severity of the current employment situation). Employment anxiety and depression of the participants were analyzed for gender and subject major using a t-test for independent samples analysis. One-way ANOVA analyses were also carried out to determine whether there are statistical differences in anxiety and depression levels across various types of university and perceived employment situations. Welch's tests were carried out for unequal variance.

Pearson's correlation was applied to examine the bivariate correlations among the studied variables. Both categorical and continuous variables that were significantly related to anxiety and depression were considered for multiple linear regression analysis. Linear regression analyses were performed to assess potential risk and protective factors for the incidence of employment anxiety and depression variables among participants. The variables of type of university and perceived employment situation were dummy coded before the analyses. Assumptions for multiple linear regression were tested, and no violations were found. Statistical significance was set at $p < .05$ (two-tailed). The analyses were performed using the IBM Statistical Package for the Social Sciences (SPSS) version 23 (IBM Corp., Armonk, NY, USA).

Results

A total of 2,627 final year college students from four public Universities in Hebei Province in China were recruited. The four universities are North China University of Science and

Technology (Comprehensive university, $n = 535$), Tangshan Normal University of Hebei (Teachers' University, $n = 380$), Tangshan Vocational and Technical College of Hebei (Medical University, $n = 339$), and Tangshan Industrial Vocational and Technical College of Hebei (Vocational Technology University, $n = 1373$). Participants aged range from 18 to 25 years old ($M = 21.11$, $SD = 1.35$). 68.1% of them were female, and 66.2% of students were art students. Besides, 35.9% and 17.4% of students considered the current employment situation as severe and very severe respectively. Further details of the demographic information of participants are shown in Table 1. Most participants reported below moderate stress levels regarding employment ($M = 32.67$, $SD = 11.90$), below moderate levels of anxiety ($M = 64.32$, $SD = 22.21$), and probable major depression (13.2%). This is consistent with hypothesis 1 that indicates students' employment anxiety and depression level increases during the COVID-19 pandemic.

Differences in employment anxiety and depression based on demographic factors and employment stress level

T-test and one-way ANOVA analyses were performed to assess differences in final year college students' level of employment anxiety and depression conflict during the COVID-19 period based on demographic profiles. Findings showed significant differences in terms of EAS across gender, type of university, perceived severity of the employment situation, which supported hypothesis 2. As depicted in Table 2, there is a significant difference in anxiety level between male students ($M = 59.56$, $SD = 23.27$) and female students ($M = 66.55$, $SD = 21.34$), $t(2625) = -7.368$, $p < .001$, which supported hypothesis 2a that female students are more anxious. Besides, findings also showed no significant

difference in anxiety level between art students ($M = 64.52$, $SD = 21.85$) and science students ($M = 63.92$, $SD = 22.91$), $t(2625) = 0.643$, $p = .520$.

Given the assumptions of equal variance were not met, hence Welch's t -test was carried out. Findings showed that there was a significant different effect of type of university

Table 2 Differences in Employment Anxiety and Depression across Socio-Demographics Characteristics ($N = 2,627$)

Variable	Anxiety		Depression	
	M±SD	t / F	M±SD	t / F
Gender ^a	64.32±22.21	-7.368***	4.17±4.99	2.718**
Male	59.56±23.27		4.59±5.67	
Female	66.55±21.34		3.98±4.62	
Subject Major ^a		0.643		-3.270**
Arts	64.52±21.85		3.94±4.69	
Science	63.92±22.91		4.64±5.50	
Type of University ^b		27.902***		27.572***
Comprehensive	71.33±19.97		5.92±5.37	
Teachers'	61.86±22.61		3.41±4.51	
Medical	64.99±22.70		4.36±5.48	
Vocational Technology	62.10±22.25		3.66±4.66	
Employment situation ^b		8.393***		1.805
Very severe	58.54±25.65		3.74±5.36	
Severe	66.19±20.62		4.27±4.78	
Generally	64.77±20.71		4.12±4.75	
Good	64.54±22.31		4.26±4.94	
Unclear	69.37±27.39		5.62±6.99	

* $p < .05$, ** $p < .01$, *** $p < .001$; ^a T-test; ^b Welch's Test for Unequal Variances

