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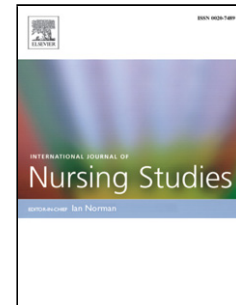
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Serial Multiple Mediation of Organizational Commitment and Job Burnout in the Relationship between Psychological Capital and Anxiety in Chinese Female Nurses: A cross-sectional questionnaire survey

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Abstract

Background: Nurses play an important role in medical and health services but anxiety among those in this profession is widespread. Anxiety not only damages the

physical and mental health of the individual, but also reduces the efficiency of their work and the quality of care, ultimately impacting on patient care. Therefore, it is necessary to elucidate the factors that lead to anxiety and explore measures to reduce the impact these factors have on nurses.

Objective: The purpose of this study was to investigate the serial-multiple mediation of psychological capital (PsyCap), organizational commitment, job burnout, and anxiety among Chinese female nurses.

Design: A cross-sectional stratified cluster sampling study.

Participants: The study consisted of 1354 Chinese female nurses from two tertiary grade A hospitals in Heilongjiang Province, China.

Methods: The Zung Self-Rating Anxiety Scale, the Chinese psychological capital questionnaire, the Chinese Maslach Burnout Inventory, and the Chinese Employee Organizational Commitment Questionnaire were used to gather data. Descriptive analysis, independent-samples T-test, one-way analysis of variance, Spearman correlation analyses, ordinary least-squares regression and the bootstrap method were used to analyze data.

Results: The prevalence rate of anxiety among nurses was found to be 41.1%, and there were significant differences in anxiety symptoms in age ($F = 15.54, p < 0.001$) and marital status ($F = 5.41, p < 0.001$), but not education ($F = 1.50, p = 0.224$) among nurses. Overall, the serial-multiple mediation of organizational commitment and job burnout in the relationship between PsyCap and anxiety was found to be statistically significant.

Conclusions: The results of the present study showed that positive PsyCap was sequentially associated with increased organizational commitment first, and then decreased job burnout, which was in turn related to reduced symptoms of anxiety among female nurses.

Keywords: Chinese female nurses, anxiety symptoms, psychological capital, job burnout, organizational commitment, serial-multiple mediation model.

1. Introduction

With the development of technology and changes in medical care, the requirements of the medical service have been steadily increasing. In particular, the role of nurses has increased as the medical community recognizes the importance of patient care. Nurses are commonly the main point of contact between patients and medical staff, and therefore need to have enthusiasm, patience, and diligence in the treatment of each patient. In many cases, this must be accomplished in high-pressure environments under severe workloads, resulting in huge psychological stress and increased likelihood of anxiety, depression and insomnia (Cheung and Yip, 2015, Eldevik et al., 2013, Song, 2013).

Anxiety is a common psychological condition(Cole, 2014). Onset can occur due to a variety of reasons, but is usually associated with stress-related either physical or mental challenges, or a combination of both. Anxiety is therefore an adaptive emotional response which has been shown to have protective functions(Cole, 2014). However, if the anxiety states become systematic, the response can be detrimental,

producing anxiety disorder (Association, 2013). In China, compared to other medical professions, nurses have been shown to be more prone to anxiety (Gao et al., 2012, Wei et al., 2009). A recent Chinese study examined the prevalence of anxiety in 7071 nurses from 460 hospitals and found that 39.12% of these nurses suffered from anxiety (Jiang, 2012). Furthermore, another cross-sectional study conducted in seven Chinese cities indicated that the prevalence of anxiety symptoms among Chinese nurses was 43.4% (Gao et al., 2012). Studies have also shown that Chinese nurses suffer more from anxiety than those from some other countries. In particular, the prevalence of anxiety symptoms among Chinese nurses was greater than those in Japan (7%) (Kawano, 2008), the U.S. (20%) (Kawano, 2008), and Singapore (21%) (Chan and Huak, 2004). Finally, the level of anxiety among Chinese nurses (44.48 ± 11.32) has also been shown to be prominently higher than the general population (33.8 ± 5.9) (Wei et al., 2009). The question arises: Why would Chinese nurses suffer so many symptoms of anxiety? The answers are complex. First, China is a country with a large population base, and the ratio of nurses to the general population is 1:1750, which is significantly lower than other developed countries where the ranges are from 1:140 to 1:320 (Wu et al., 2010). Chinese nurses tend to work overtime, experience long working hours, and have an enormous workload (Wang et al., 2012). In addition, the social status of Chinese nurses is relatively low and therefore there is a large imbalance in effort and reward (Gao et al., 2012). Furthermore, due to the huge population base and the low ratio of nurses to the general population, each nurse has to serve more patients compare with nurses in

