



# The relationship between psychological distress and professional identity in graduate nursing students during COVID-19: A longitudinal cross-lagged analysis

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**Título:** La relación entre el malestar psicológico y la identidad profesional en estudiantes de posgrado de enfermería durante el COVID-19: un análisis longitudinal cruzado.

**Resumen:** Cada vez hay más evidencia de que la reciente epidemia de que la COVID-19 puede afectar a la salud mental y la identidad profesional de los estudiantes de posgrado en enfermería. Es por ello que el propósito de este estudio fue explorar las trayectorias del estrés psicológico y la identidad ocupacional y examinar su relación causal de dichos estudiantes de posgrado durante la nueva epidemia. Se llevó a cabo un estudio prospectivo longitudinal con 556 estudiantes de posgrado en enfermería en China, a los que se les pidió que completaran los cuestionarios de emergencia de salud pública y el de identidad ocupacional para estudiantes de enfermería en tres etapas del brote (T1 = brote, T2 = aislamiento estatal, T3 = reapertura escolar). Los resultados mostraron que el estrés psicológico y la identidad psicológica de los estudiantes universitarios habían cambiado con el tiempo. En T3, la perturbación emocional fue la más baja y la identidad ocupacional la más alta. El análisis de retraso cruzado mostró que la identidad ocupacional de T1 y T2 tenía un efecto predictivo negativo sobre la perturbación psicológica de T2 y T3. Conclusión: los educadores de enfermería deberían formular programas y estrategias que cultiven la identidad profesional de sus estudiantes a fin de mejorar la salud mental en emergencias públicas.

**Palabras clave:** Malestar psicológico. Identidad ocupacional. Estudiante de posgrado de enfermería. COVID-19. Análisis longitudinal cruzado.

**Abstract:** There is growing evidence that the COVID-19 pandemic has had an impact on the mental health and professional identity of nursing students. This study aimed to explore the trajectories of psychological distress and professional identity and examine their causal relationship among graduate nursing students. A prospective longitudinal study was conducted with 556 graduate nursing students in China who were asked to complete the Questionnaires for Emergent Events of Public Health and the Professional Identity Questionnaire for Nursing Students at three timepoints during the pandemic (T1 = onset of the outbreak, T2 = state-wide isolation, T3 = school reopening). The results showed that psychological distress and psychological identity changed over time, with the lowest psychological distress and highest professional identity at T3. The cross-lagged analysis showed that professional identity at T1 and T2 negatively predicted psychological distress at T2 and T3. We concluded that nurse educators should develop programs and strategies to cultivate professional identity in graduate nursing education to improve mental health during public health crises.

**Keywords:** Psychological distress. Professional identity. Graduate nursing student. COVID-19. Cross-lagged analysis.

## Introduction

Coronavirus disease 2019 (COVID-19) was first reported in Wuhan, China, at the end of December 2019 (Huang et al., 2020; Chen, 2020) and has now become a global pandemic, with infections reported in nearly every country. The confirmed numbers of those infected and those who have died continue to climb (Ahsan et al., 2022). Confirmed COVID-19 cases increased six-fold from the end of November 2021 to mid-January 2022 (Murray, 2022). The COVID-19 pandemic has aroused fear and anxiety globally, which poses a threat to the public's mental health. In this global health crisis, the role of graduate nursing students as an important reserve force against COVID-19 cannot be ignored, since they were in close contact with patients during their clinical training or their voluntary roles in educating the public about COVID-19 (Mustafa et al., 2020). The stress related to the outbreak and the risk of exposure to COVID-19, as well as the academic pressure related to the courses, internship, and

dissertation, may give rise to mental health problems among graduate nursing students (Wang et al., 2020). However, little concern was given to the mental health of this vulnerable population. Only a few cross-sectional studies have suggested increases in the psychological distress of graduate nursing students as a result of COVID-19 (Jardon & Choi, 2022; Rosenthal et al., 2021). One such study, a survey conducted in Jordan, showed that graduate nursing students suffered from higher levels of anxiety and depression than other students during the COVID-19 pandemic (Rosenthal et al., 2021).

