Self-reported chronic non-specific pain prevalence among nursing students in Chongqing, China: A cross-sectional study

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Introduction. To investigate the prevalence of chronic non-specific pain among nursing students in Chongqing, China, identify factors associated with chronic non-specific pain, and to provided evidence for the early prevention and management of it among nursing students.

Methods. There were 1752 full-time college nursing students in Chongqing enrolled in this cross-sectional study during August 2023. An anonymous questionnaire was used for data collection. Besides, Independent sample t test, non-parametric rank sum test, Chi-square test, binary logistic regression analysis, etc. were used in data analysis.

Results. The prevalence of chronic non-specific pain among nursing students was 45.5%, about 44.0% nursing students self-reported chronic nonspecific low back pain, followed by neck (25.5%) and shoulder (22.0%). The overall pain degree of nursing students was low. The average NRS (numeric rating scale) score of pain within 24h was (2.69±1.71) and the most common nature of pain was sore pain (61.1%). It was often aggravated by activity (23.6%), sitting (23.1%), weight bearing (21.4%) and bending (18.2%), and relieved by rest (48.2%) and lying flat (22.7%). Chronic non-specific pain still had certain effects on nursing students' daily life, and the greatest effects were on emotions (2.07±2.12) and sleep (1.81±2.18). Students who did not participate in sports ($p < 0.05$), received less help when they were in pain ($p < 0.05$), had fewer semester courses ($p < 0.05$), had less sleep ($p < 0.05$), spent more time on electronic devices ($p < 0.05$), used screen projection ($p < 0.05$), had larger BMI ($p < 0.05$), had experienced chronic non-specific pain previously ($p < 0.05$) and had a family history of chronic non-specific pain ($p < 0.05$) were significantly more prone to self-reported chronic non-specific pain. Conclusions. The prevalence of chronic non-specific pain is high

among nursing students in Chongqing. Nursing school authorities need to attend to this and offer relevant

courses that contribute to improving the related knowledge of nursing students. Nursing students are recommended to develop an awareness of chronic non-specific pain health hazards, increase physical exercise to control BMI, reduce electronic device/screen time, and devote more time to rest and sleep.

Keywords: Self-reported chronic non-specific pain; nursing students; questionnaire

INTRODUCTION

Pain is currently defined by the International Association for the Study of Pain (IASP) as "an unpleasant sensory and emotional experience associated with, or described in terms of, actual or potential tissue damage" [1]. Due to various factors such as lifestyles, working conditions, and social pressure, chronic non-specific pain has become a common condition in modern society [2, 3]. It refers to the disease course of more than 12 weeks, without danger signs (general discomfort such as fever, chest pain, night pain, resting pain, unexplained weight loss, etc.), or with danger signs but no clear cause of imaging and other examinations, no pathological changes caused by pain, discomfort, stiffness and limited movement of a part of the body (except for pain diagnosed by the hospital with a clear cause) [4]. According to 2019 statistics, the burden of chronic non-specific pain in women is 1.29 times more incident cases, 2.24 times more mortality rate, and 1.45 times more disability-adjusted life-years than in men [5]. Chronic non-specific pain is most commonly characterized by non-specific neck pain [6, 7], back pain [8, 9], and low back pain (LBP) [10, 11]. The Lancet Global Burden of Disease study has shown that chronic non-specific low back pain (CNLBP) is one of the leading causes of disability [12]. The global lifetime prevalence of CNLBP in adults is approximately 38.9% [13], and it is expected to increase in the future. As reported by previous studies, long duration and recurrent episodes of chronic non-specific pain can lead to chronic physical pain and dysfunction that severely affects patients ' quality of life, thereby leading to decreased productivity and increased use of healthcare resources, and ultimately affecting the social economy [14, 15].

There are numerous studies on chronic non-specific pain locally and in other countries, which involves various demographic groups such as children, adults, the elderly [16–19], students [20, 21] and nurses [22, 23]. Surveys have shown that the incidence of chronic non-specific pain in young people is increasing [24, 25]. In a Japanese survey, 36.9% of nursing students self-reported the presence of nonspecific

disorders in some parts of the body [26]. According to a questionnaire survey from a Swedish university,

64% of nursing students reported nonspecific symptoms in their bodies [27]. All of the above studies confirm the high prevalence of chronic non-specific pain among nursing students abroad, which not only possibly affect these students ' productivity in the future but also may influence economic development [28]. However, there were few studies on chronic non-specific pain among nursing students in China.