Table 1 Socio-Demographic Characteristics of Participants ($N = 2,627$)

		n	%	Mean	SD
Age range	18-25			21.11	1.35
Gender	Male	838	31.9		
	Female	1789	68.1		
Subject Major	Arts	1739	66.2		
	Science	888	33.8		
Type of University	Comprehensive	535	20.4		
	Teachers'	380	14.5		
	Medical	339	12.9		
	Vocational Technology	1373	52.3		
Perceived severity of the current employment situation	Very severe	457	17.4		
	Severe	944	35.9		
	Generally	813	30.9		
	Good	329	12.5		
	Unclear	84	3.2		

on anxiety level at significant difference between the four types of universities, $F(3, 905) = 27.902, p < .001$. The anxiety mean score for the comprehensive university ($M = 71.33, SD = 19.97$) was significantly higher than the teachers' university ($M = 61.86, SD = 22.61$), medical university ($M = 64.99, SD = 22.70$), and vocational technology university ($M = 62.10, SD = 22.25$), thus hypothesis 2c has been verified. Findings also showed significant different in anxiety level across five types of perceived employment situation, $F(4, 484) = 8.393, p < .001$. The anxiety mean score for the very severe employment situation ($M = 58.54, SD = 25.65$) was significantly lower than the severe employment situation ($M = 66.19, SD = 20.62$), generally employment situation ($M = 64.77, SD = 20.71$), good employment situation ($M = 64.54, SD = 22.31$), and unclear about the employment situation ($M = 69.37, SD = 27.39$), thus hypothesis 2d is not supported.

Meanwhile, depression levels were significantly different based on four factors (i.e., gender, subject major, type of university, and employment situation) (see Table 2). There is a significant difference in depression levels between male students ($M = 4.59, SD = 5.67$) and female students ($M = 3.98, SD = 4.62$), $t(2625) = 2.718, p < .01$. The result supported hypothesis 2a suggesting that male students are more depressed. Besides, it is worth noting the difference in depression level between art students ($M = 3.94, SD = 4.69$) and science students ($M = 4.64, SD = 5.50$), $t(2625) = -3.270, p < .01$. Hypothesis 2b has been verified.

Other than that, there was also a significant different effect of type of university on depression level for the four types of university, $F(3, 905) = 27.572, p < .001$. The depression mean score for the comprehensive university ($M = 5.92, SD = 5.37$) was significantly higher than the teachers' university ($M = 3.41, SD = 4.51$), medical university ($M = 4.36, SD = 5.48$), and vocational technology university ($M = 3.66, SD = 4.66$), supporting hypothesis 2c. Besides, findings also showed no significant difference in depression level across five types of perceived employment situation, $F(4, 483) = 1.805, p = .127$. The depression mean score for the very severe employment situation ($M = 3.74, SD = 5.36$), severe employment situation ($M = 4.27, SD = 4.78$), generally employment situation ($M = 4.12, SD = 4.75$), good employment situation ($M = 4.26, SD = 4.94$), and unclear about the employment situation in the country ($M = 5.62, SD = 6.99$) were reported in Table 2. The finding does not support hypothesis 2d.

The relationship between demographic variables, employment stress and employment anxiety, depression

Table 3 showed the Pearson's correlation matrix between demographic variables (age, gender, subject major, type of university, and perceived current employment situation),

employment stress and employment anxiety, depression. Most variables' correlation coefficients ($r = -.043$ ——.735) at a significant level of $p < .05$.

Predictors of employment anxiety and depression

The result from multiple linear regression analysis to identify the determinants associated with employment anxiety was summarized in Table 4. In the multivariate analyses, the independent variables including age, gender, type of university, perceived employment situation, and four factors of employment stress (i.e., family factors, college factors, professional factors and individual factors) were significantly associated with employment anxiety score (refer to Table 3). The model was statistically significant, with R^2 value of 0.589 was reported (refer to Table 4). The results found that gender ($\beta = -5.244, p < .001$), perceived employment situation as severe ($\beta = 2.045, p < .05$) and generally ($\beta = 2.240, p < .01$), family stress ($\beta = 1.000, p < .001$), college stress ($\beta = 0.365, p < .05$), professional stress ($\beta = 1.159, p < .001$) and individual stress ($\beta = 3.229, p < .001$) significantly predicted anxiety level. The finding partially supported hypothesis 3a, with all factors predicting employment anxiety except subject major and type of university.

