



Research article

Career adaptability and career coping styles among Chinese medicine specialty students during the COVID-19: The mediating role of career decision-making self-efficacy

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ABSTRACT

Over the past decade, the attrition rate of Chinese medical graduates has remained high, and the COVID-19 pandemic has exacerbated this situation. Medicine specialty students are the main force of the future healthcare industry. The career choices and career confidence of those entering the healthcare industry will have a huge influence on the quality of future healthcare provision. Considering the possible emergence of public health emergencies such as COVID-19 in the future, helping students develop good career adaptability will contribute to their future career development. However, the relationship between career adaptability, career coping styles and career decision-making self-efficacy remains unclear during the COVID-19. This study aims to examine the interconnections amongst career coping styles, career adaptability and career decision-making self-efficacy among Chinese medicine specialty students and the mediating role of career decision-making self-efficacy. Questionnaire survey was conducted on 747 medicine specialty students from China. The results showed that positive coping style has a significant positive correlation with career decision-making self-efficacy, career adaptability, and their sub-dimensions. There was a partial mediating effect of career decision self-efficacy between the predictor variable positive coping style and the outcome variable career adaptability. By promoting the level of positive coping style or career decision-making self-efficacy among medicine specialty students, the career adaptability can be directly or indirectly enhanced. This survey will help to guide future medical education decisions during a similar pandemic to prevent further loss of healthcare professionals in the medical service.

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1. Introduction

The first case of COVID-19 was reported in China and subsequently declared a pandemic by the WHO. The severe impact of COVID-19 has led to a surge in cases in various countries, resulting in decreased medical resources and exhausted healthcare workers [1,2]. In China, the shortage of personnel in the medical industry was an issue that existed before the COVID-19. A study revealed that from 2005 to 2014, approximately 4,727,977 clinical medicine graduates were produced in China. Nevertheless, the number of registered clinicians increased by only 752,233 (15.91 %) during this period [3]. The COVID-19 epidemic has led to a further increase in the attrition rate of doctors in China. A recent study indicated that 14 % of medical graduates have chosen to pursue alternative careers [4]. Both the government and the society lack career guidance resources for medicine specialty students [5,6]. Hou and Zhang found that career planning, assessment, and guidance were among the five major deficiencies in the field of counseling psychology in China [7]. Medicine specialty students are the main workforce of the future healthcare industry, and their career choices and confidence directly impact the industry's development and the quality of future medical services. The paucity of medical resources can impede the delivery of optimal patient care, potentially leading to unfavorable outcomes on patients and elevated mortality rates. As the world faces an unprecedented global health threat, the demand for physicians continues to rise, understanding the facilitating factors and barriers affecting medicine specialty students' career decisions will be helpful in guiding medical education to facilitate the entry of students into the healthcare workforce and prevent further attrition of healthcare professionals.

Career adaptability is defined as the socio-psychological resources that enable individuals to cope with changing work and work conditions [8], representing the core competence for individual career success [9]. This concept was derived from the modification of career maturity theory [10], which posits that individual career choices and subjective attitudes, such as satisfaction, are the result of career adaptability [11]. The majority of research on career adaptability is based on career construction theory (CCT). In addition to the CCT, researchers have employed a number of other theories as a basis for their research. These include self-regulation theory, motivational systems theory, work adjustment theory, social cognitive career theory (SCCT), and a number of postmodern or contemporary career concepts [9,12–14]. The capacity to display adaptability has become a desirable quality in a changing social environment. The concepts of protean and boundaryless careers are both popular career theories that emphasize the individual responsibility for active career management. Both theories postulate that adaptability is a necessity for success [12]. It can be argued that the most pivotal period for the advancement and transition of students' career roles is during their college education [15]. Career adaptability is an essential capacity that aids in the development of college students, playing a role in their career development and decision-making processes [16,17]. Consequently, a key reference variable for the observation of the lifelong career development of college students is career adaptability [9].

The study proposed by Lent and Brown identifies adaptive career behaviors that individuals employ in order to guide career development [18]. Both Adaptive career behaviors and Savickas' notion of career adaptability provide a relevant conceptual framework for the managing of life role transitions. This is because both concepts address positive functioning and resilience in the context of change [19]. The results of previous studies have indicated that the effective use of coping skills is related to individuals' ability to cope with a variety of career transitions [18,20].