Other studies have reported a high prevalence of chronic non-specific pain among medical students, possibly owing to their severely demanding curricula in which they are exposed to stress, a sedentary lifestyle, and prolonged hours in hospital wards and clinics [21]. Nursing students in China also carry a heavy burden for their learning tasks. They have to undergo lengthy training in nursing skills and a clinical internship that lasts for about 1 year. During their practical training and clinical practice, they regularly need to stand, bow their heads, bend, and concentrate on their work for long periods, which may increase their risk of chronic non-specific pain. Studies have shown that nursing students have an elevated incidence of chronic non-specific pain, which can lead to an increase in negative emotions and weakened physical function, thereby affecting the clinical employment rate and quality of work of nursing students [29].

The causes of chronic non-specific pain are diverse and its mechanisms are complex. Briefly, chronic non-specific pain is affected by individual factors (gender, age, obesity, smoking, back and abdominal muscle strength, low education level), psychological factors (stress, anxiety, sadness, depression) [30, 31], and occupational factors (physical labor, frequent bending and twisting, single repetitive motion) [32]. In addition, one study confirmed the positive impact of pain education on work-related chronic non-specific pain through a comprehensive assessment [33].

The objectives of this study were to investigate the prevalence of chronic non-specific pain among nursing students in Chongqing, China, identify factors associated with chronic non-specific pain, and to provided evidence for the early prevention and management of it among nursing students.

MATERIALS AND METHODS

Study Participants

A convenience sampling and cross-sectional study was conducted in August 2023. Nursing students from five colleges (including Chongqing Three Gorges Medical College, Chongqing Nursing Vocational College,

Chongqing Medical and Pharmaceutical College, Nursing School of Chongqing Medical University,

Chongqing Health School) located in different districts and counties in Chongqing were selected as the research subjects for the questionnaire survey. This study was approved by the ethics committee of the First Affiliated Hospital of Chongqing Medical University (Approval No. 2023-246). The students who participated in this study were all full-time college nursing students. Questionnaires were made through the questionnaire star (https://www.wjx.cn/). Then, they were distributed to students in these schools who meet the inclusion criteria and completed voluntarily.

Screening Criteria

Inclusion criteria: 1) Full-time enrolled nursing students; 2) Obtain informed consent and volunteer to participate in the study. Exclusion criteria: nursing students 1) Menstrual pain in women; 2) has been diagnosed with specific pain; 3) suffering from serious diseases such as cardiovascular and cerebrovascular diseases and tumors; 4) Acute pain caused by various causes; 5) diagnosed by the hospital with a clear cause.

Questionnaire

Chronic non-specific pain was defined as pain or discomfort in the shoulder or neck or back or waist or other parts that occurred once or more in the past week, lasting more than 30 minutes, and at a degree of pain of 1 point or more (referred to numeric rating scale, NRS) [26]. Each student who meet the inclusion criteria and completed voluntarily was asked to fill out the anonymous questionnaire. The questionnaire consisted of questions on demographic characteristics (including gender, age, grade, height and weight), circumstances of chronic non-specific pain (location, quality, intensity, duration, predisposing and mitigating factors, control methods, and impact) and influencing factors (social support, number of courses, duration of sleeping and learning, time spent on electronic devices, postures, previous history, and family history). Use "always," "often," "sometimes," "occasionally," and "never," as a response of chronic non-specific pain.

2.4. Statistical analysis. SPSS26.0 software was used for statistical analysis. Measurement data were expressed as mean ±standard deviation. The measurement data were described by frequency and component ratio. Two groups of data were compared, and independent sample t test was used for the indicators that met normality, homogeneity of variance and independence. The paired T-test was performed on the data before and after the same intervention. t 'test or non-parametric rank sum test were used for data that did not meet the above conditions. Chi-square test was used for qualitative data, disordered categorical variables and

bicategorical variables, and rank sum test was used for rank data. Binary logistic regression analysis was

used for multivariate analysis, and dummy variables were treated for disordered categorical variables. The W test was used to test the normality of the data, and the Levene variance homogeneity test was used. The test level α was 0.05.

RESULTS

Prevalence of Self-reported Nonspecific Pain

A total of 1944 questionnaires were collected, 1752 of which were valid (an effective rate of 90.12%). The prevalence of chronic non-specific pain among nursing students was about 45.5%. There was no significant difference in gender between positive and negative groups of chronic non-specific pain ($p>0.05$), but there was significant difference in grade and age ($p < 0.05$) (Table 1). About 44.0% of the 797 nursing students self-reported chronic nonspecific low back pain CNLBP, followed by neck (25.5%) and shoulder (22.0%) (Table 2). The overall pain degree of nursing students was low. The NRS score of the most severe pain within 24h was (4.04±1.94), the average NRS score of pain within 24h was (2.69±1.71), and the current NRS score of pain was (3.25±1.52). The NRS score for the mildest pain within 24 hours was (3.25±1.52) (Table 3). The most common nature of pain was sore pain (61.1%), which was often aggravated by activity (23.6%), sitting (23.1%), weight bearing (21.4%) and bending (18.2%), and relieved by rest (48.2%) and prostration (22.7%) (Table 4). chronic non-specific pain still had certain effects on nursing students' daily life, emotions, walking ability, learning, interpersonal relationship, sleep and hobbies, but the greatest effects were on emotions (2.07±2.12) and sleep (1.81±2.18) (Table 5).