other developed countries. Taken together, these facts suggest that Chinese nurses have more opportunity to confront diseases and death, which cause negative effects to their mental health(Li et al., 2016). Finally, in China, the relationship between medical staff and patients is very intense, with violent incidents between medical staff and patients increasing 11% each year since 2000(Yao et al., 2014). The occurrence of these violent incidences has become one of the origins of anxiety amongst Chinese nurses. This increased anxiety among medical staff, as well as nurses, not only damages their physical and mental health, but also reduces the efficiency of their work and the quality of care, thus negatively impacting on patient care. As nurses play an important role in medical and health services it is necessary to elucidate the factors that lead to anxiety and explore measures to reduce the impact these factors have on nurses.

In 2000 Seligman began advocating positive psychology and encouraged the study of human development and positive emotional qualities (Seligman and Csikszentmihalyi, 2014). Likewise, Luthans advanced the concept of psychological capital (PsyCap) in the field of positive organizational behavior and positive psychology (Luthans et al., 2004). Here, we draw from the perspective of positive psychology and positive organizational behavior to investigate protection factors that could reduce anxiety symptoms in a cohort of nurses. PsyCap is defined as “a kind of positive psychological state of individuals”, and contains four core parts; self-efficacy, hope, optimism, and resiliency(Luthans et al., 2004, Luthans and Youssef, 2004). Self-efficacy refers to the state of the individual in the face of challenging work where

confidence is associated with a successful outcome; hope is characterized by a positive motivational state that helps an individual achieve the intended goals through various means; resiliency is defined as the positive psychological capacity to recover quickly from failure, conflict or distress; and optimism is defined as a positive attitude towards the present and future and acknowledging positive events (Luthans et al., 2007). PsyCap can be measured and developed, and therefore can lay the foundation for the better application of PsyCap in practice. Several studies have already determined that PsyCap has positive effects on negative emotions such as depression and anxiety (Aliyev and Karakus, 2015, Song, 2014, Tian et al., 2012, Wang et al., 2012).

Recently, the mechanism of how PsyCap affects outcome variables has become of great interest to researchers. Luthans et al. and other scholars have put forward several models: the main effect model, whereby the PsyCap has a direct gain function towards individuals, groups, and organizations in relation to their outcome variables (Cole et al., 2009, Luthans et al., 2005); and the buffering and moderate effect models, both of which indicate that the PsyCap may indirectly affect the outcome variables instead of directly effecting them. Wang and colleagues proposed the dynamic effect model, in which the processes of PsyCap affect the outcome variables, and therefore both the main and buffering effects can co-exist (Yanfei Wang and Zhu., 2007). As expected, the relationship between PsyCap and related outcome variables is most likely a complex relationship (Cole, 2006). Although the protective effect of PsyCap on anxiety symptoms has been tested (Liu et al., 2013), few studies

have emphasized the potential mechanism underlying the relationship between PsyCap and anxiety, and thus the mechanism remains unclear. Therefore, in agreement with the dynamic effect model, we propose that PsyCap not only directly affects anxiety symptoms among nurses, but also indirectly impacts these symptoms.

PsyCap is reported to be a positive resource for improving organizational commitment, employee happiness and mental health(Laschinger and Grau, 2012, Lifeng, 2007). Organizational commitment refers to the individual's psychological attachment to the organization. Organizational commitment has been defined as "a psychological state that describes the relationship between employees and the organization and can influence the decision of employees to continue or discontinue membership in the organization"(Sheldon, 1971). Allen and Meyer initiated research whereby they concluded that organizational commitment can be divided into three dimensions: continuance commitment, affective commitment and normative commitment(Meyer and Allen, 1991). In China, research into organizational commitment is relatively recent. Using the above dimensions, Ling et al. systematically researched organizational commitment, and produced five models of the Chinese workforce based on organizational commitment, including ideal commitment, affective commitment, economic commitment, normative commitment, and opportunity commitment(Ling and Zhang, 2000). In addition, Zhu showed that a high level of organizational commitment was correlated with positive psychological health(Zhu, 2008). Interestingly, Daniel et al. indicated that negative emotions such as anxiety were correlated with continuous commitment(Pasquier and Valéau, 2011).

Overall, a large number of studies have proven that PsyCap is a predictor of organizational commitment(Lifeng, 2007, Luthans and Jensen, 2005) and that PsyCap affects working performance, a sense of happiness and job burnout via mediation of organizational commitment(Peng et al., 2013). Therefore, in the current study, we hypothesize that organizational commitment might be the potential mediating variable between PsyCap and anxiety.