Multiple linear regression analysis was performed for the identification of the determinants associated with depression, with the result shown in Table 5. In the multivariate analyses, the independent variables including age, gender, subject major, type of university, employment situation, and four factors of employment stress (i.e., family factors, college factors, professional factors and individual factors) were significantly associated with depression (refer to Table 3). The model was statistically significant, with R^2 value of

Table 3 Pearson's Correlation Matrix of the Socio-Demographic Characteristics, Employment Stress and Employment Anxiety, Depression

Variables	Anxiety	Depression
Age	0.048*	0.071***
Gender	0.147***	-0.057**
Subject Major	0.013	-0.067**
Type of University	-0.136***	-0.143***
Employment situation	0.074***	0.043*
Employment Stress	0.735***	0.530***
ESS-F	0.648***	0.490***
ESS-C	0.640***	0.481***
ESS-P	0.597***	0.408***
ESS-I	0.732***	0.496***

* $p < .05$, ** $p < .01$, *** $p < .001$, ESS-F: Family Factors of Employment Stress, ESS-C: College Factors of Employment Stress, ESS-P: Professional Factors of Employment Stress, ESS-I: Individual Factors of Employment Stress.

Table 4 Multivariate Linear Regression Analysis for Employment Anxiety (N = 2,627)

Variables	B	SE	p value	95% CI
Age	0.015	0.263	0.955	[-0.501, 0.530]
Gender (male)	-5.244	0.677	<0.001	[3.936, 6.553]
Type of University				
Comprehensive *				
Teachers'	-1.540	1.002	0.124	[-3.503, 0.424]
Medical	0.687	1.167	0.556	[-1.602, 2.975]
Vocational Technology	0.278	0.893	0.756	[-1.473, 2.028]
Employment Situation				
Very Severe *				
Severe	2.045	0.826	0.013	[0.426, 3.664]
Generally	2.240	0.842	0.008	[0.589, 3.892]
Good	1.698	1.040	0.103	[-0.342, 3.738]
Unclear	3.017	1.707	0.077	[-0.330, 6.364]
Factors of Employment Stress				
ESS-F	1.000	0.134	<0.001	[0.737, 1.262]
ESS-C	0.365	0.144	0.011	[0.083, 0.647]
ESS-P	1.159	0.166	<0.001	[0.833, 1.485]
ESS-I	3.229	0.144	<0.001	[2.946, 3.512]

$R^2 = 0.589$, adjusted $R^2 = 0.296$, $F(14, 2612) = 267.522$, $p < .001$.
 * Reference variable, ESS-F: Family Factors of Employment Stress, ESS-C: College Factors of Employment Stress, ESS-P: Professional Factors of Employment Stress, ESS-I: Individual Factors of Employment Stress.

0.300 was reported (refer to Table 5). The results found that gender ($\beta = 0.661$, $p < .001$), teachers' university ($\beta = -1.062$, $p < .001$), vocational technology college ($\beta = -0.636$, $p < .05$), family stress ($\beta = 0.233$, $p < .001$), college stress ($\beta = 0.171$, $p < .001$) and individual stress ($\beta = 0.388$, $p < .001$) significantly predicted the depression level. The result partially supported hypothesis 3b, with all factors predicting employment related depression except subject major, perceived employment situation, and professional stress.

Discussion

Employment stress, employment anxiety, and depression

In this study, the employment stress, employment anxiety, and depression of college students during the COVID-19 pandemic were evaluated. Besides that, the associations between the four factors of employment stress and psychological well-being during the COVID-19 pandemic were also explored. To our knowledge, this is the first study to identify the relationships between stress factors (i.e., family factor, college factor, professional factor, and individual

Table 5 Multivariate Linear Regression Analysis for Depression (N = 2,627)