Influencing Factors of Self-reported Nonspecific Pain

Single factor influence analysis. Chronic non-specific pain was negatively correlated with the frequency of receiving help, the number of semester courses, the length of sleep per day and the number of physical exercise days per week. They were positively correlated with the length of daily use of electronic devices, the length of daily play of video games during holidays, screen learning, history and family history chronic non-specific pain, and BMI (Table 6).

Multi-factor Impact Analysis. The variables that have significant influence on nursing students' chronic non-specific pain in the single factor analysis were included in the multi-factor analysis model to test the

influence relationship. These variables are assigned before validation (Table 7). On the basis of single factor

analysis, binary logistic regression was used to further analyze the influence relationship. In the model, the dependent variable was chronic non-specific pain， and the independent variable was the significant factor in the univariate analysis. The results showed that the frequency of receiving help when nursing students had pain had a significant positive relationship with the occurrence of chronic non-specific pain (B=0.219, OR=1.244, p<0.05), indicating that the less help nursing students received when they had pain, the less help they received. The higher the probability of chronic non-specific pain; There was a significant negative relationship between the number of semester courses and the occurrence of chronic non-specific pain of nursing students (B=-0.100, OR=0.905, p<0.05), indicating that the fewer the number of semester courses, the higher the probability of chronic non-specific pain. There was a significant negative relationship between the daily sleep duration of nursing students and the occurrence of chronic non-specific pain (B=-0.317, OR=0.728, p<0.05), indicating that the longer the daily sleep duration of nursing students, the lower the probability of chronic non-specific pain. There was statistical significance in the probability of chronic non-specific pain among nursing students who used different learning tools. The probability of chronic non-specific pain among nursing students who used screen projection was 3.735 times that of those who used other tools (B=1.318, OR=3.735, p<0.05). There was a significant positive relationship between the duration of using electronic equipment and the occurrence of chronic non-specific pain of nursing students (B=0.093, OR=1.097, p<0.05), indicating that the longer the average time of using electronic equipment per day, the higher the probability of chronic non-specific pain. There was a significant negative relationship between the history of chronic non-specific pain and the occurrence of chronic non-specific pain in nursing students (B=-1.468, OR=0.230, p<0.05), indicating that the probability of nursing students who had not experienced chronic non-specific pain later developing it was only 0.234 times that of nursing students who had experienced it. BMI of nursing students had a significant positive relationship with the occurrence of chronic non-specific pain (B=0.528, OR=1.696, p<0.05), indicating that the higher the BMI of nursing students, the higher the probability of chronic non-specific pain (Table 8).

DISCUSSION

According to the results of our study, the prevalence of chronic non-specific pain among Chongqing nursing students was about 45.5%, which was consistent with similar studies conducted in South Korea (46.3%) [35].

However, the prevalence of chronic non-specific pain in our study was higher than that in studies conducted

in Japan (36.9%) [26] and Iran (30.2%) [36]. This discrepancy may be owing to that chronic pain or pain in specific body areas was specifically investigated in the other studies, whereas in our study, chronic or acute pain was not specified, and pain from any part of the body could be reported. The above results may suggest that pain perception or self-report differs across cultural groups, even in young adults. Pain is influenced by many factors, such as race, ethnicity, and culture, which are infrequently investigated [37].

The most frequently reported painful body areas in our study were the waist and back, and neck and shoulders, consistent with previous reports [38]. This may be related to the frequent and long-term use of electronic devices by nursing students. Indeed, previous studies have reported a significant positive correlation between the severity and duration of chronic non-specific pain with mobile phone use [39]. Our survey also showed that the longer time the nursing students spent on electronic devices every day, the more likely they were to self-report chronic non-specific pain. In particular, the prevalence of chronic non-specific pain for students who used the screen projection method was 3.735 times higher than those using other tools. Similarly, the longer the nursing students played video games during the holidays, the more likely they were to self-report chronic non-specific pain. In addition, we also found that nursing students reporting shorter sleep duration were more likely to suffer from chronic non-specific pain.

The prevalence of chronic non-specific pain in nursing students who slept less than 5 hours per day was 72.2%, which was considerably higher than that of those who slept for 8–9 hours (36.7%). This was also consistent with our results on factors associated with pain relief, that was, nursing students had the most effective pain relief through rest (like sitting down) and bed rest, with 48.2% experiencing pain relief from rest and 28.70% from bed rest.