The experience of Chinese graduate nursing students during this pandemic can be divided into three phases. The first phase (*onset of the outbreak*) occurred at the beginning. In this phase, much remained unknown about the disease, and graduate nursing students were still in schools or hospitals (State Council Information Office, 2020). The second phase (*state-wide isolation*) lasted from late January 2020 to late April 2020, when a state-wide isolation policy was introduced by the government, and the spring semester was postponed in all universities, colleges, schools, and kindergartens to lower the risk of contagion (State Council Information Office, 2020). The third phase (*school reopening*) began on April 29, 2020, when COVID-19 was well contained, and all the schools were reopened (State Council Information Office, 2020). Since then, China has entered the post-COVID-19 era, with short-duration and sporadic outbreaks reported in

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some provinces. However, it remains unclear how the mental health of graduate nursing students was affected and may have changed during the different phases of the COVID-19 pandemic. Hence, tracking and understanding the trajectory of psychological distress of graduate nursing students across the different phases of the COVID-19 pandemic is important for nurse educators seeking to provide appropriate psychological support for their students.

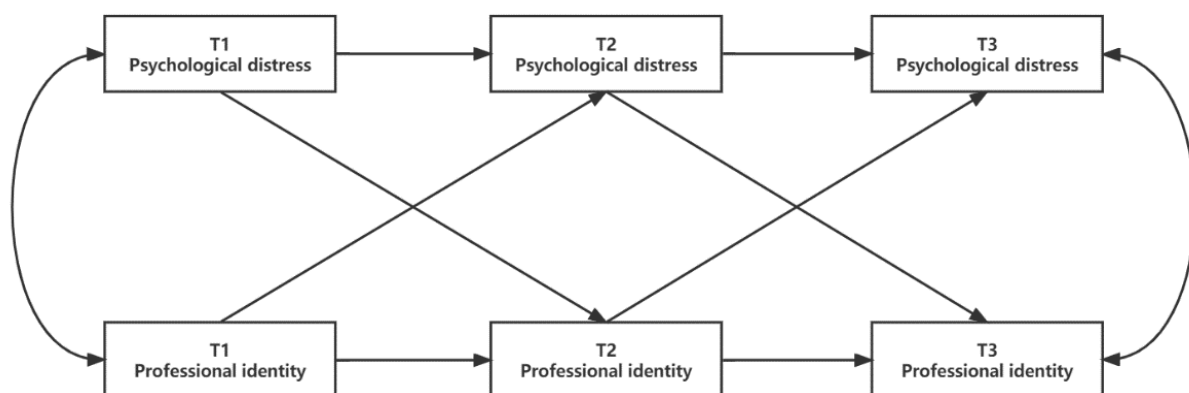
Professional identity refers to an individual's attitudes, values, knowledge, and views that are shared within a professional group (Cowin et al., 2013; Philippa et al., 2021) and can alleviate the negative effects of a high-stress work environment (Sun et al., 2016; Zhang et al., 2021) and improve an individual's clinical performance (Kotera & Matsuda, 2015). Nursing students with a higher professional identity exhibited the ability to work under stress during their clinical internships (Sun et al., 2016). The COVID-19 pandemic not only placed significant stress on nursing students but also provided them with an opportunity to reconstruct their professional identities (Nie et al., 2021). Previous studies have indicated that professional identity changes when a public health emergency occurs (Sun et al., 2007). Both positive and negative information related to nursing work during the COVID-19 pandemic may impact professional identity (Nie et al., 2021). Several cross-sectional studies found that nursing undergraduates reported increased professional identity during the COVID-19 crisis (Tang et al., 2022; Zhang et al., 2021). Nevertheless, to the best of our knowledge, no literature has explored how the professional identity of graduate nursing students changed during the different phases of the pandemic.

Evidence has shown that psychological distress and professional identity are correlated with each other (Wang et al., 2019). Some studies found that psychological stress and anxiety had a negative influence on professional identity among Chinese undergraduate nursing students during the COVID-19 quarantine period (Sun et al., 2020; Zhi et al., 2020), while other studies found that nurses' professional identity could negatively predict work-related anxiety, depression, and irritation (Wang & Zhang, 2017). Hence, it is possible that there is a bidirectional interrelationship between professional identity and psychological distress. However, the cross-sectional design of previous studies limited the ability to examine the causal association over time. Thus, clarifying the cause-effect relationship between psychological distress and professional identity across different phases of the COVID-19 pandemic may have important implications for understanding and improving graduate nursing students' mental health during and after this public emergency crisis.

Therefore, the aim of this study is to (1) describe the trajectory change of psychological distress and professional identity during the COVID-19 pandemic and (2) explore potential bidirectional associations between psychological distress and professional identity among a sample of graduate students using a longitudinal cross-lagged model (see Figure 1). We hypothesized that (1) both psychological distress and professional identity would increase with time; (2) psychological distress at T1 would negatively predict professional identity at T2, and vice versa; and (3) psychological distress at T2 would negatively predict professional identity at T3, and vice versa.