Nursing has been characterized as a high-risk, high-pressure profession with a high intensity of labor, as a consequence it is an occupation with an increased risk of burnout syndrome(Peng et al., 2013, Wang et al., 2012). In 1974, the American psychologist Freudenberg first proposed the term “job burnout”, which was a special type of work-related psychological stress(Freudenberg, 1974). According to Maslach’s model, burnout is characterized by three key dimensions: emotional exhaustion, cynicism or depersonalization, and reduced professional efficacy(Maslach et al., 2001). For nurses, prolonged burnout not only harms their own mental and physical health, but also reduces their work enthusiasm and quality, which can lead to medical malpractice(Dasgupta, 2012). Recent research examined how job burnout significantly influenced anxiety and it also was shown to predict the onset of anxiety (Lei Ni et al., 2012, Zhou et al., 2016). Other research studied the relationship of PsyCap and burnout, with results suggesting that PsyCap could negatively affect job burnout(Laschinger and Grau, 2012, Wang et al., 2012, Wang et al., 2012); while another indicated that job burnout mediated the effects of occupational stress on anxiety symptoms(Ding et al., 2014). Therefore, we first hypothesize that job burnout

may mediate the relationship between PsyCap and anxiety. Interestingly, PsyCap was shown to have a positive impact on organizational commitment(Lifeng, 2007); organizational commitment was in turn found to have a negative impact on job burnout(Wright and Hobfoll, 2004). Peng et al also indicated that PsyCap affected job burnout via mediation of organizational commitment(Peng et al., 2013). With these finding in mind, we also hypothesize that positive PsyCap is sequentially associated with increased organizational commitment first and then decreased job burnout, which is in turn related to a reduction in anxiety.

Although the positive impact of PsyCap on anxiety symptoms has already been examined, the mechanisms underlying the association between PsyCap and anxiety has yet to be elucidated. Furthermore, we believe that in order to fully understand these mechanisms, it is crucial to determine the roles organizational commitment and job burnout have on anxiety symptoms.

To this end the present study aimed to determine the prevalence of anxiety symptoms in Chinese female nurses and evaluated a serial-multiple mediation model among PsyCap, organizational commitment, burnout and anxiety. As most of the nurses in China are females, only Chinese female nurses were recruited for the current study. Additionally, in this way, the effect of gender on anxiety was also removed. Furthermore, based on the dynamic effect model and results from previous work, the present study aimed to test the following hypothesis: that PsyCap would have an indirect effect on anxiety among nurses through the serial multiple mediation effect of organizational commitment and job burnout. Determining how PsyCap in nurses

impacts symptoms of anxiety that are mediated by organizational commitment and burnout may be important for preventative mental health-based research and subsequent relevant interventions for nurses in order to reduce the negative effects of anxiety. To our knowledge, this is the first study examining the mechanisms underlying the complex relationship between PsyCap and anxiety.

2. Methods

2.1 Study design and participants

This cross-sectional survey was conducted in Daqing, Heilongjiang Province, China. There were five comprehensive hospitals of tertiary grade A (> 500 beds) in Daqing subsequently labeled 1 to 5, two of which were randomly selected for the study via a random number table. Cluster sampling procedures were used to recruit participants from the two randomly selected hospitals and a total of 1410 female nurses were recruited for the present study. Questionnaires were distributed to each of the participants and a total of 1354 effective responses (effective response rate: 96.0%) were obtained.

2.2 Ethics statement

The present study was approved by the Ethics Committee of Harbin Medical University. The attributes, benefits, uses, and disadvantageous effects of the study were explained to all participants and informed consent was also obtained.

2.3 Measurement of anxiety symptoms

Anxiety related symptoms of female nurses were measured using the Zung Self-Rating Anxiety Scale (SAS) (Zung, 1971). The SAS includes 20 items and each

item is scored on a four-point Likert scale(1, not at all or rarely; to 4, most of the time). The raw score of the scale ranged from 20 to 80. In order to generate the index score, the raw score was multiplied by 1.25 and only the integer part was kept. The index score ranged from 25 to 100 with higher index scores on the SAS reflecting increasing levels of anxiety. According to the Chinese criteria(Wang, 1984), this study defined anxiety symptoms as a total index score ≥ 50 . The Chinese version of the SAS has previously been shown to have good reliability (the Cronbach's alpha was 0.85) (Wang, 1984) and has been widely used among the Chinese population. In present study, Cronbach's α coefficients for the scale was 0.860.

