ปัจจัยที่มีอิทธิพลต่อความเครียดทางจิตใจในผู้ป่วยที่มีโรคกระดูกคอเสื่อมที่ได้รับการฝังเข็ม ประเทศจีน: การศึกษาแบบตัดขวาง
Factors Influencing Mental Stress among Patients with Cervical Spondylosis Undergoing Acupuncture in China: A Cross-sectional Study

นิพนธ์ต้นฉบับ **Original Article**

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วารสารไทยเภสัชศาสตร์และวิทยาการสุขภาพ 2567;19(2):135-141.

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Thai Pharmaceutical and Health Science Journal 2024;19(2):135-141.

บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาปัจจัยที่มีอิทธิพลต่อความเครียดทางจิตใจในผู้ป่วยโรคกระดูกคอเสื่อมที่ได้รับการฝังเข็ม เพราะความเครียดทางจิตใจอาจทำให้ผู้ป่วยปฏิบัติตามแผนการรักษาได้ไม่ดี **วิธีการศึกษา:** การศึกษาแบบตัดขวางในผู้ป่วยโรคกระดูกคอเสื่อมที่ได้รับการฝังเข็มจำนวน 256 ราย ในช่วง 5 กันยายน ถึงพฤศจิกายน 2565 ที่คลินิกฟื้นฟูสมรรถภาพ ที่โรงพยาบาล Second Affiliated Hospital แห่งมหาวิทยาลัยการแพทย์เหวินโจว เมืองเหวินโจว ประเทศจีน ใช้แบบสอบถามรวบรวมข้อมูลด้านความเครียดทางจิตใจ และปัจจัยด้านคุณภาพการนอนหลับ วิถีชีวิต พฤติกรรมสุขภาพ การสนับสนุนทางสังคม และความรู้เกี่ยวกับโรคกระดูกคอเสื่อม ทดสอบความสัมพันธ์ด้วยค่าสหสัมพันธ์ของเพียร์สันและการถดถอยเชิงเส้นพหุคูณ **ผลการศึกษา:** พบว่าปัจจัยคุณภาพการนอนหลับมีความสัมพันธ์เชิงบวกกับความเครียดทางจิตใจ ($r = 0.209$, P-value < 0.01) ในขณะที่ปัจจัยวิถีชีวิต พฤติกรรมสุขภาพ และความรู้เกี่ยวกับโรคกระดูกคอเสื่อมมีความสัมพันธ์เชิงลบกับความเครียดทางจิตใจ ($r = -0.413$, -0.390 และ -0.280 ตามลำดับ, P-value < 0.01 ทุกคู่) และปัจจัยวิถีชีวิตเป็นปัจจัยเดียวที่สามารถทำนายความเครียดทางจิตใจเชิงบวกอย่างมีนัยสำคัญ ($\beta = 0.288$, P-value < 0.05) **สรุป:** การระบุปัจจัยที่มีอิทธิพลต่อความเครียดทางจิตใจสามารถส่งเสริมการฟื้นฟูกระดูกคอและคุณภาพชีวิตของผู้ป่วยโรคกระดูกคอเสื่อม ผลการวิจัยนี้ชี้ให้เห็นว่าปัจจัยวิถีชีวิตทำนายความเครียดทางจิตใจเชิงบวก ดังนั้นการประเมินวิถีชีวิตของผู้ป่วยจึงเป็นสิ่งจำเป็นเมื่อได้รับการรักษาด้วยการฝังเข็ม

คำสำคัญ: ความเครียดทางจิตใจ; โรคกระดูกคอเสื่อม; การฝังเข็ม; ปัจจัยที่มีอิทธิพล

Editorial note
Manuscript received in original form: August 21, 2023;
Revision notified: September 3, 2023;
Revision completed: September 16, 2023;
Accepted in final form: September 19, 2023;
Published online: June 30, 2024.