**Figure 1**

Hypothesized model for the bidirectional effects between psychological distress and professional identity.



Note: T1, Time 1; T2, Time 2; T3, Time 3.

## Methods

### Sampling and setting

This prospective observational survey was conducted in nine universities in China from January to May 2020. Sampling was a two-stage process. Based on the geographical distribution of universities, we first selected nine universities with Master of Nursing programs, and then we used convenience sampling to select eligible graduate nursing students from each university. The inclusion criteria for participants were as follows: (1) nursing students currently enrolled in a full-time master's programme in nursing; (2) staying in China during the COVID-19 pandemic; and (3) willing to participate. Potential participants were excluded if they were suffering from mental disorders before the outbreak.

### Procedures

The study was approved by the Ethics Committee of the university. The participants were asked to complete the electronic questionnaires via a network platform called "Questionnaire Star" one week after receiving the questionnaire link. Prior to completing the survey, participants had to provide online informed consent. All participants were told that they could withdraw from the study at any time. The first survey was conducted from January 8 to January 15, 2020 (T1) at the onset of the outbreak, the second survey was conducted from January 24 to January 29, 2020 (T2) at the nation-wide isolation phase when lockdown began in Wuhan, and the third survey was conducted from May 1 to May 7, 2020 (T3) at the school reopening phase. To prevent null values, participants could submit the questionnaire only when all the items were completed. Participants with the same phone number could only submit the questionnaire once in each research stage.

### Measures

- *Sociodemographic characteristics*: The sociodemographic characteristics included sex, age, residence region, race, family monthly income, marital status, school, and grade.
- *Psychological Questionnaires for Emergent Events of Public Health (PQEEPH)*: Designed by Yang et al. (2016), was employed to investigate psychological distress in response to the COVID-19 pandemic. It is a 25-item questionnaire that includes five dimensions: depression, neurasthenia, fear, confusion-anxiety, and hypochondria. Each item was rated on a 3-point scale ranging from 0 (occasionally) to 3 (always). Higher scores indicate worse mental health. The psychometric property of the PQEEPH has been well documented (Cronbach's  $\alpha = 0.93$ ) (Huang et al., 2021). The Cronbach's  $\alpha$  in the present study was 0.692, which met the minimum acceptable reliability of 0.65 to 0.70 (Devellis, 1991).

- *Professional Identity Questionnaire for Nurse Students (PIQNS)*: Designed by Hao (2011), was employed to measure professional identity. It is a 17-item questionnaire with five dimensions: professional self-concept, retention benefit, turnover risk, independence of career choice, social comparison and self-reflection, and social modelling. Each item was rated on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree), with a total score of 17 to 85. Higher scores indicate a higher level of professional identity. The Cronbach's  $\alpha$  in the present study was 0.827, which indicates good reliability (Devellis, 1991).

### Statistical analysis

IBM SPSS statistics, version 23.0 (IBM Corp., Armonk, NY, USA), was used to analyse the data. Descriptive statistics are presented as the mean  $\pm$  standard deviation or frequency (percentage). Pearson correlation was used to examine the correlations between psychological distress and professional identity. Repeated measures ANOVA was used to measure the trajectory of psychological distress and professional identity during COVID-19. The cross-lagged regression model was set up to test the causal relationship between psychological distress and professional identity in AMOS, version 26.0 (IBM Corp., Armonk, NY, USA). The maximum likelihood method was used for parameter estimation. The chi-square/degree of freedom ( $\chi^2/df$ ), root mean square error of approximation (RMSEA), goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), relative fit index (RFI), and Tucker Lewis index (TLI) were used to estimate the fit of the model. The model was proven to have a good fit if  $\chi^2/df < 3$ , RMSEA  $< 0.08$ , and GFI, AGFI, RFI, and TLI  $> 0.9$  (Hu & Bentler, 1999). A two-tailed  $p$  value of  $< .05$  indicated statistical significance.