In addition, chronic non-specific pain was not significantly affected by gender, learning time, learning postures and places in our study, which is inconsistent with reports from Australia [40] and India [41]. We usually assume that studying for too long a day, such as have a large number of courses, may increase the risk of assume, but no significant effect was found in this study, which may be related to the fact that longer study hours or more classes have the potential to reduce the relative time spent playing games and electronic devices. Besides, owing to methodological heterogeneity across studies, such as different sample sizes, methods of sampling, data extraction strategy and other methodologies, it is challenging to compare the

prevalence of assume between populations and over time.

This study shows that the probability of nursing students suffering from chronic non-specific pain increases with age and grade, which may be related to the chronic degenerative changes of individuals [38]. Some studies have shown that social support and help may affect an individual's pain. Indeed, the results of this study also showed that the prevalence of chronic non-specific pain (29.5%) in nursing students who regularly got help when they had pain was considerably lower than that who seldom received help (60.2%). Therefore, we appeal to colleges and universities, hospitals and parents to provide help for nursing students so as to assist in reducing the prevalence of chronic non-specific pain. In this study, we found that the percentage of nursing students with chronic non-specific pain decreased with the increase of exercise days per week, which is consistent with the results of previous studies [42]. The results showed that 53.2% (the highest proportion) of nursing students who did not participate in physical activity during a week had chronic non-specific pain. This may be related to the fact that exercise increases core muscle strength and controls BMI. The previous studies only mentioned that chronic non-specific pain might related to obesity [39], but few in-depth studies on the specific relationship between chronic non-specific pain and BMI. In this study, the incidence of chronic non-specific pain in underweight (BMI < 18.5) and normal (BMI 18.5~23.9) nursing students was much lower than that in overweight (BMI 24.0~27.9) and obese (BMI ≥28.0) nursing students ($p < 0.05$).

However, nursing students who participated in physical activities three times a week (42.9%) or every day (33.9%) were less likely to have chronic non-specific pain. Therefore, school authorities must set up physical education courses as part of the curriculum, and the physical education courses need to be held at least three times per week or once a day, to encourage students to exercise. At the same time, practical information about body mechanics and how to protect the body should also be taught.

Students who had previously experienced chronic non-specific pain were more likely to suffer from chronic non-specific pain than students who had not experienced it (77.6% *vs*. 38.4%). Nursing students with a family history of chronic non-specific pain (63.1%) was much higher self-report chronic non-specific pain than students that without (37.9%). Research by Song J [48] et al. and Ren Q et al. [49] have showed that pain experience may cause chronic pain patients to develop fear of pain, accompanied by emotional cognitive impairment, which may exacerbate pain perception and physical dysfunction. In the long term,

psycho-physiological interactions can lead to lower pain thresholds, creating a vicious cycle that worsens a

patient's overall health. Therefore, the treatment strategy should be a combination of psychological intervention and physical therapy to break this negative cycle and promote the recovery of patients. At the same time, Chiwaridzo M [50] et al. have proved that the pain experience of others also has a certain effect on people around them. For example, the pain of postoperative patients will bring fear to patients who will undergo the same operation in the same ward and enhance their pain sensitivity. Similarly, family members suffering from chronic non-specific pain may also have a certain negative emotional impact on nursing students, which increases their sensitivity to pain. In addition, previous studies have found that chronic non-specific pain is closely relevant to genetics [51 、 52]. Consequently, nursing students should learn and apply more methods and knowledge to protect themselves from chronic non-specific pain, as well as to reduce the probability of chronic non-specific pain inheritance. Besides, nursing students with a history of chronic non-specific pain or family history should pay more attention to avoid its recurrence.

There were several limitations in our study. 1) The survey was undertaken in only one city, and the survey area needs to be expanded to nursing students from different medical universities across the country. 2) Data on the experience of chronic non-specific pain, potential triggers, and the impact of chronic non-specific pain were based on self-report, and information bias was probably present. 3) Although the guidelines [53] have pointed out that pain without danger signals is not recommended to do radiological examinations such as MRI, CT, etc., but if the project funding is sufficient, some objective indicators (such as biological indicators) can be combined to diagnose may be more scientific. One research investigation [45] revealed that workers with chronic non-specific pain had higher scores on the organic subscale and lower scores on the psychological subscale than workers without pain. Therefore, the collection of data on smoking, drinking habits, and psychosocial factors needs to be taken into consideration in future research.

CONCLUSION

This study demonstrated that chronic non-specific pain is a common health problem among nursing students in Chongqing, China. Nearly half of the participants in this paper were identified as chronic non-specific pain by self-report. Given this situation, nursing school authorities need to offer relevant training to improve the chronic non-specific pain related knowledge of nursing students. It is recommended that nursing students

develop an awareness of chronic non-specific pain related health hazards. Besides, they are encouraged to

exercise more, reduce their electronic device time (especially the use of screen projection), and ensure they have sufficient sleep and rest time.

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Data Availability

Additional data could be obtained from the corresponding author upon formal request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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