Abstract

Objective: To explore factors influencing mental stress among patients with cervical spondylosis (CS) undergoing acupuncture. This was because poor mental stress could worsen compliance of patients. **Methods:** A cross-sectional study was conducted in 256 patients with CS undergoing acupuncture at the Rehabilitation Clinic of the Second Affiliated Hospital of Wenzhou Medical University which is a tertiary level hospital, located in Wenzhou, China from September 5th to November 5th, 2022. Questionnaires assessing mental stress, sleep quality, lifestyle, health behavior, social support and knowledge about CS were used to collect data. Associations were tested using Pearson's correlation test and multiple linear regression analysis. **Results:** It was found that sleep quality score was positively correlated with mental stress ($r = 0.209$, P-value < 0.01), while lifestyle, health behavior and knowledge about CS were negatively correlated with mental stress ($r = -0.413$, -0.390 and -0.280, respectively, P-value < 0.01 for all). Lifestyle was significantly, positively predicted the mental stress ($\beta = 0.288$, P-value < 0.05). **Conclusion:** Identifying factors influencing mental stress can promote rehabilitation of cervical spine and quality of life among patients with cervical spondylosis. Our findings suggest lifestyle factor positively predicts mental stress. Therefore, evaluating patients' lifestyle is necessary when they have acupuncture treatment.

Keywords: mental stress; cervical spondylosis; acupuncture; influencing factors

Journal website: http://ejournals.swu.ac.th/index.php/pharm/index

Introduction

Mental stress can bring a variety of harm if individuals can't release stress well. Many studies have found the impact of mental stress includes hypertension[1], cardiovascular disease[2], peptic ulcer[3] and headache[4], etc. Mental stress is an important performance of mental health, while mental health has increasing attentions among human beings. More people realize the importance of maintaining mental health. Reducing mental stress is an important measure for improving quality of life.

Cervical spondylosis has a high incidence rate and become a common disease in China.[5] More young people suffer different level of neck pain. Neck pain brings some unpleasant experience, such as low working efficiency, poor sleep quality and emotion disorders. This badly impacts mental health and life quality among patients with cervical spondylosis. There are many treatments for cervical spondylosis. Among these treatments, acupuncture therapy is the prior choice, due to its unique advantages of simplicity, convenience, efficacy, and low cost.[6] However, acupuncture

therapy cannot change other factors that influence the health of cervical spine.

Recent studies found that mental stress was associated with cervical spondylosis and mental stress usually came from workload[7] and study load.[8] It was found that the high incidence population of cervical spondylosis are software engineers[9], teachers[10] and students.[8] The pressure of work and study makes people maintain a bowed posture for a long time, resulting in an increased load on the cervical spine, which leads to the occurrence of cervical spondylosis. It was known that neck pain had high recurrence[11] and longtime treatments takes time and money which will increase patients' mental stress. In addition, mental stress can result in poor compliance of patients, which is not conducive to the rehabilitation among patients with cervical spondylosis.

Mental stress has been found to increase the severity of cervical spondylosis and even impact on its rehabilitation.[12] Previous studies suggested that lifestyle, sleep quality, knowledge, social support and health behavior positively influence the health of cervical spine. Lifestyle factor, such as longtime using electronic products, work demand[13] and some daily habits[14], can negatively compact on physiological curvature and bony structure of cervical spine. Poor sleep quality can increase the weight loading time of the cervical spine and accelerate its degeneration.[5] Knowledge about cervical spondylosis (CS) can change the confidence of overcoming disease and the co-operation with treatment which might influence the rehabilitation among patients with cervical spondylosis.[15] Social support can cushion the stress of cervical spondylosis patients, increase patients' psychological satisfaction and gain confidence in their life.[16] Health behavior can improve patients' confidence in recovery, reduce pain and promote cervical spine function.[17]

Based on theory of unpleasant symptoms[18] and literature review, the causes of neck pain can be divided into physiological, psychological and background levels. The physiological factors include sleep quality factor, while psychological factors include knowledge about CS factor, and situational factors include lifestyle, health behavior and social support factors. The authors hypothesized that these factors, when combined, may explain mental stress level among patients with CS undergoing acupuncture. The conceptual framework of this study is depicted in Figure 1.

Previous studies focused on relieving neck pain by different treatments[19,20], few studies focused on influencing factors. Patients pay more attention on their mental health and life quality. They have a requirement to know about the influencing factors. Therefore, this study aimed to explore whether these factors can influence mental stress among patients with cervical spondylosis undergoing acupuncture. The result of this study would help nurses develop effective intervention for reducing mental stress among these patients.

