

Career Choice Regret During COVID-19 Among Healthcare Students and Professionals in Mainland China: A Cross-Sectional Study

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Abstract

Background

The COVID-19 epidemic affected the career choice of healthcare professionals and students. To explore career choice regret of healthcare professionals and students during COVID-19 outbreak and its affected factors.

Methods

Convenience sample of nurses, doctors, and medical students were recruited from hospitals and universities nationwide. The data collected including demographic information, professional value before and after the COVID-19 outbreak, the Connor-Davidson Resilience Scale, and career choice regret level by an online questionnaire. Multinomial logistic regression was employed to explore the factors associated with career choice regret.

Results

In total, 9322 participants of convenience sampling were enrolled in, including 5786 nurses, 1664 doctors, and 1872 medical students. 6.7% participants had career choice regret. Multinomial logistic regression analysis showed, compared to participants with no regret, that as levels of resilience increased, the odds of experiencing career choice regret decreased ($OR=0.951, P<0.001$), while participants with lower professional value evaluation after the COVID-19 outbreak had higher probability to experience career choice regret ($OR=1.552, P<0.001$). Medical students were more likely to regret than nurses ($OR=1.654, P=0.002$), participants whose career/major choice was according to their personal ideal had higher risk of experience career choice regret ($OR=1.592, P<0.001$), while participants who were very afraid of the coronavirus had higher risk to experience career choice regret than participants with no fear at all ($OR=1.997, P=0.004$).

As for the medical students, results indicated that medical students major in nursing and undergraduates had higher risk to experience career choice regret compared to medical students major in clinical medicine and postgraduate (Master or PhD), with an odds ratios of 2.645 and 6.851 respectively.

Conclusions

A minority of healthcare professionals and medical students regretted their career choices during the COVID-19 outbreak. Enhance personal psychological resilience and professional value would helpful to reduce career choice regret among healthcare professionals and students during pandemic.

1 Background

The coronavirus disease 2019 (COVID-19) is a severe acute respiratory infection caused by SARS-CoV-2 which is high transmission. It has spread to 200 countries and has been declared a global pandemic by

the World Health Organization (WHO). Globally, as of 24 November 2020, there have been more than 58 million confirmed cases of COVID-19, including 1385 thousand deaths, reported to WHO(1). With the rapid and extensive spread, doctors and nurses have been confronted with mounting challenges that they have not been faced before.

They encounter work difficulties due to lack of resources and threats to the safety of their loved ones(2) and the highest risk of being infected(3). Moreover, the COVID-19 epidemic had negative impacts on the psychology of healthcare professionals. Studies have showed during the COVID-19 outbreak, healthcare professionals dealing with COVID-19 were under increased levels of anxiety, depression, and stress(4, 5). The epidemic also has increased medical students' perceptual awareness of the high-risk characteristics of medical and health services(6).

Previous studies showed that depressive symptoms and higher levels of burnout were related to decrease medical career interest, increased career choice regret(7–9). CNN News reported that affected by the epidemic, some American nurses were overwhelmed to strike(10).

To depict the situation of career choice regret among healthcare professionals and students during COVID-19 pandemic and to explore strategies to prevent career choice regret among healthcare professionals and students, we conducted the following study.

2 Methods

2.1 Study design, setting, and participants

A cross-sectional study was conducted from April 23 to May 20,2020. Convenient sampling of healthcare professionals (doctors and nurses) and medical students in mainland China were recruited nationwide online. All participants were invited to complete the questionnaire online via Questionnaire Star (<https://www.wjx.cn>).

2.2 Measurements

The online questionnaire collected the following information, general information, professional value before and after the outbreak of COVID-19, the Connor-Davidson Resilience scale and one question about career choice regret affected by the COVID-19. A pilot study was conducted before the survey to make sure all the questions/items were clear and unambiguous. Details of each part are as described below.