2.4 Measurement of psychological capital

The psychological capital questionnaire (PCQ-24), developed by Luthans et al. was used to measure the PsyCap of female nurses(Luthans et al., 2007). The PCQ-24 consists of a 24-item self-reported scale that includes four dimensions with each dimension consisting of six items. The four dimensions included: self-efficacy, optimism, resiliency, and hope. Each item was rated from 1 (strongly disagree) to 6 (strongly agree). The scale score was calculated using the sum of all items with high scores indicating a higher level of PsyCap. According to the literature, the sum of all items can be regarded as the results of PsyCap and total score has been used to measure PsyCap(Estiri et al., 2016, Koller and Hicks, 2016, Liu et al., 2013, Rahimnia et al., 2013, Shen et al., 2014). The PCQ-24 is suitable for Chinese nurses and has been shown to have good validity and reliability(Luo and Hao, 2010). In present study, the Cronbach's alpha coefficient for the total scale was 0.924.

Additionally, confirmatory factor analysis (CFA) on four factors model was conducted to support the validity of the PCQ-24 among Chinese nurses ($\chi^2 /df = 9.626$, CFI = 0.900, GFI = 0.862, TLI = 0.888 and RMSEA = 0.080).

2.5 Measurement of organization commitment

The 25-item Chinese Employee Organizational Commitment Questionnaire (OCQ for Chinese), as developed by Chinese scholar, Ling et al.(Zhang et al., 2001), was designed specifically for Chinese employees. The questionnaire was used to measure the organization commitment of female nurses. The questionnaire includes five dimensions; affective commitment, normative commitment, ideal commitment, economic commitment and opportunity commitment. Each dimension consists of five items, and each item is scored on a five-point scale (1, from strongly disagree; to 5, strongly agree). The scale score was the sum of all items and total scores ranged from 25 to 125; a high scale score indicated a high level of organizational commitment (Pan et al., 2012). The questionnaire has high reliability and validity (Cronbach's alpha = 0.88)(Pan et al., 2012), which indicated that all items on the test measured the same construct or trait(Zheng, 2005). The total score thus reflected the level of organizational commitment. This scale is widely used in China and the total score has previously been used to measure the organizational commitment of Chinese employees(Bai et al., 2011, Pan et al., 2012, Peng et al., 2013, Tang et al., 2016, Yang et al., 2017). The Cronbach's alpha coefficient for the scale was 0.890 in present study. In addition, CFA on the five factor model was conducted to support the validity of the OCQ among Chinese nurses ($\chi^2/df = 7.268$, CFI = 0.906, GFI = 0.886, TLI = 0.894

and RMSEA = 0.068).

2.6 Measurement of job burnout

The 15-item Chinese Maslach Burnout Inventory (CMBI), revised by Li et al. (Li et al., 2005) was used to measure job burnout. The CMBI consists of three dimensions; emotional exhaustion, depersonalization and reduced personal accomplishment. Each item was scored from 1 (never) to 7 (every day). The cut-off values for the three dimensions were > 25, 11, and 16, respectively. All items of reduced personal accomplishment were reversely coded. According to the scores of the three dimensions, job burnout was divided into four levels (Yongxin and Yimin, 2006): no burnout (scores of all three dimensions were below the cut-off values); slight burnout (scores of any one of the three dimensions were higher than or equal the cut-off values); moderate burnout (scores of any two of the three dimensions were higher than or equal to the cut-off values); and severe burnout (scores of all three dimensions were higher than or equal to cut-off). In this study, the four levels of burnout ('0 = no burnout,' '1 = mild burnout,' '2 = moderate burnout,' and '3 = severe burnout') were considered to be the mediating variable. The CMBI has previously been shown to be suitable for the Chinese population and also has an excellent internal consistency (Cronbach's alpha = 0.816) (Hao C, 2012, Li and Li, 2007). In present study, the Cronbach's alpha coefficient for the scale was 0.816. The three factors model showed an acceptable result for the data of this study ($\chi^2/df = 5.737$, CFI = 0.917, GFI = 0.950, TLI = 0.899, and RMSEA = 0.059).

2.7 Demographic characteristics

Data regarding age (≤ 30 years, 31–40 years, and ≥ 41 years), marital status (single, married/cohabitation, or divorced/separated/widow) and education level (technical secondary school, junior college, or college or above) were obtained from each participant. In the current study, the effective responses from 1354 female nurses were obtained.

In addition, the PsyCap was considered to be an independent variable, while anxiety was considered to be dependent variable. The mediating variables were organizational commitment and job burnout level.