Coping is a core topic in the field of stress research. Folkman defined it as "cognitive and behavioral efforts to reduce the demands that are appraised as exceeding the resources of the person" [16]. The differentiation of effective from ineffective coping represents a significant and challenge within the domain of coping research [21]. The ability to effectively cope with various career-related challenges is considered central to career adaptability [22]. Problem-focused coping efforts have been identified as an effective mechanism for reducing career decision difficulty [23]. In a study of social cognitive career theory, it was found that self-efficacy was positively associated with problem-focused coping style and with job satisfaction [24]. Therefore, guiding students to regulate their emotions and improve coping strategies during public health emergencies can effectively prevent losses caused by crisis events, which is a focus of college education.

Table 1
Demographic characteristics of the study population (N = 747).

Variable	n	Percentage (%)
Gender		
Women	508	32.0
Men	239	68.0
Grade		
Freshman	199	26.6
Sophomore	190	25.4
Junior	163	21.8
Senior	140	18.8
Fifth year	55	7.4
Place of residence		
Central region	78	10.4
Western region	542	72.6
Eastern region	127	17.0
Subject category		
Clinical medicine	486	65.1
pharmacy and nursing	261	34.9

Table 2
Descriptive statistics analysis results (N = 747).

	M±SD
Coping styles	
Positive	3.64 ± 0.70
Negative	2.64 ± 0.95
Career decision-making self-efficacy	3.80 ± 0.65
Self-appraisal	3.86 ± 0.70
Occupational information	3.73 ± 0.77
Goal selection	3.92 ± 0.71
Planning	3.65 ± 0.79
Problem-solving	3.82 ± 0.72
Career adaptability	4.05 ± 0.64
Concern	4.02 ± 0.71
Curiosity	4.09 ± 0.69
Control	4.05 ± 0.68
Confidence	4.03 ± 0.66

Table 3
Correlation between career decision-making self-efficacy and coping styles.

Correlation analysis (<i>r</i>)		Coping styles	
		Positive	Negative
Career decision-making self-efficacy	Self-appraisal	0.610 ^a	0.155 ^a
	Occupational information	0.523 ^a	0.193 ^a
	Goal selection	0.632 ^a	0.141 ^a
	Planning	0.543 ^a	0.277 ^a
	Problem-solving	0.580 ^a	0.229 ^a
	Total	0.659 ^a	0.224 ^a

^a $p < 0.05$.

Similar to coping styles, students with high self-efficacy are more likely to achieve success in academic and clinical work [25,26]. The concept of career self-efficacy was introduced into the field of career psychology by Betz and Hackett, building upon the theoretical work of Bandura [27]. The confidence with individuals make career decisions is referred to as career decision-making self-efficacy [28]. The concept of general self-efficacy has been a key variable in educational and psychological researches. This variable helps to explain individual differences in motivation, attitudes, learning, and task performance [15,29]. Based on Rudolph's argument, career decision-making self-efficacy can serve as a response, mediating the relationship between career adaptability and the outcomes of career adaptability [11,12]. The study by Lent and Brown concluded that adaptive career behavior is influenced by a number of factors, including career self-efficacy [27]. However, there is limited research on the mediating effect of career decision-making self-efficacy on medicine specialty students' career adaptability and career coping styles.

Based on this, this study focuses on exploring the relationship between career adaptability, coping styles, and career decision-making self-efficacy, as well as the mediating role of career decision-making self-efficacy, among Chinese medicine specialty students during the COVID-19 period.

2. Methods

2.1. Participants

This study employed a cross-sectional design, with a total sample size of 1700 students from the specialty of medicine in grades 1–5 from a university in Guangdong province. Samples were selected through random sampling method. We recruited participants by contacting schools directly and requesting them to send the online questionnaires to their students.

To calculate the sample size, $p = 0.05$, $q = 0.05$ and $\alpha = 1.96$ with the accuracy of 0.05 was considered [30]. The minimum sample size required was 385 students. From November 2021 to March 2022, a total of 782 questionnaires were collected, out of which 747 were valid after excluding 35 incomplete or insincere questionnaires. The response rate was 46 %.