General information

The following information were collected from all the participants, including gender, age, educational level, the reason of career choice for healthcare professionals/ major choice for medical students, whether have experienced verbal violence or physical violence during medical practicing, the willingness to participate in treatment or nursing during public health emergencies and the degree of fear of the coronavirus. In addition to the above, doctors and nurses were also asked if they participated in the

treatment or nursing of patients with COVID-19, and medical students were asked whether their current major was the first choice, whether have had started internship in the hospital .

Professional value before and after the COVID-19 outbreak

This part contains 5 items to investigate the professional value of the participants before and after the outbreak of COVID-19. Each item using a 5- Likert response scale, response options ranged from “non-conformity” to “full conformity” (score range,5-25) and a higher score indicated lower professional value evaluation.

The Connor-Davidson Resilience scale (CD-RISC)

The scale was developed by Connor and Davidson(11) and was revised by Yu(12), comprises 3 dimensions (competency, toughness, and adaptability), 25 items rated on a 5-point scale (0-4), with higher scores reflecting greater resilience. The internal consistency coefficient of the questionnaire is 0.89, which has good reliability and validity.

Career choice regret

This part contains one question for all the participants “ after the outbreak of COVID-19, I regret the choice I made about my career”. Response options were “strongly agree”, “agree” ,“neutral”, “disagree” and “strongly disagree”; responses of “strongly agree” or “agree” indicated with career choice regret, “disagree” and “strongly disagree” indicated without career choice regret.

2.3 Statistical analysis

Categorical data are presented as frequencies and percent, continuous data are described by mean and standard deviation or median and interquartile range (IQR) as appropriate. Mann-Whitney U or Kruskal-Wallis H test were performed to test the association of career choice regret with the following categorical variables, identity, gender, whether experienced physical violence during practicing, whether experienced verbal violence during practicing, the reason of career/major choice , major, work intention after graduation , whether current major was the first choice, whether have had started internship in the hospital, whether participated in the treatment or nursing of patients with COVID-19. Test for Linear Trend was used to test the association of career choice regret with the fear level after the COVID-19 outbreak. Paired t test or Wilcoxon signed-rank test were used to measure the change of professional value during COVID-19. Multinomial logistic regression analysis was performed to identify factors associated with regret of choice of career among all the participants, a subgroup analysis was also done among potential healthcare professionals (medical students).All statistical analyses were conducted in SPSS version 26.0 (IBM, Chicago, IL, USA), and $p < 0.05$ was considered to be statistically significant.

2.4 Ethics statement

This study was approved by Peking University People's Hospital Ethical Committee [No:2020PHB181-01]. The online survey was anonymous. Informed consent was obtained from all subjects (age ≥ 18), if subjects are under 18, from a parent and/or legal guardian when they accessed the online survey. All methods were carried out in accordance with relevant guidelines and regulations.

2.5 Patient and Public Involvement

Patients or the public were not involved in the design, or conduct, or reporting, or dissemination plans of our research.

3 Results

3.1 Participants' characteristics

A total of 9322 participants were finally included, consisted of 5786 nurses, 1664 doctors, and 1872 medical students. Among the medical students, 1100 are major in clinical medicine and 772 are major in nursing. Among the healthcare professionals, 2482 were involved in the treatment or nursing the patient with COVID-19, accounting for 33.3%. The average age of participants was 31.65 years; 1796 were male (19.3%) and 7526 were female (80.7%, Table 1).

3.2 The level of career choice regret among healthcare professionals and potential healthcare professionals

There were 5506 of 9322 respondents (59.1%) reported that they had no regret of their choice of career, while 624 of 9322 respondents (6.7%) reported that they had career choice regret. For the question about whether the outbreak of covid-19 made them regret the choice they made about their career, 4.5% reported "agree" and 2.5% reported "strongly agree" among healthcare professionals, while for medical students, 3.9% and 1.4% reported "agree" and "strongly agree".