Variables	B	SE	p value	95% CI
Age	0.043	0.077	0.581	[-0.108, 0.194]
Gender (male)	0.661	0.196	0.001	[0.277, 1.044]
Major (science)	0.241	0.225	0.283	[-0.199, 0.682]
Types of University				
Comprehensive *				
Teachers'	-1.062	0.293	<0.001	[-1.638, -0.487]
Medical	-0.434	0.342	0.205	[-1.104, 0.237]
Vocational Technology	-0.636	0.262	0.015	[-1.149, -0.123]
Stress Level				
Very Severe*				
Severe	-0.168	0.242	0.487	[-0.643, 0.306]
Generally	0.005	0.247	0.984	[-0.479, 0.489]
Good	0.059	0.305	0.847	[-0.539, 0.656]
Unclear	0.975	0.500	0.051	[-0.006, 1.955]
Factors of Employment Stress				
ESS-F	0.233	0.039	<0.001	[0.156, 0.310]
ESS-C	0.171	0.042	<0.001	[0.088, 0.253]
ESS-P	0.048	0.049	0.323	[-0.047, 0.144]
ESS-I	0.388	0.042	<0.001	[0.305, 0.471]

$R^2 = 0.300$, adjusted $R^2 = 0.296$, $F(14, 2612) = 79.962$, $p < .001$.
 *Reference variable, ESS-F: Family Factors of Employment Stress, ESS-C: College Factors of Employment Stress, ESS-P: Professional Factors of Employment Stress, ESS-I: Individual Factors of Employment Stress.

factor) and anxiety, and depression among the final year college students during the COVID-19 pandemic.

The present finding found that final year college students in the Hebei province displayed below moderate level of employment stress. In details, the total score of employment stress among final year college students was 32.67, which is slightly lower than the middle score of 42.00 for the whole scale. The means score of 2.33 of each item was slightly lower than the theoretical middle score of 3. All four factors of employment stress reported a mean score ranging from 2.19 to 2.52 that were lower than the theoretical middle score of 3 for each item, with the mean scores of individual factors, professional factors, college factors and family factors were mounting from highest to lowest. This finding is in line with a study by Wei and Yi (2019) that found below the moderate level of employment stress among vocational college students, which they reported the score of total and subdimensions of employment stress ranging from 2.70 to 2.86 that slightly lower than the middle score of 3. Students had lower levels of employment stress than before the pandemic. This finding contradicts our hypothesis, and it could be attributed to perceived social support or job search self-efficacy, as studies have shown that social support (Zhao et al., 2018) is protective factor of

employment stress. In response to the severe employment situation caused by the pandemic, the government, universities and families made efforts to assist students in their job search, which may have made students feel more supported than before the pandemic. This explanation was also corresponded to the findings of Yang et al. (2022) who discovered that during the pandemic, high level of employment policy support and job search self-efficacy moderates the impact of perceived reductions in employment opportunities on employment stress.

Besides, the present finding also reported a below moderate level of employment anxiety, that is consistent with the finding of Lin et al. (2021) that reported the anxiety level of medical master's students as below moderate, with the total score of 67.11. This study also reported a prevalence of 13.2% for probable major depression among college students, which displayed a huge gap with previous finding that reported a prevalence of 43.77% (Zhan et al., 2021), and yet similar to another study that reported a prevalence of 9.0% (Tang et al., 2020). The disparities in the incidence of depression might owe to the various cutoff score implemented, which different cutoff scores may contribute to different incidences of depression.

Differences in employment stress, employment anxiety, and depression based on demographic factors

Based on the finding by Liyanage et al. (2022), females scored significantly higher than males on the measures of anxiety, this is consistent with our result stating that females are more anxious compared to males. According to the study by Li et al. (2020), gender differences and perceived vulnerability were found to associate with a higher risk of anxiety, with female students more sensitive under stressful life circumstances, and stress exacerbates their worries (Gao et al., 2020).

In contrast to previous findings that found arts students are more difficult in getting employed, a study by Wei and Ju (2016) indicated science students in year 2015 were more difficult in getting hired. In China, the employment options for science major students are limited when compared to liberal arts students (Wei & Ju, 2016). The difficulty in getting employed for science students may have been associated with the nature of their study, as science students are more focused on learning specific skills and highly technical throughout their learning, where the skills are hard to transfer across different types of jobs (Luo & Zhou, 2017). As a result, science students avoid working by furthering their education, with science students showing a graduate enrolment rate that is 23% higher than arts students in universities in China (Luo & Zhou, 2017). The difficulty in employment for science students had explained the reason science students displayed a higher level of depression in this study.