2.2. Measures

The data collection tool used in the research had four parts.

2.2.1. Socio-demographic information

The socio-demographic information collected in this study included age, gender, grade, hometown, major.

Table 4
Correlation between coping styles and career adaptability.

Correlation analysis (<i>r</i>)		Coping styles	
		Positive	Negative
Career adaptability	Concern	0.553 ^a	0.036
	Curiosity	0.609 ^a	0.007
	Control	0.599 ^a	0.059
	Confidence	0.641 ^a	0.092 ^a
	Total	0.643 ^a	0.051

^a $p < 0.05$.

Table 5
Correlation between career decision-making self-efficacy and career adaptability.

Correlation analysis (<i>r</i>)		Career adaptability				
		Total	Concern	Curiosity	Control	Confidence
Career decision-making self-efficacy	Total	0.811 ^a	0.729 ^a	0.738 ^a	0.757 ^a	0.805 ^a
	Self-appraisal	0.801 ^a	0.723 ^a	0.733 ^a	0.748 ^a	0.785 ^a
	Occupational information	0.672 ^a	0.613 ^a	0.583 ^a	0.639 ^a	0.675 ^a
	Goal selection	0.782 ^a	0.702 ^a	0.719 ^a	0.734 ^a	0.766 ^a
	Planning	0.642 ^a	0.579 ^a	0.588 ^a	0.580 ^a	0.648 ^a
	Problem-solving	0.632 ^a	0.548 ^a	0.584 ^a	0.597 ^a	0.631 ^a

^a $p < 0.05$.

2.2.2. Coping styles' scale

Chinese version of coping styles' scale [31] consisting of 20 items, divided into positive and negative dimensions, and the Cronbach's alpha coefficient was 0.944 for positive coping style and 0.930 for negative coping style in this study, and the Cronbach's alpha for the total scale was 0.906.

2.2.3. Career decision-making Self-Efficacy Scale-short form

The Career Decision-making Self-Efficacy Scale-short Form (CDSES-SF) developed by Betz includes 25 items, with 5 items for each of the 5 subscales (self-appraisal, occupational information, goal selection, planning, problem-solving) [32]. In this study, the Cronbach's alpha coefficients for each dimension ranged from 0.868 to 0.930, and the Cronbach's alpha for the total scale was 0.966.

2.2.4. Career adapt-abilities scale-taiwanese form

The Career Adapt-Abilities Scale-Taiwanese Form (CAAS-Taiwan) [33], which contains 24 items that combine to form a total score indicating career adaptability. The items are divided into four sub-scales that measure the adapt-ability resources of concern, control, curiosity, and confidence. The Cronbach's alpha coefficients for each dimension ranged from 0.912 to 0.949, and the Cronbach's alpha for the total scale was 0.979 in this study.

Table 6
Correlation between different grade-level groups and coping styles, career decision-making self-efficacy, and career adaptability.

Correlation analysis (<i>r</i>)	Grade Level					F	<i>p</i>
	Freshman	Sophomore	Junior	Senior	Fifth year		
N	199	190	163	140	55		
Coping styles							
Positive	3.77 ± 0.64	3.60 ± 0.68 ^a	3.56 ± 0.76 ^a	3.63 ± 0.73	3.63 ± 0.64	2.538	0.039
Negative	2.50 ± 0.99	2.67 ± 0.93	2.69 ± 0.95	2.66 ± 0.97	2.80 ± 0.84	1.623	0.166
Career decision-making self-efficacy	3.84 ± 0.61	3.82 ± 0.59	3.77 ± 0.74	3.76 ± 0.70	3.80 ± 0.55	0.454	0.770
Self-appraisal	3.90 ± 0.67	3.87 ± 0.64	3.79 ± 0.81	3.87 ± 0.73	3.91 ± 0.63	0.584	0.674
Occupational information	3.79 ± 0.77	3.72 ± 0.73	3.71 ± 0.84	3.69 ± 0.79	3.73 ± 0.65	0.432	0.785
Goal selection	4.01 ± 0.68	3.92 ± 0.64	3.85 ± 0.78	3.85 ± 0.75	3.93 ± 0.67	1.553	0.185
Planning	3.56 ± 0.81	3.71 ± 0.74	3.66 ± 0.84	3.64 ± 0.80	3.70 ± 0.65	0.976	0.420
Problem-solving	3.93 ± 0.72	3.85 ± 0.65	3.84 ± 0.76	3.66 ± 0.76 ^a	3.67 ± 0.62 ^a	3.532	0.007
Career adaptability	4.18 ± 0.56	4.05 ± 0.57 ^a	3.99 ± 0.73 ^a	3.96 ± 0.70 ^a	3.97 ± 0.63 ^a	3.187	0.013
Concern	4.14 ± 0.63	4.03 ± 0.61	3.96 ± 0.80 ^a	3.95 ± 0.77 ^a	3.92 ± 0.82 ^a	2.426	0.047
Curiosity	4.22 ± 0.61	4.08 ± 0.62 ^a	4.04 ± 0.75 ^a	4.02 ± 0.79 ^a	3.94 ± 0.72 ^a	3.090	0.015
Control	4.19 ± 0.60	4.05 ± 0.63 ^a	4.00 ± 0.76 ^a	3.93 ± 0.75 ^a	4.02 ± 0.63	3.505	0.008
Confidence	4.15 ± 0.60	4.02 ± 0.61 ^a	3.97 ± 0.77 ^a	3.95 ± 0.7 ^a	3.99 ± 0.57	2.511	0.041