3.3 Factors associated with career choice regret after the COVID-19 outbreak

The healthcare professionals who participated in the treatment or nursing of patients with COVID-19 have lower career choice regret after the COVID-19 outbreak ($Z = -2.726, P = 0.006$). For all the participants, in the univariate analysis (Table 2), career choice regret after the COVID-19 outbreak was associated with identity, gender, having experienced physical or verbal violence, the reason of career/major choice was personal ideal or family will.

As for medical students, univariate analysis results showed that, career choice regret after the COVID-19 outbreak was associated with their current major, work intention after graduation, whether their current major was the first choice, whether have had started internship in the hospital, willingness to participate in treatment or nursing facing public health emergencies. (Table 3).

3.4 Factors associated with career choice regret after the COVID-19 outbreak

Multinomial logistic regression results (Table 4) showed that as levels of resilience increased, the odds of experiencing career choice regret decreased ($OR = 0.951, P < 0.001$), while participants with higher professional score (means lower professional value evaluation) had higher probability to experience career choice regret

($OR = 1.552, P < 0.001$). Medical students were more likely to regret about their career choice than nurses ($OR = 1.654, P = 0.002$), participants whose career/major choice was according to their personal ideal had higher risk of experience career choice regret ($OR = 1.592, P < 0.001$), participants who have not experienced physical violent medical incidents had lower probability to experience career choice regret ($OR = 0.673, P = 0.001$), while participants who were very afraid of the coronavirus had higher risk to experience career choice regret than participants with no fear at all ($OR = 1.997, P = 0.004$).

As for the medical students, multinomial logistic regression analysis results (Table 5) indicated that medical students major in nursing and undergraduates had higher risk to experience career choice regret compared to medical students major in clinical medicine and postgraduate (Master or PhD), with an odds ratios of 2.645 and 6.851 respectively.

4 Discussion

This nationwide research investigated the current situation and influencing factors of the career choice regret of healthcare professionals and medical students during the COVID-19 epidemic. Although the epidemic has brought challenges to healthcare, but our research showed only 6.7% healthcare professionals and medical students regret about their career choice. This situation is similarly to previous pandemic (13). Despite the initial shock, the health professionals in China appear to exhibit high levels of commitment and professionalism. The increasing knowledge about preventing and dealing with the disease, and the development of more specific procedural and treatment protocols, alongside educational activities, contributed to improving the morale of healthcare workers dealing with the pandemic.

Our research shows that the degree of regret of medical students' career choice is lower than that of medical staff, and it is statistically significant. Among medical students, those who have had started internship have more risk to experience career choice regret than those who have not entered clinical internship. It is possible that the COVID-19 pandemic resulted in cancellation of medical student clinical rotations (14). Therefore, educators should intervene and cultivate their professional values after students started internship, and targeted efforts by medical schools to address these concerns through enhanced virtual curriculum development and advising strategies will become increasingly important. So as to reduce their professional regret and reserve talents for the medical career.

The multivariate analysis showed that the professional value was the influence factor of career choice regret during the COVID-19 outbreak. The population with higher professional value showed lower level of regret. Although the professional value has declined slightly after the epidemic, it was still at a high level, and the impact on professional regret was still positive. Many previous studies have shown that personal achievement leading doctors to strongly recommend their work in the health center to dear ones but not

to put aside other job options(15). Therefore, cultivating the professional value of medical staff in peacetime was more conducive to reducing the impact on the career choices of medical staff after major public health incidents.

When the COVID-19 outbreak, healthcare professionals directly participated in the treatment or nursing of the patient with COVID-19. They were facing great mental and physical pressure. Regarding the psychological suffering of individuals, an important key psycho-social factor was psychological resilience. Our research showed that the stronger a person's psychological resilience was, the lower his regret for career choices when facing the COVID-19 epidemic. Resilience plays a decisive role in the response of individuals under pressure and can help them deal with difficulties and adverse circumstances more effectively(16). The previous study showed psychosocial strengths play a significant role in subsiding the risk associated with severity of disease when facing COVID-19(17).Therefore, it is believed that higher levels of resilience can protect a person from pressure and reduce the risk of regretting career choices.