2.8 Statistical analyses

Descriptive analysis, independent-samples T-test and one-way analysis of variance (ANOVA) were used to describe and compare the demographic data (age, marital status, and education) and the distribution of anxiety symptoms. Spearman correlation analyses of the four variables (anxiety symptoms, PsyCap, organizational commitment and job burnout) were performed using SPSS version 19.0. To test the significance of the multiple-mediator model in this study, we adopted the model 6 of PROCESS macro for SPSS provided by Hayes(Hayes, 2013). This approach was based on ordinary least-squares regression and the bootstrap method. Compared with the causal steps approach(Baron and Kenny, 1986) or the Sobel test(Sobel, 1982), Hayes considered bootstrapping as the most powerful approach of assessment of indirect effects, as it was free from assumptions regarding the shape of the sampling distribution of the indirect effect and also had better control on type I errors. Hayes recommended 10,000 bootstrap bias-corrected 95% confidence intervals (BC CI) to

be used for mediation analyses in the test from the Serial-Multiple Mediation Model 6, and if they did not contain zero, they were considered significant (Hayes, 2013). PROCESS macro was performed using one independent variable (PsyCap), two mediators (organizational commitment and job burnout), and one dependent variable (anxiety symptoms). The core hypothesis model we tested was how PsyCap influences anxiety symptoms via organizational commitment and burnout. Furthermore, in adherence with Mathieu and Taylor's guidelines (Mathieu and Taylor, 2006), both the direct and the total effect were tested. Finally, age, marital status and education were treated as covariates.

3. Results

3.1 Preliminary analyses

Descriptive analysis, independent-samples T-test and one-way ANOVA were used to describe and compare the demographic data (age, marital status, and education) and the distribution of anxiety symptoms are shown in Table 1. Data from 1354 female nurses were collected and the average age of the study population was 31.42 ± 7.69 years (mean \pm SD), while the mean index score and raw score for anxiety symptoms were 47.81 ± 12.66 and 38.25 ± 10.13 , respectively. The level of anxiety among Chinese nurses was significantly higher than the Chinese norm ($t = 30.78$, $p < 0.001$).

The prevalence of anxiety symptoms among Chinese female nurses was found to be 41.1%. One-way analysis of variance showed there were significant differences in anxiety symptoms related to age ($F = 15.54$, $p < 0.001$) and marital status ($F = 5.41$, p

= 0.005) but not in education ($F = 1.50$, $p = 0.224$) among nurses.

3.2 Preliminary correlation analyses

The means, standard deviations, ranges of values, and the correlations between the four variables are shown in Table 2. Results showed that anxiety symptoms were negatively related to PsyCap ($r = -0.415$, $p < 0.001$) and organizational commitment ($r = -0.193$, $p < 0.001$), and positively related to burnout ($r = 0.388$, $p < 0.001$). P values between the aforementioned variables were significant, and correlation coefficient indicated that the effect sizes between the variables were more than 0.1.

3.3 Mediation analyses

To determine the serial-multiple mediation of organizational commitment and job burnout in the relationship between PsyCap and anxiety symptoms, the bootstrap method was used. In this approach, the unstandardized path coefficients were calculated in order to reduce type 1 errors due to distribution (Hayes, 2013). The results of the mediation analysis are presented in Figure 1.

Total effect ($c = -0.286$, $SE = 0.020$, $t = -14.567$, $p < 0.001$) of PsyCap on anxiety symptoms was found to be significant (Step 1). In addition, PsyCap had a positive direct effect on organizational commitment ($B = 0.262$, $SE = 0.022$, $t = 11.757$, $p < 0.001$) and a negative direct effect on job burnout level ($B = -0.017$, $SE = 0.002$, $t = -11.665$, $p < 0.001$). The direct effect of organizational commitment as the first mediating variable on the second mediating variable of job burnout level ($B = -0.005$, $SE = 0.002$, $t = -2.862$, $p < 0.01$) was also found to be significant (Step 2). A

review of the direct effects of mediating variables on anxiety symptoms showed that the effects of organizational commitment ($B = -0.103$, $SE = 0.023$, $t = -4.459$, $p < 0.001$) and job burnout level ($B = 3.618$, $SE = 0.362$, $t = 9.995$, $p < 0.001$) were significant (Step 3). When PsyCap and the two mediating variables were simultaneously entered into the model (Step 4), the direct effect of PsyCap on anxiety symptoms was also found to be significant ($c' = -0.192$, $SE = 0.021$, $t = -9.271$, $p < 0.001$). Overall, these results revealed that serial-multiple mediation had occurred. The comparison of indirect effects and specific effects of female nurses' PsyCap on anxiety symptoms through organizational commitment and burnout level are shown in Table 3.

As seen in Table 3, when taking into account all variables (including covariates) in the tested model, the path through single mediation of organizational commitment (point estimate = -0.0269 ; 95% BC CI [-0.0428 , -0.0114]), the path through both mediators (point estimate = -0.0047 ; 95% BC CI [-0.0085 , -0.0014]), and the path through single mediation of burnout level (point estimate = -0.0627 ; 95% BC CI [-0.0814 , -0.0468]) were all statistically significant. The total indirect effect was also statistically significant (point estimate = -0.0943 ; 95% BC CI [-0.1194 , -0.0711]). Thus, the path through both mediators was significant, moreover the indirect effect through both organizational commitment alone and burnout level alone were also significant.