^a There was a statistically significant difference between this year group and the freshman year group ($p < 0.05$).

Table 7
Regression analysis of the relationship between variables (N = 747).

Regression equation		Model Fit			Model Coefficient			
Outcome variables	Predictors variables	R	R2	F (df)	B	SE	t	p
Career decision-making self-efficacy	Positive coping style	0.621	0.386	93.038	0.642	0.031	20.995	<0.001
	Gender				-0.034	0.040	-0.850	0.396
	Grade				-0.020	0.016	-1.221	0.223
	Hometown				-0.049	0.025	-1.993	0.047
	Major				-0.047	0.043	-1.094	0.274
Career adaptability	Positive coping style	0.533	0.284	58.818	0.531	0.033	16.222	<0.001
	Gender				0.082	0.043	1.895	0.059
	Grade				-0.049	0.017	-2.835	0.005
	Hometown				-0.050	0.027	-1.884	0.060
	Major				0.005	0.046	0.103	0.918
Career adaptability	Positive coping style	0.821	0.674	254.804	0.024	0.028	0.857	0.392
	Gender				0.789	0.027	29.736	<0.001
	Grade				0.109	0.029	3.731	0.000
	Hometown				-0.033	0.012	-2.861	0.004
	Major				-0.011	0.018	-0.611	0.542
	Positive coping style				0.042	0.031	1.347	0.178

Table 8
The mediating effect of career decision-making self-efficacy between career adaptability and positive coping style (N = 747).

Path	Effect	Boot SE	Boot LLCI	Boot ULCI	Relative effect
Mediation effect	0.5133	0.0427	0.4293	0.5947	95.41 %
Direct effects	0.0247	0.0275	-0.0295	0.0788	4.59 %
Total effect	0.5380	0.0480	0.4430	0.6300	100.00 %

Table 9
The mediating effect of career decision-making self-efficacy between career adaptability and positive coping style (X = Positive coping style, Y=Career adaptability, M = Career decision-making self-efficacy).

Path	C (Total effects)	a	b	a*b (mediating effects)	a*b (BootSE)	a*b (95 % Boot CI)	C' (Direct effects)
X→M→Y	0.538 ^a	0.651 ^a	0.789 ^a	0.513 ^a	0.0427	0.429–0.594	0.025

^a $p < 0.01$.

2.3. Data analysis

SPSS 25.0 and AMOS 24.0 statistical software were used for the descriptive and correlational analysis among career adaptability, career coping styles and career decision-making self-efficacy. The Model4 of SPSS's Process macro [34], was employed to test the mediating effect of career self-efficacy on the relationship between coping styles and career adaptability. The significance level was set to 0.05 ($p < 0.05$).