Conclusion

During COVID-19 outbreak in China, career choices of medical staff and medical students was low. Career intention is personal ideal, experienced physical or verbal violence, higher psychological resilience, higher professional value after the epidemic, lower change of professional value were associated with a lower career choice regret. Medical students' career choice regret was lower than the health professionals. For the medical students, having entered the clinical practice stage, major was not the first choice for college entrance examination volunteers, work intention after graduation wasn't hospital had higher level of regret.

Limitations Of This Study

Our study is limited in several ways. First, as a cross-sectional design, this study could only evaluate the career choice regret at the time without the longitudinal observation of the subjects, so follow up is warranted in the future. Second, the survey use convenience sample recruited online, which could resulted in selection bias. However, the findings of this study may have some generalizability given the large sample.

Declarations

Ethics approval and consent to participate

This study was approved by Peking University People's Hospital Ethical Committee [No:2020PHB181-01]. The online survey was anonymous. Informed consent was obtained from all subjects(age \geq 18), if subjects are under 18, from a parent and/or legal guardian when they accessed the online survey. All methods were carried out in accordance with relevant guidelines and regulations.

Consent for publication

Not applicable

Availability of data and materials

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

Competing interests

The authors declare that they have no competing interests

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Authors' contributions

- (I) Conception and design: All authors
- (II) Administrative support: HXL, TX
- (III) Provision of study materials or patients: All authors
- (IV) Collection and assembly of data: GYY, HXL, JW, ZXG
- (V) Data analyses and interpretation: GYY, HXL, LW, TX
- (VI) Preparation of the manuscript: All authors
- (VII) Final approval of manuscript: All authors

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Tables

Table 1 Personal and professional characteristics of participants (n=9322)

	healthcare professionals		medical students	
Characteristics	nurses	doctors	Clinical Medicine	nursing
Gender				
Male	192(3.3%)	1018(61.2%)	468(42.5%)	118(15.3%)
Female	5594(96.7%)	646(38.8%)	632(57.5%)	654(84.7%)
Age	33.02±7.42	38.65±8.27	21.60±3.02	20.60±2.81
Educational level				
Below Bachelor degree	1907(33.0%)	60(3.6%)	0	135(17.5%)
Bachelor degree	3765(65.1%)	773(46.5%)	897(81.5%)	598(77.5%)
Master's degree	114(2.0%)	506(30.4%)	149(13.5%)	37(4.8%)
Doctorate	0.0	325(19.5%)	54(4.9%)	2(0.3%)
Work intention after graduation				
Tertiary hospital	N/A	N/A	972(88.4%)	642(83.2%)
Primary hospital	N/A	N/A	69(6.3%)	43(5.6%)
Others	N/A	N/A	59(5.4%)	87(11.3%)
Whether current major is the first choice				
Yes	N/A	N/A	1025(93.2%)	456(59.1%)
No	N/A	N/A	75(6.8%)	316(40.9%)
Whether have had started internship in the hospital				
Yes	N/A	N/A	318(28.9%)	431(55.8%)
No	N/A	N/A	782(71.7%)	341(44.2%)
Reason of major/career choice				
Personal ideal				
Yes	996(59.9%)	2048(35.4%)	825(75.0%)	396(51.3%)
No	668(40.1%)	3738(64.6%)	275(25.0%)	376(48.7%)
Family wishes				
Yes	826(49.6%)	2824(48.8%)	567(51.5%)	358(46.4%)

No	838(50.4%)	2962(51.2%)	553(48.5%)	414(53.6%)
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Table 2 Univariate analysis of influencing factors of career choice regret after COVID-19 outbreak (n=9322)