In the present study, to decide whether specific indirect effects of mediators were stronger than others, contrasting findings were indicated, and three pairs of

contrasting findings were found. In addition, as shown in Table 3, the three statistically significant contrasts were not inside the zero-point estimate based on the 95% BC CI. Based on the contrasting pairs of specific direct effects, the path through single mediation by job burnout level was observed to have stronger mediating power than the path through serial-multiple mediation. Moreover, the serial-multiple mediation of organizational commitment and burnout level was observed to have a stronger mediation than the path through single mediation by organizational commitment.

4. Discussion

In this study, we revealed the prevalence of anxiety symptoms among female nurses in a region of China. Furthermore, we explored a model of the association between PsyCap, organizational commitment, job burnout and anxiety symptoms by testing a serial multiple mediation model using bootstrapping methods. The results of present study showed that the prevalence rate of anxiety symptoms in female nurses was 41.1%, which was considerably higher than the rates found in Japan (7%)(Kawano, 2008), and the US (20%)(Mealer et al., 2007). This rate was also considerably higher than anxiety rates reported in the general Chinese population (5.6%)(Phillips et al., 2009). The result suggested that female Chinese nurses were more prone to anxiety and thus appropriate psychological intervention is needed. Here, we sought to examine the mechanisms that could potentially explain how PsyCap impacted on anxiety symptoms among female nurses.

First, results suggested that there was a strong negative correlation between

PsyCap and anxiety symptoms in Chinese female nurses, which was in agreement with previous research(Liu et al., 2013). Several studies had confirmed that PsyCap was a negative predictor of anxiety and depression among nurses and physicians(Liu et al., 2012, Liu et al., 2013, Wang et al., 2012). PsyCap was known to be a positive mental state that manifests itself during the process of an individual's development and growth. Individuals with high levels of PsyCap were more likely to confront problems from a positive standpoint and are also more likely to recover more rapidly from frustrating circumstances compared to individuals with low PsyCap. Indeed, in the current study, nurses with high levels PsyCap were less likely to develop anxiety. As PsyCap could be utilized to measure and develop job performance(Ding et al., 2015), more attention is warranted towards PsyCap as a remedy for anxiety symptoms among Chinese female nurses.

In the current study, from the perspective of positive psychology, and testing a serial-multiple mediation model using bootstrapping methods, we sought to reveal the potential mechanism of the relationship between PsyCap and anxiety among nurses. The results of our study also verified the dynamic effect model, which was proposed by Wang(Yanfei Wang and Zhu., 2007). Based on the results from the serial-multiple mediation model and the contrasting pairs of specific indirect effects examined, we found PsyCap not only had a direct effect on anxiety in female nurses, but it also had an indirect influence on anxiety, via mediation by organizational commitment and burnout. There are three crucial pathways through which the mediation model of PsyCap impacts on anxiety symptoms: (1) organizational commitment partly

mediated the relationships between PsyCap and anxiety; (2) job burnout partly mediated the relationships between PsyCap and anxiety; (3) the serial-multiple mediation of organizational commitment and job burnout in the relationship between PsyCap and anxiety was found to be statistically significant. The separate mediation of single mediating variables was statistically significant in the relationship between PsyCap and anxiety symptoms among Chinese female nurses. One of the mediating variable examined was organizational commitment. Results indicated that nurses who had a high level of PsyCap were more likely to have a high level of organizational commitment, which in turn led lower symptoms of anxiety. Based on the studies from Luthans et al.(Luthans et al., 2008) and Avey et al.(Avey et al., 2009), higher levels of PsyCap resulted in more satisfied and committed work practices. Moreover, Jain and colleagues confirmed that organizational commitment could control the negative effect of organizational stress on the employees' health and psychological well-being(Jain et al., 2013). The other mediating variable examined was job burnout. Results indicated that nurses who had a high level of PsyCap were more likely to have a low level of job burnout, which in turn led to a reduction in anxiety. This finding was similar to previous research, which suggested that the relationship between PsyCap and mental health among nurses was mediated by job burnout(Estiri et al., 2016). These results suggested that increasing PsyCap of nurses, enhancing their organizational commitment and reducing their job burnout were possible intervention points to reduce anxiety symptoms.