2.4. Data collection and ethical considerations

Institutional approval was supported by MUST and ethical approval was obtained from the Human Research Ethics Committee (on March 2, 2023; Decision no: MUST-HSS-202301331001). This research was conducted according to the principles of the Declaration of Helsinki. The principles and requirements of informed consent, no-harm and confidentiality were strictly followed during the course of study. The online questionnaire was strictly designed with response restrictions to ensure compliance with logical requirements. Participants were required to complete all questions before submission to ensure data integrity. Logical checks were performed on the data to guarantee its reliability. Both raw and final data were backed up on two separate hard drives to ensure data security.

3. Results

3.1. Demographics

A total of 747 participants (Male = 239, Females = 508) completed the survey. The mean age of participants was 21.25 (± 1.57) years. Most participants from the western region ($n = 542$, 72.6 %). The study participants were from different majors, with 486 (65.1 %) from clinical medicine and 261 (34.9 %) from pharmacy and nursing. The largest group were freshman ($n = 199$, 26.6 %). The general demographic data of the subjects are shown in Table 1.

3.2. Descriptive statistics

The descriptive statistics are shown in [Table 2](#). The analysis revealed that the mean score for positive coping style was 3.64 ± 0.7 , and the mean score for negative coping style was 2.64 ± 0.95 . The average value of career decision-making self-efficacy was 3.80 ± 0.65 . Among the dimensions, the highest mean score is for goal selection at 3.92 ± 0.71 , and the lowest mean score is for planning at 3.65 ± 0.79 . The average value of career adaptability was 4.05 ± 0.64 . Among the dimensions, the highest mean score is for career curiosity at 4.09 ± 0.69 , and the lowest mean score is for career concern at 4.02 ± 0.71 .

The statistical results showed that medicine specialty students generally showed a positive way of coping styles during COVID-19. The self-appraisal, goal selection, and problem-solving were all higher than the average value of career decision-making self-efficacy, and the lowest score was for planning. In the sub-dimension of career adaptability, medicine specialty students have the highest score of career curiosity and low score of career concern. Medicine specialty students have a strong desire to explore potential problems in the future career, but have weaker planning awareness, which is reflected in the planning of career decision-making self-efficacy.

3.3. Correlation analysis

3.3.1. Correlation between career decision-making self-efficacy and coping styles

Results of the correlation between career decision-making self-efficacy and coping styles are given in [Table 3](#). A significant positive correlation was found between positive coping style and career decision self-efficacy total and sub-dimensions ($r > 0.5, p < 0.05$). There was a weak significant positive relationship between negative coping style and career decision self-efficacy total and sub-dimensions ($0.1 < r < 0.3, p < 0.05$).

3.3.2. Correlation between coping styles and career adaptability

Results of the correlation between coping styles and career adaptability are given in [Table 4](#). A significant positive correlation was found between positive coping style and career adaptability total and sub-dimensions ($r > 0.5, p < 0.05$). No significant relationship between negative coping style and career adaptability total and most sub-dimensions ($p > 0.05$).

3.3.3. Correlation between career decision-making self-efficacy and career adaptability

Results of the correlation between career decision-making self-efficacy and career adaptability are given in [Table 5](#). There was a significant positive correlation between career adaptability and career decision-making self-efficacy total and sub-dimensions ($r > 0.5, p < 0.05$).

3.3.4. Correlation between different grade-level groups and coping styles, career decision-making self-efficacy, and career adaptability

Results of the correlation between different grade-level groups and coping styles, career decision-making self-efficacy, and career adaptability are given in [Table 6](#) a significant correlation was found between grade-level and positive coping style, problem-solving, and career adaptability total and sub-dimensions ($p < 0.05$).

Further comparative analyses showed that the mean score of positive coping style for sophomore and junior was lower than for freshman ($p < 0.05$). The mean score of career problem-solving for senior and fifth year students was lower than for freshman ($p < 0.05$). The statistical results showed that the mean score of career adaptability and career curiosity for freshman was higher than other grades ($p < 0.05$). The mean score of career concern for freshman was higher than junior, senior and fifth year students ($p < 0.05$). The mean score of career control and career confidence for freshman was higher than sophomore, junior and senior ($p < 0.05$).