Variable	I regret the career choice I made					P*
	strongly disagree	disagree	neutral	agree	strongly agree	
Identity						□ 0.001
Doctor	277	720	542	79	46	
Nurse	1075	2240	2071	259	141	
Student	391	803	579	73	26	
Gender						0.027
Male	353	764	543	92	44	
Female	1390	2999	2649	319	169	
Whether experienced physical violence						□ 0.001
Yes	282	622	592	125	72	
No	1461	3141	2600	286	141	
Whether experienced verbal violence						□ 0.001
Yes	910	2174	1945	301	160	
No	833	1589	1247	110	53	
The reason of career/major choice is personal ideal						□ 0.001
Yes	1122	1954	1007	110	72	
No	621	1809	2185	301	141	
The reason of career/major choice is family will						□ 0.001
Yes	769	1880	1607	213	106	
No						
Fear level						□ 0.001
Very	78	77	118	35	36	
Fear	175	420	488	76	33	

General fear	607	1842	1687	194	85
No fear	518	1125	708	82	34
No fear at all	365	299	191	24	25

Note:*P for trend.

Table 3 factors of associated career choice regret after COVID-19 outbreak among medical students (n=1872)

Variable	I regret the career choice I made					P*
	strongly disagree	disagree	neutral	agree	strongly agree	
Educational level						□ 0.001
Below Bachelor degree	39	47	43	4	2	
Bachelor degree	326	649	457	44	19	
Above Bachelor degree	26	107	79	25	5	
Major						□ 0.001
Nursing	101	306	310	39	16	
Clinical medicine	101	306	310	39	16	
Work intention after graduation						□ 0.001
Tertiary hospital	349	716	482	48	19	
Primary hospital	24	47	32	8	1	
Others	18	40	65	17	6	
Whether major is the first choice						□ 0.001
Yes	360	655	397	52	17	
No	31	148	182	21	9	
Whether is interning in the hospital						□ 0.001
Yes	125	323	243	45	13	
No	266	480	336	28	13	
For public health emergencies, will you participate in the treatment or nursing?						□ 0.001
Definitely will	216	206	97	12	10	
Will	135	397	228	27	4	
Not necessarily	37	197	238	32	6	
Not will	1	3	14	2	4	

Definitely not

2

0

2

0

2

Table 4 Factors associated with career choice regret after the COVID-19 epidemic in multinomial logistic regression(n=9322)

Career choice regret		β	SE	Wald	OR	95%CI	P
With career choice regret	Intercept	-5.578	0.549	103.156			0.000
	Total score of psychological resilience						
		-0.051	0.004	131.317	0.951	0.943-0.959	0.000
	Age	-0.010	0.007	2.119	0.990	0.977-1.004	0.146
Total score of professional value after the covid-19 outbreak							
		0.440	0.017	652.894	1.552	1.501-1.605	0.000
Change of professional value							
		-0.151	0.022	48.630	0.860	0.824-0.897	0.000
Identity							
	Student	0.503	0.163	9.477	1.654	1.201-2.278	0.002
	Doctor	-0.297	0.160	3.466	0.743	0.543-1.016	0.063
	Nurse	reference					
Gender							
	Female	-0.174	0.148	1.380	0.840	0.629-1.123	0.240
	Male	reference					
The reason of career/major choice is personal ideal							
	No	0.465	0.107	18.989	1.592	1.291-1.962	0.000
	Yes	reference					
The reason of career/major choice is family will							
	No	0.042	0.094	0.204	1.043	0.868-1.254	0.652
	Yes	reference					