In particular, to determine the potential mechanism between PsyCap and anxiety

symptoms, we tested a serial-multiple mediator model among PsyCap, organizational commitment, job burnout, and anxiety symptoms in female nurses. The results of the present study demonstrated that positive PsyCap was sequentially associated with increased organizational commitment first and then decreased job burnout, which was in turn related to a reduction in anxiety. A large number of studies have shown that PsyCap has a positive impact on organizational commitment(Luthans and Jensen, 2005). Moreover, according to a study by Zhang examining other health care professions, organizational commitment had a negative correlation with job burnout, and was therefore deemed a protective factor against job burnout(Zhang, 2013). Individuals with higher organizational commitment might work with greater efficiency and are therefore more satisfied. Furthermore, people with higher organizational commitment could have a stronger willingness to continue working in their organization compared with those with lower levels of commitment. Ultimately, this also led to a reduction in job burnout. Finally, job burnout was positively related to anxiety symptoms(Ding et al., 2014) and nurses who had lower levels of job burnout tended to be less prone to anxiety.

Although comprehensive, the current study had several limitations. First, the nurses were randomly recruited from the only tertiary grade A comprehensive hospitals in Heilongjiang Province and future research should include nurses from other types of hospitals. Second, given that the current study was a cross-sectional design, we were not able to establish a causal model explaining the above-mentioned relationships, and therefore certain results should be interpreted with caution. Future

work incorporating longitudinal or experimental models should be conducted to confirm the conclusions of the present study. Third, we only explored relationships among PsyCap, organizational commitment, job burnout and anxiety, and examined differences in basic demographic variables. Other factors that may have an effect on anxiety symptoms among female nurses should be investigated (e.g. life events, night shifts, job satisfaction, coping style and so on) and correlations among the four variables in the marital status and age groups should be investigated. Finally, the current study used self-reported measures and therefore response biases were unavoidable. Regardless of these limitations, this study provides new insight into the relationship between PsyCap and anxiety using a theoretical exploratory approach.

4.1 Implications for practice

Our study further verified that the prevalence of anxiety among Chinese female nurses was significantly higher than the general population(Phillips et al., 2009). As nurses play an important role in medical and health services, it is necessary to elucidate the factors that lead to anxiety and explore measures to reduce anxiety of nurses. The major contribution of our findings is to highlight that PsyCap not only have a direct effect on anxiety in female nurses, but also have indirect influence on anxiety via a mediating mechanism of organizational commitment and job burnout. The mediation effect contained three paths: the separate mediations and the serial mediation effect of organizational commitment and job burnout. The findings of this study have important implications for the serial multiple mediation effect model of influencing factors of nurses' anxiety, as well as for the intervention and prevention of

anxiety within this profession. Our findings suggest that hospital administrators should pay more attention to improving PsyCap and organizational commitment levels and to reducing burnout level among nurses, in order to reduce their anxiety. We propose several ways to do this: introduce regular training programs (e.g. PsyCap short training interventions) to improve the PsyCap of nurses(Avey et al., 2009); establish a fair performance appraisal system, provide more educational opportunities and provide more encouragement and care to improve the organizational commitments of nurses(Hu and Shi, 2004); ensure the balance between efforts and rewards, reduce working hours, and guarantee a more secure working environment(Chou et al., 2014) to diminish the negative effects of job burnout on anxiety.

5. Conclusions

The present study was the first to explore the relationship between PsyCap and anxiety symptoms among Chinese female nurses using a serial-multiple mediation model, with results indicating the prevalence of anxiety symptoms among Chinese female nurses to be 41.1%. Finally, the results of the present study showed that positive PsyCap was sequentially associated with increased organizational commitment first and then decreased job burnout, which was in turn related to reduced anxiety symptoms.

Author Contributions

Conceived and designed the experiments: Jiawei Zhou, Yanjie Yang and Zhengxue Qiao. Performed the experiments: Xiaohui Qiu, Xiuxian Yang, Hui Pan and Bo Ban. Data Analyses: Wenbo Wang and Jiawei Zhou. Contributed: reagents/materials/analysis tools: Zhengxue Qiao and Lin Wang. Wrote the paper: Jiawei Zhou and Yanjie Yang. All authors reviewed the manuscript.

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Competing interests

This paper has not been published elsewhere in whole or in part. There are no conflicts of interest involved in the present study.

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What is already known about the topic?

1. Under the environment of high pressure, high workload and high demand Chinese nurses suffer huge psychological stress, which would make it easier for them to get

psychological problems such as anxiety and the prevalence of anxiety symptoms among nurses may be higher.

2. The positive impact of psychological capital on anxiety symptoms has already been examined.

3. It is necessary to find out the affect factors of nurses' anxiety symptoms so that the measures of reducing anxiety symptoms among nurses can be explored.

What this paper adds?