3.4. Regression analysis and mediation effect test analysis

The analysis results are displayed in [Table 7](#), [Table 8](#), [Table 9](#). Model 4 in the SPSS macro program PROCESS 4.0 was used to test the mediating effect. Statistically significant variables from the single-factor analysis, including gender, grade, birthplace, and major, were used as control variables. After variables were controlled, positive coping style was used as the independent variable, career adaptability as the dependent variable, and career decision-making self-efficacy as mediating variables, and the Bootstrap method was used to calculate 95 % confidence intervals for each of the 5000 repeated draws. The results showed that there was a partial mediating effect of career decision self-efficacy between the predictor variable positive coping style and the outcome variable career adaptability. The direct effect ($=0.0247$) and the mediating effect ($=0.5133$) accounting for 4.59 % and 95.41 % of the total effect ($=0.538$).

4. Discussion

This study examines the relationship between career adaptability and career coping styles in Chinese medicine specialty students during the COVID-19 period and identifies the mediating role of career decision-making self-efficacy. This survey will help to guide future medical education decisions during a similar pandemic to prevent the healthcare workforce from continuing to decline.

The results of the descriptive analysis of this study are similar to those of previous studies. Medicine specialty students were more inclined to take a positive coping style than a negative coping style when facing difficulties [35]. As the main force in the future healthcare industry, medicine specialty students' professional knowledge courses helped them to confront the stressful event of the pandemic with a positive approach [36]. Furthermore, a number of studies have highlighted the importance of social support in encouraging positive coping style in Chinese medicine specialty students [35,37]. This research showed that the career

decision-making self-efficacy of medicine specialty students was at upper middle level, indicating that medicine specialty students had high level of confidence in completing their career decision-making tasks, but there was still room for improvement, consistent with previous research findings [38,39]. The study revealed that the COVID-19 had a positive impact on the career self-efficacy of Chinese nursing students [40]. Among the sub-dimension of career decision-making self-efficacy, the score of career goal selection was the highest while that of career planning was the lowest, which was strongly related to the targeted employment goals in the future medical career. The study suggested that higher career adaptability is associated with more positive and optimistic the subjective feelings and self-assessments, stronger vocational role transition, and better coping with changing career tasks [41]. The previous study showed that Chinese medicine specialty students must undergo extensive study and training before they can become licensed doctors. This protracted process may result in a decline in their career decision-making self-efficacy. Consequently, relying solely on career decision-making self-efficacy may prove inadequate to sustain their pursuit of a medical career. In order to develop perseverance, it is essential to promote their identification and passion for the profession [42]. The career adaptability in this study was slightly higher than previous research results [43], which was considered to be related to the environmental plasticity of career adaptability [44]. During the COVID-19 period, the entire society highly valued and paid attention to the doctors and nurses, which stimulated the enthusiasm of medicine specialty students for the healthcare profession. The low score of career attention indicated that medicine specialty students have a weak sense of career concern, which was consistent with the low score of career planning. The previous study showed that Chinese clinical medical students exhibit the highest mean scores for career curiosity and the lowest scores for career confidence [45]. The results revealed that the career confidence of medical and nursing graduate students was adversely affected by the tough employment situation.

The results of correlation analysis showed that coping styles was related to career adaptability, consistent with previous studies [46]. Specifically, positive coping style has a significant positive correlation with career adaptability and sub-dimension, while negative coping style has no significantly correlated with career adaptability and most sub-dimension. Previous research results have indicated that coping styles are correlated with career decision-making self-efficacy, especially with the positive coping style [47,48]. This study also showed that the higher score of positive or negative coping style tend to have higher career decision-making self-efficacy. Considering the contradictory social mentality of Generation Z [49]. Generation Z often express negative attitudes, but their actual behavior shows strict self-requirements and clear planning. However, considering the regression coefficients, the influence of positive coping style on career decision-making self-efficacy is stronger than that of negative coping style, indicating that the role of positive coping style in promoting the career decision-making self-efficacy of medicine specialty students may be more prominent. In his social cognitive theory, Bandura pointed out that career decision-making self-efficacy can promote career behaviors, such as career choices [50]. Previous studies have shown that the career decision-making self-efficacy and sub-dimensions were significantly positively correlated with career adaptability and sub-dimensions [51]. The higher an individual's career decision-making self-efficacy, the higher career adaptability, which was consistent with the results of this study. Additionally, the previous study showed that family support, friend support, and teacher support all indirectly influence career adaptability through career decision-making self-efficacy [52].