This study showed science students mainly comprised of male students. Therefore, corresponding to the higher depression rate among science students found in this study, males also displayed greater depressive symptoms than females. Besides that, the finding of this study had shown that final year college students in comprehensive universities scored significantly higher in their anxiety and depression levels compared to students from teachers', medical and vocational technology universities. This result might be due to the students with education majors who were more likely to obtain a job shortly after graduation, with their employment rate accounting for 80.6% (Yang, 2020). Additionally, the outbreak of the COVID-19 pandemic has also caused huge labor demand for medical graduates and vocational technology personnel. Existing data shows that the employment rate for medical graduates is 95.9% and 75.8% for vocational technology graduates during the COVID-19 pandemic (Chen, 2021; Wang et al., 2022). In comparison, the COVID-19 pandemic has also led to a tough employment environment for the students from comprehensive universities and other professionals (e.g., management, philosophy, economic, etc.), and in turn, affected their mental health with a high level of anxiety and depression were displayed. However, a previous study reported that the Chinese graduates from vocational and technical colleges displayed an average score of employment stress that is above medium level (Peng & Li, 2020), and this result is slightly higher than those reported in COVID-19 studies (Laranjeira et al., 2021).

In contrast to findings of Yang et al. (2022), the result showed that final year college students who viewed the employment situation as very severe reported the lowest level of anxiety when compared to other students who did not view the employment situation as very severe, and there were no significant differences between other perceived degrees of employment situation (i.e., severe, generally, good and unclear). Next, the finding also showed no significant difference in depression severity across students with various perceptions of employment severity. It is perhaps that students who perceived the employment situation as very severe had given up in searching for jobs, which liberated them from employment stress and anxiety. Given a study showed that perceived employability which is influenced by the perception of the external labor market had a positive effect on job search intensity and effort, with graduates perceiving themselves as more likely to get employed were more likely and frequently invest their effort in the search for a job (Xie et al., 2017). On the other hand, graduates who perceived the employment situation as very severe and unlikely to get employed had reduced their intensity in job seeking, and thus prevent themselves from job search failure that negatively impacted their self-efficacy, which subsequently led to anxiety and stress (Xie et al., 2017).

Predictors of employment anxiety and depression

The results of the multiple linear regression analysis showed that the predictors of employment anxiety were gender, family stress, college stress, professional stress, and individual stress, whilst the predictors of depression included gender, type of university, family stress, college stress, and individual stress. As we can see, most of the predictors were the same for anxiety and depression (i.e., gender, family stress, college stress, and individual stress).

First, students who experienced high level of family stress may owe the fact that their parents are unable to provide helpful support, advice, or resources to them. Even if they could, they may also have distinct career views with students that caused students to feel pressured when asking for support (Zhang, 2021). Second, the high level of stress from families may be due to the impact of the COVID-19 pandemic on their financial stability, where a lot of parents were also getting unemployed and losing their income (Gao, 2021). Third, in China culture, parents and extended family are more likely to provide advice and even comment on students' career planning, which makes students to experienced undesired attention and enormous family stress that subsequently led to anxiety and depression (Liu, 2020).

The relatively low rank or poor reputation of their universities also concerns students, as they feel stress that they may not be competent enough to employers' standard and making it harder for them to secure a place in the competitive job market. A study had found students from Sino-foreign cooperative universities (SFCU) had a distinct competitive advantage in getting direct employment and earning a higher salary compared than students from local China universities, suggesting the graduates from the reputable university were seemed more capable and motivated, with a greater chance of receiving an interview invitation, earning a high salary and advancing their career development (Wu et al., 2020). In contrast, students from lower rank or poorer reputable universities were at a disadvantage in the job market.

As for the professional stress, the poor development prospects of subject majors and the reduced labor demand affected by the COVID-19 pandemic make it more difficult for students studying unpopular subject majors to work. For instance, a study conducted by Kong (2013) found that engineering and business students find jobs more easily compared to law and science students. The high level of professional stress led to anxiety, but not depression (Mok et al., 2021).