1. In light of the dynamic effect model we made the hypothesis that psychological capital not only had a direct impact on anxiety symptoms among nurses, but also had an indirect impact on anxiety symptoms.

2. The mechanism underlying the association between psychological capital and anxiety has not been investigated yet. To fill this gap and to investigate the mechanism between psychological capital and anxiety symptoms among nurses, it is crucial to understand the roles of organizational commitment and job burnout in this relationship.

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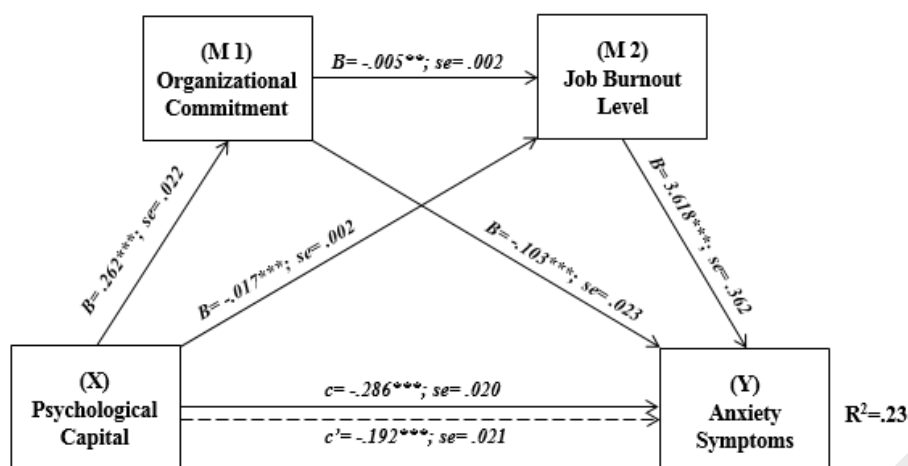


Figure 1. Serial-multiple mediation of organizational commitment and job burnout level in the relationship between PsyCap and anxiety symptoms with non-standardized beta values and standard error. Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 1. Descriptive statistics and the distribution of anxiety symptoms.

Category	Subcategory	N(%)	Anxiety symptoms mean (SD)
Age (yr)	≤30	701(51.77%)	49.20(12.42)
	31–40	457(33.75%)	47.49(13.11)
	>40	196(14.48%)	43.60(12.66)
F		15.54	
p		< 0.001	
Marital status	single	478(35.30%)	49.34(12.52)
	married/cohabitation	816(60.27%)	47.00(12.71)
	divorced/separated/widow	60(4.43%)	46.65(12.21)
F		5.41	
p		0.005	
Education	technical secondary school	93(6.87%)	46.71(11.69)
	junior college	562(41.51%)	48.49(12.41)
	college or above	699(51.62%)	47.42(12.97)
F		1.50	
p		0.224	

Table 2. Correlations between anxiety symptoms, PsyCap, organizational commitment, and job burnout.

Variables	1	2	3	4
1. Anxiety symptoms	1.000			
2. PsyCap	-.415***	1.00		
3. Organizational commitment	-.193***	.344***	1.000	
4. Job burnout Level	.388**	-.346***	-.160***	1.000
Mean	47.81	102.25	78.49	1.14
Standard deviation	12.66	16.28	14.06	0.89

Note: *p <0.05, **p <0.01, ***p <0.001.

Table 3. Comparison of indirect effects of PsyCap on anxiety symptoms mediated by organizational commitment and burnout.

Effect	Product of Coefficients		Bootstrapping 95% BC Confidence Interval(CI)	
	Point Estimate	Boot SE	BootLL CI	BootUL CI
Total indirect effect of X on Y	-0.0943	0.0124	-0.1197	-0.0709
Indirect effect 1: X→M1→Y	-0.0269	0.0081	-0.0433	-0.0111
Indirect effect 2: X→M1→M2→Y	-0.0047	0.0018	-0.0084	-0.0014
Indirect effect 3: X→M2→Y	-0.0627	0.0088	-0.0815	-0.0469
Contrasts				
Model 1 versus Model 2	-0.0222	0.0080	-0.0382	-0.0067
Model 1 versus Model 3	0.0358	0.0117	0.0132	0.0585
Model 2 versus Model 3	0.0580	0.0090	0.0417	0.0773

Note: N = 1354. Number of bootstrap samples for bias corrected bootstrap confidence intervals: 10,000. Level of confidence for all confidence intervals: 95%. X = PsyCap, M1 = organizational commitment, M2 = job burnout level, Y = anxiety symptoms. Model 1 = PsyCap – organizational commitment – anxiety symptoms; Model 2 = PsyCap – organizational commitment – job burnout level – anxiety symptoms; Model 3 = PsyCap – job burnout level – anxiety symptoms.