The analyses of study showed that there was a significant correlation between grade-level and coping styles, career decision-making self-efficacy, and career adaptability. The mean score of positive coping style for freshman was higher than upper-grade students, which is consistent with previous studies [53]. Considering the fact that study load, employment and financial pressures the consume much of the time and energy related to upper-grade students [54,55]. The mean score of career problem-solving, career adaptability and sub-dimensions for freshman was higher than upper-grade students, which is consistent with previous studies [56]. During COVID-19, the increased responsibility and stress of patient care was experienced by students in the upper grades. It is possible that students may doubt their capacity and motivation to become doctors [57]. It is not uncommon for senior students to experience heightened feelings of uncertainty when it comes to setting and attaining their career goals. So upper-grade students may tend to do what has been done before instead of being creative and thinking of a plan to solve the problem step by step [58]. The overall prevalence of burnout among upper-grade students in more advanced years of training also increased with study load, difficulties with studying and time management, with balancing school/clinical work, and the disconnect between the experiences encountered in practice and those taught in the formal curriculum [57,59–62]. During the early year of their studies, freshman may have greater freedom of choice than seniors. This allowed them to reflect on their own career decision-making self-efficacy. In contrast, seniors may be more aware of potential career constraints. All of these negative factors impacted the career decision-making self-efficacy of upper-grade students.

This study also found that there was a partial mediating effect of career decision self-efficacy between the predictor variable positive coping style and the outcome variable career adaptability. The results indicated that the enhancement of the level of positive coping style or career decision-making self-efficacy among medicine specialty students can result in direct or indirect improvements in the career adaptability.

Based on the results, we suggest enhancing the career decision-making self-efficacy among medicine specialty students by increasing the courses which can help students improve the occupational information and career planning in career planning education program. We also suggest developing a more positive coping style by providing education on the mental health of medicine specialty students and offering good social support [63,64]. This is aimed at raising the career adaptability among medicine specialty students and reducing the attrition rate of medicine specialty students and the turnover rate of doctors [65].

5. Limitations and future research

Firstly, in addition to the career decision-making self-efficacy, there may be other potential mediating effects that have not yet been

identified. Secondly, the study used a cross-sectional design. Further longitudinal studies are required to address these limitations of the current study. Third, the relatively small sample size limits the generalisability of the results. In order to test the causal relationship between variables, it is necessary to ensure that data for future studies is drawn from a diverse range of sources. Future sample sizes could be increased to enable a more comprehensive exploration of problems. Furthermore, a longitudinal study may also prove beneficial in allowing for a more in-depth exploration of the problems. This will provide medical educators with ways to prevent further loss of healthcare professionals in the medical service. Finally, we have not investigated the effects of other reasons on career adaptability, such as personal variables and social support. In addition to career adaptability, further research may also benefit from investigating some other outcome variables, such as vocational identity.

6. Conclusions

In conclusions, positive coping style has a significant positive correlation with career decision-making self-efficacy, career adaptability, and their sub-dimensions. There was a partial mediating effect of career decision self-efficacy between the predictor variable positive coping style and the outcome variable career adaptability. By promoting the level of positive coping style or career decision-making self-efficacy among medicine specialty students, the career adaptability can be directly or indirectly enhanced.

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Institutional review board statement

The study was approved by Macau University of Science and Technology Medical Ethics Committee (protocol code MUST-HSS-202301331001, valid date December 31, 2025).

Informed consent statement

Not applicable.

Data availability statement

Data may be provided on reasonable request to the corresponding author.

CRedit authorship contribution statement

Xiaobin Zhang: Writing – original draft, Visualization, Methodology, Formal analysis, Data curation, Conceptualization. **Lili Yu:** Writing – review & editing, Writing – original draft, Visualization, Validation, Project administration, Methodology, Funding acquisition, Formal analysis, Conceptualization. **Yuying Chen:** Software, Investigation, Data curation. **Zongmei Fu:** Writing – review & editing, Visualization. **Fangfang Zhang:** Resources, Investigation. **Zhongcheng Li:** Software, Data curation. **Qibiao Wu:** Writing – review & editing, Validation, Supervision, Funding acquisition.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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