In addition, various units adopted online recruitment, which has required good comprehensive quality of college students, thus causing greater employment stress, anxiety, and depression. Since the pandemic started, college students have had less interaction in person with each other due to the closure of colleges. This has in turn weakened their language expression and interpersonal communication skills (Zhang

et al., 2020). In turn, employment stress had made them more vulnerable to anxiety and depression (Luo, 2016).

The present study has several limitations. Firstly, the cross-sectional research design does not provide solid and causal evidence for the detected associations. The studied variables can be better understood with longitudinal research designs. Secondly, the study adopted only self-reported instruments, with social desirability bias that may occur when participants respond to the survey. Thirdly, this study was done only in one region (i.e., Hebei Province) of China, thus these findings may not generalize to other college students in other parts of China.

Despite these limitations, the current study has several strengths, such as (a) the potential contribution to the mental health field; (b) the use of standard and validated self-report measures that allow the assessment of study variables; and (c) an adequate sample size.

Therefore, to relieve the employment stress, anxiety, and depression of college students, here are a few suggestions. Firstly, in response to the pandemic crisis, the government should prioritize the development of programs that help to improve psychological well-being (Ferreira et al., 2021; Chen et al., 2020). Cross-sectoral plans, combining several measures to protect and promote psychological well-being should be developed and widely implemented (McDaid, 2021). Second, government and relevant authorities should carry out more publicity and awareness campaigns to raise public awareness including family to the psychological well-being of college students amidst the COVID-19 pandemic. As a result, the family could provide more support, care and be more understanding towards college students (Xu et al., 2020). Third, the university should formulate a plan with clear rules and regulations that adapt to the COVID-19 pandemic to improve the quality of career counseling services for college students. For instance, the Enrollment and Employment Department of the university could actively organize an online recruitment fair for college students and provides active cooperation and support to help students secure a job smoothly (Feng & Gu, 2021). Fourth, strengthen the construction of professional courses, so that students can increase their professional competitiveness during the employment period (Sun, 2022). Fifth, students should make more preparations during college, actively participate in social practice, conduct various social practices during the pandemic period, and actively exercise their expression and communication skills (Di Meglio et al., 2022). Lastly, students could also make more preparation throughout their learning in college by actively participating in social events, organizing various social activities even if it is in an online module to create more opportunities to exercise their verbal expression and communication skills (Zhang, 2021).

Notwithstanding the abovementioned limitations, the study offers valuable insights into the mental health

condition of students regarding employment during the COVID-19 pandemic, and in particular its association with external factors including family and universities. It also certainly enhances the understanding of professionals regarding the role of family, college, individual and professionals with students' employment stress, anxiety and depression. These valuable insights could also serve as a reference for professionals in diagnosing depression and anxiety. Besides, this research also provides fruitful insights for relevant stakeholders about the impact of phenomena of underemployment in China and be of practical significance in improvising the employment policy implemented in China during the pandemic. Given the mixed findings of the current study, additional research with variables such as social support, personal self-efficacy, optimistic or coping skills to investigate its complex association with employment stress, depression and anxiety is encouraged, which believe to shed more light on this matter in the context of a pandemic.

Conclusion

To conclude, the employment stress of final year college students had increased during the COVID-19 pandemic and affected their psychological well-being. The psychological well-being of both females and males was affected, despite they are varying in terms of the type of psychological issue that bothered them, with female students were more anxious and male students were more depressed. Furthermore, students from comprehensive universities are also more anxious and depressed. Students who perceived the employment situation as very severe were least anxious. Besides, it is important to note that science students in this present study are more depressed than arts students, that are inconsistent with previous findings. Further research should be carried out to understand the underlying association. In short, gender, families, colleges, professional and individual factors are the main factors that contribute to employment stress and impact their psychological well-being.

Author contributions Yan Peng and Shao Bo Lv conceptualized and designed the study. Data was collected and the first draft of the manuscript was written by Peng Yan. Shao Bo Lv performed the data analysis. All authors reviewed, commented and revised the manuscript. All authors read and approved the final manuscript.

Declarations

Conflicts of interest We have no known conflicts of interest to disclose.

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