## Results

### Demographics

Among the 567 graduate nursing students approached, 566 took part in the baseline survey, and all 566 students completed the follow-up surveys. The overall mean age of the participants was  $20.50 \pm 2.82$  years. Of the 556 responding participants, 94 (16.91%) were men, and 462 (83.09%) were women. The Han nationality, the largest ethnic group in China (National Bureau of Statistics of China, 2021), accounted for the majority of participants ( $n = 531$ , 95.50%). Approximately half of the participants were in their first year of the programme ( $n = 311$ , 55.94%) and had family monthly incomes of 2000–6000 RMB ( $n = 279$ , 50.18%). Detailed demographic characteristics of the participants are summarized in Table 1.

**Table 1**  
Demographic characteristics of the participants ( $n = 556$ )

Variable	$n$ (%) or ( $M \pm SD$ )
Age	20.50±2.82
Sex	
Male	94 (16.91)
Female	462 (83.09)
Nationality	
Han	531 (95.50)
Other	25 (4.50)
Family monthly income	
< 2000 RMB	119 (21.40)
2000-6000 RMB	279 (50.18)
6001-10000 RMB	116 (20.86)
>10000 RMB	42 (7.55)
Year of the programme	
First	311 (55.94)
Second	155 (27.88)
Third	90 (16.19)

**Table 2**  
Scores for psychological distress and professional identity at the three timepoints ( $n = 556$ )

Value	Time 1	Time 2	Time 3
<i>Psychological distress</i>			
Total	7.99±9.06	8.38±8.74	7.64±8.68
Depression	1.40±2.43	1.56±2.57	1.47±2.68
Neurasthenia	1.29±2.36	1.43±2.45	1.28±2.45
Fear	4.10±3.83	4.16±3.47	2.91±2.85
Obsessive anxiety	0.87±1.97	0.93±1.89	0.70±1.70
Hypochondria	0.34±0.79	0.31±0.73	0.19±0.67
<i>Professional identity</i>			
Total	56.68±12.42	57.98±12.20	59.29±12.39
Professional self-concept	19.65±5.49	20.30±5.35	20.84±5.49
Retention benefit and turnover risk	12.27±3.76	12.53±3.69	12.81±3.74
Social comparison and self-reflection	10.83±2.25	11.01±2.20	11.23±2.22
Independence of career choice	6.86±1.45	6.86±1.49	6.98±1.45
Social modelling	7.06±2.05	7.27±1.96	7.43±1.99

Professional identity changed significantly over the three phases,  $F(1.292, 717.221) = 114.792, p < .001$ , with partial  $\eta^2 = 0.171$ . Post hoc analysis with Bonferroni correction revealed that the professional identity score significantly increased from T1 to T2 (1.299 [95% CI, 0.953–1.644],  $p < .001$ ), from T2 to T3 (1.315 [95% CI, 1.002–1.627],  $p < .001$ ), and from T1 to T3 (2.613 [95% CI, 2.068–3.159],  $p < .001$ ). Figure 2 shows the psychological distress and professional identity trends over time.

### Relationship between psychological distress and professional identity

The Pearson correlation coefficients are presented in Table 3. There was no significant correlation between psychological distress at T1 and professional identity at any time point. Significant negative correlations were found between psychological distress and professional identity at T2 and T3 (T2 psychological distress-T2 professional identity, T3 psychological distress-T3 professional identity). Significant cor-

### Psychological distress and professional identity of graduate nursing students in three waves

The scores of psychological distress and professional identity in the three waves are presented in Table 2. Repeated measures ANOVA was conducted with time (T1, T2, and T3) as the within-group independent variable and the scores on mental health and professional identity as dependent variables. The level of psychological distress changed significantly over the three phases,  $F(1.534, 851.426) = 41.563, p < .001$ , with partial  $\eta^2 = 0.070$ . Post hoc analysis with Bonferroni correction revealed that the level of psychological distress significantly decreased from T2 to T3 (1.838 [95% CI, 1.470–2.207],  $p < .001$ ) and from T1 to T3 (1.446 [95% CI, 0.826–2.066],  $p < .001$ ), but psychological distress did not change significantly from T1 to T2 (0.392 [95% CI, -0.118–0.902],  $p = .197$ ).

relations were also found between participants' psychological distress and professional identity on different occasions (T2 psychological distress-T3 professional identity, T1 professional identity-T2 psychological distress, and T2 professional identity-T3 psychological distress).