	Whether experienced physical violence						
	No	-0.395	0.117	11.449	0.673	0.536-0.847	0.001
	Yes	reference					
	Whether experienced verbal violence						
	No	0.121	0.121	1.001	1.129	0.891-1.430	0.317
	Yes	reference					
	Afraid of coronavirus degree						
	Very afraid	0.692	0.242	8.202	1.997	1.244-3.206	0.004
	Afraid	0.385	0.202	3.639	1.470	0.989-2.183	0.056
	General afraid	0.116	0.178	0.423	1.123	0.792-1.593	0.515
	Not afraid	-0.126	0.193	0.426	0.882	0.604-1.287	0.514
	Not afraid at all	reference					
neutral	Intercept	-1.866	0.298	39.148			0.000
	Total score of psychological resilience						
		-0.043	0.002	294.021	0.958	0.953-0.963	0.000
	Age	-0.016	0.004	18.175	0.984	0.977-0.991	0.000
	Total score of professional value after the COVID-19 outbreak						
		0.252	0.010	687.117	1.287	1.263-1.311	0.000
	Change of professional value						
		-0.042	0.012	12.349	0.959	0.937-0.982	0.000
	Identity						
	Student	0.157	0.084	3.503	1.170	0.993-1.379	0.061

Doctor	0.016	0.085	0.034	1.016	0.860-1.200	0.855
Nurse	reference					
Gender						
Female	0.084	0.080	1.121	1.088	0.931-1.272	0.290
Male	reference					
The reason of career/major choice is personal ideal						
No	.601	.055	120.181	1.823	1.638-2.030	0.000
Yes	reference					
The reason of career/major choice is family will						
No	0.065	0.051	1.619	1.067	0.966-1.178	0.203
Yes	reference					
Whether experienced physical violence						
No	-0.006	0.072	0.007	0.994	0.863-1.145	0.934
Yes	reference					
Whether experienced verbal violence						
No	0.249	0.060	17.086	1.283	1.140-1.444	0.000
Yes	reference					
Afraid of coronavirus degree						
Very afraid	0.175	0.167	1.093	1.191	0.858-1.654	0.296
Afraid	0.547	0.116	22.243	1.727	1.376-2.168	0.000
General afraid	0.490	0.099	24.266	1.632	1.343-1.984	0.000
Not afraid	0.223	0.105	4.495	1.250	1.017-1.536	0.034
Not afraid at all	reference					

Table 5 Factors associated with career choice regret after the COVID-19 epidemic in multinomial logistic regression among medical students(n=1872)

Career choice regret		B	SE	Wald	OR	95%CI	P
With career choice regret	Intercept	-2.372	0.573	17.116			0.000
	Major						
	Nursing	0.973	0.269	13.031	2.645	1.56-4.485	0.000
	Clinical Medicine	reference					
	Work intention after graduation						
	Tertiary hospital	-1.522	0.292	27.155	0.218	0.123-0.387	0.000
	Primary hospital	-0.62	0.45	1.899	0.538	0.223-1.299	0.168
	Others	reference					
	Whether is interning in the hospital						
	No	-0.211	0.27	0.615	0.809	0.477-1.373	0.433
Yes	reference						
Whether major is the first choice							
No	0.466	0.267	3.037	1.593	0.944-2.690	0.081	
Yes	reference						
Educational level							
Below Bachelor degree	0.475	0.485	0.962	1.609	0.622-4.158	0.327	
Bachelor degree	1.924	0.518	13.795	6.851	2.481-18.912	0.000	
Master's degree or doctorate	reference						
neutral	Intercept	-0.825	0.297	7.728			0.005
	Major						
	Nursing	0.717	0.132	29.624	2.049	1.583-2.653	0.000
Clinical Medicine	reference						

Work intention after graduation							
Tertiary hospital	-0.715	0.195	13.432	0.489	0.334-0.717	0.000	
Primary hospital	-0.685	0.288	5.655	0.504	0.287-0.886	0.017	
Others	reference						
Whether is interning in the hospital							
No	0.165	0.136	1.464	1.179	0.903-1.539	0.226	
Yes	reference						
Whether major is the first choice							
No	0.623	0.137	20.625	1.864	1.425-2.438	0.000	
Yes	reference						
Educational level							
Below Bachelor degree	0.145	0.225	0.419	1.157	0.744-1.797	0.518	
Bachelor degree	0.755	0.263	8.244	2.128	1.271-3.563	0.004	
Master's degree or doctorate	reference						

The reference category is without career choice regret