### Cross-lagged analysis for psychological distress and professional identity

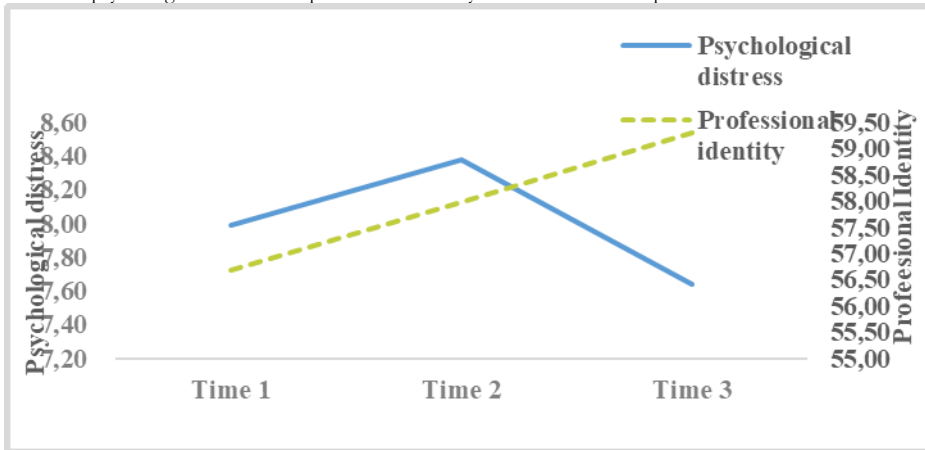
We examined whether the demographic variables would influence the base level of psychological distress and professional identity to determine the covariates. The results showed that sex ( $t = 2.010, p = .047$ ) and age ( $r = .102, p < .05$ ) could influence the base level of professional identity. Hence, after controlling for age and sex, longitudinal cross-lagged analyses were conducted to explore the causal relationships between psychological distress and professional identity by establishing the structural equation model shown in Figure 3. The measurement model showed an acceptable

fit to the data, with  $\chi^2/df = 2.502$ ; RMSEA = 0.052; GFI = 0.986; AGFI = 0.959; RFI = 0.986; and TLI = 0.991.

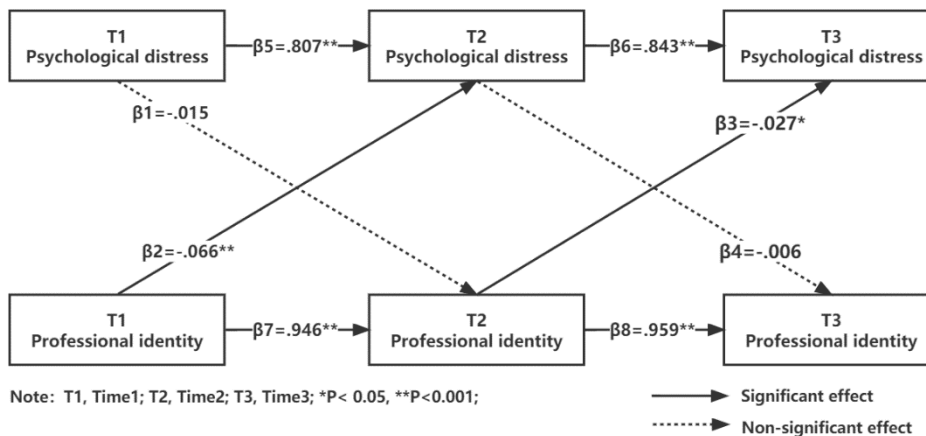
The path estimate revealed that the level of professional identity at T1 significantly and negatively predicted the level of mental health at T2 ( $\beta_2 = -0.326, p < .001$ ), and the level

of professional identity at T2 significantly and negatively predicted the level of mental health at T3 ( $\beta_3 = -0.027, p < .05$ ). However, the level of mental health at any phase did not significantly predict the level of professional identity.

**Figure 2**  
Trends of psychological distress and professional identity across the three timepoints



**Figure 3**  
Final model of the bidirectional effects between the main variables. Age and sex were controlled as covariates in the model.



## Discussion

Our study found that the psychological distress of graduate nursing students differed across different periods of the COVID-19 pandemic, increasing slightly from the onset of the outbreak phase to the state-wide isolation period and decreasing significantly at the school-reopening phase. The higher level of psychological distress of graduate nursing students during the outbreak phase and state-wide isolation phase was consistent with previous findings among the general population (Wang et al., 2020) and college students (Li et al., 2020). Ambiguous information about COVID-19, the increased number of COVID-19 patients, strict quarantine strategies (Pang et al., 2020), interruption of clinical

practice, and social panic (Xu & Sattar, 2020) increased anxiety and depression among graduate nursing students, but there was no significant difference between the onset of the outbreak phase and the state-wide isolation period, which might be partially due to the protective role of professional identity. However, this result should be viewed with caution given the short interval between these two phases. Unlike previous findings that college students showed increased rates of depressive and anxiety symptoms when the pandemic was under control (Li et al., 2021), a significant downwards trend was observed in our sample, which indicates that graduate nursing students may have been more resilient than other students. Future studies

should compare the difference in psychological response between nursing students and other college students.

In contrast to the previous finding that undergraduate nursing students showed little change or a decreased level of professional identity during the pandemic (Chen et al., 2021; Swift et al., 2020), the professional identity of graduate nursing students in this study showed a significant upwards trend throughout the COVID-19 pandemic. Since graduate nursing students hold more enthusiasm for nursing and pay more attention to the public's perception of nursing than nursing undergraduates (Sun et al., 2016), the extrinsic validation of professional worth and value is more important for the development of their professional identities (Philippa et al., 2021). Hence, the label of nurses as "heroes" by politicians, the mass media, and the general public (Mohammed et al., 2021) increased their commitment to the nursing profession, as did the example set by their clinical teachers and friends providing front-line care to COVID-19 patients; both positively reinforced their professional responsibility (DosSantos, 2020) and improved their satisfaction with their nursing careers.

The cross-lagged model found that professional identity at the beginning of the epidemic and the nationwide isolation phase negatively predicted students' psychological distress during the isolation phase and school-reopening phase. This result suggests that a higher professional identity might prevent students from experiencing psychological distress in a high-stress situation (Wang et al., 2019), which partially supports the statement that a low professional identity increases the consumption of psychological resources and aggravates stress and psychological maladjustment (Hao et al., 2020). Inconsistent with our hypothesis, psychological distress at any time point cannot predict professional identity in this study, suggesting that professional identity was a significant predictor of psychological distress, but not vice versa. Hence, interventions, such as role modelling (Felstead & Springett, 2016), resilience intervention (Yilmaz, 2017), and reflective writing about the COVID-19 experience (Byram et al., 2022), to continuously increase the professional identity of graduate nursing students might be useful in reducing the negative impact of the public health crisis on the mental health of graduate nursing students.

The main advantage of the study is that it longitudinally investigates the changes in psychological distress and professional identity of graduate nursing students during the COVID-19 pandemic and verifies the predictive role of professional identity on psychological distress by using cross lag research. However, this study has some limitations. First, the study sample was limited to Chinese graduate nursing students; thus, the generalization of our results to other coun-

tries or regions should be done with caution. Future studies should replicate the findings using internationally representative samples. Second, most of our participants were female students in their first year of the master's programme; as such, our findings may not adequately represent all graduate nursing students. Several studies have found that males and females might have different experiences of professional identity (Chen et al., 2020; Vaismoradi et al., 2011), and the different clinical experiences between senior and junior nursing students may also influence professional identity (Kinneer et al., 2021) and affect the trajectory of professional identity. Therefore, future studies should take sex and clinical experience into consideration. Third, the internal consistency of the PQEPPH in this study is not excellent; thus, another scale with better psychometric characteristics should be used in future studies. Fourth, the self-reporting methods employed to collect data may lead to information bias. Fifth, data collection occurred from January to May 2020, which precludes our understanding of how these processes may have manifested after the COVID-19 pandemic. Although psychological distress and professional identity changed significantly across time, the interval between the first and second phases was short, which may have limited our understanding of the trajectory changes in psychological distress and professional identity. Thus, more frequent measurements and longer durations between intervals would provide more information about the causal relationships between psychological distress and professional identity.

## Conclusion

This longitudinal study found that psychological distress increased from the onset of the COVID-19 outbreak to the nationwide isolation phase and gradually decreased in the school-reopening phase, while professional identity showed an upwards trend during the COVID-19 pandemic. Professional identity was a significant predictor of psychological distress, and those with higher levels of professional identity may be less susceptible to psychological distress. These findings broaden the cross-sectional results in earlier studies and fill part of the knowledge gap about the relationship between professional identity and mental health in graduate nursing students. Future intervention studies are warranted to verify this relationship further. This study showed a new perspective that cultivating the professional identity of graduate nursing students is vital in promoting mental health in the crisis of public emergencies. Therefore, nursing educators should pay attention to formulating related programmes to foster professional identity in nursing education as part of the preparation of future health professionals.



**Conflict of interest.**- The authors declare that they have no competing interests.

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