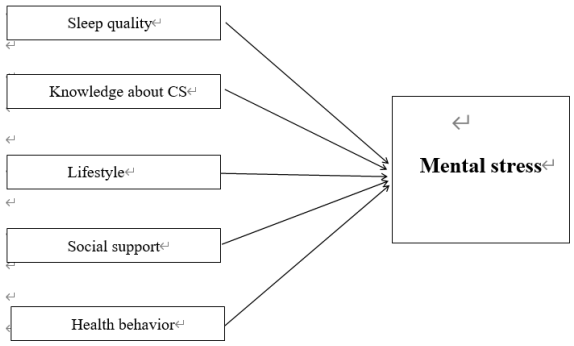

Figure 1 Conceptual framework.

Methods

This cross-sectional study explored factors influencing mental stress among patients with cervical spondylosis undergoing acupuncture, conducted from September 5th to November 5th in 2022. It was conducted at Rehabilitation Clinic of the Second Affiliated Hospital of Wenzhou Medical University which is a tertiary level hospital, located in Wenzhou, China. The characteristics of patients receiving health care service at this hospital could represent the people in Wenzhou. The study protocol was approved by the Institutional Review Board of Burapha University (approval number: G-HS037/2565), Thailand and the Research Ethics Board of the Second Affiliated Hospital of Wenzhou Medical University (approval number: 2022-K-87-01), Wenzhou, China.

The sample size for this study was calculated using G*Power 3.1 software. With a power estimate of 90%, a type I error of 5%, and an effect size of 0.055[21], a total of 262 participants were needed. A simple random sampling method was used to select the participants. The inclusion criteria included age of 20 to 50 years old, having received acupuncture therapy at least six times (six-time course)[22], having no history of neck injury, having no problems related to cardiac, hepatic, and renal dysfunction, coagulation dysfunction, immune system diseases, malignant tumor, and cognitive and behavioral dysfunction, being non-pregnant

women or preparing to become pregnant or lactating women, and having no skin allergy or skin disease at the treatment site. Individuals with the following characteristics were excluded: patients with history of neck injury, or cardiac, hepatic or renal dysfunction, coagulation dysfunction or immune system diseases, malignant tumor, or cognitive or behavioral dysfunction. Women who were pregnant or prepared to become pregnant or to breastfeed, or individuals with skin allergy or skin disease at the treatment site were also excluded.

Research instruments

Demographic data record form was used to collect demographic characteristics of the participants. These characteristics included age, gender, marital status, education level, type of occupation, household income, duration of illness, type of cervical spondylosis, and pain level.

Lifestyle questionnaire was used to measure lifestyle factor.[23] The questionnaire consists of 42 items comprised of six subscales which are diet, sleep, psychology, exercise, stress control, and environment. The response was a 5-point rating scale ranging from 1-never to 2-seldom, 3-sometimes, 4-often, and 5-always. The higher score indicates a healthier lifestyle. The scale had a good internal consistency reliability (Cronbach's alpha coefficient of 0.82).

Pittsburgh Sleep Quality Index was used to assess the sleep quality factor.[24] The 19 self-rated items are combined to seven components, each of them has a range of 0 - 3 points. In all cases, a score of "0" indicates no difficulty, while a score of "3" indicates severe difficulty. The seven component scores are then added to yield one "global" score, with a range of 0 - 21 points. The higher the score indicates the poorer sleep quality. The split-half reliability coefficient of PSQI was 0.824. The scale had a good internal consistency reliability (Cronbach's alpha coefficient of 0.845).

Self-Rated Abilities for Health Practices Scale was used to measure health behavior factor.[25] It contains 28 items with four subscales namely exercise, nutrition, responsible health practice, and psychological well-being. Each subscale has seven items. Items are rated from 0 (not at all) to 4 (completely). Ratings for each subscale are summed to yield subscale scores. Subscale scores are summed to obtain a total score. Total scores range from 0 to 112 points. Higher scores indicate more health behavior. The total scale had a high internal consistency reliability (Cronbach's alpha coefficient of 0.95) and good ones for the four dimensions (Cronbach's alpha coefficients of 0.86 – 0.89)

Social Support Rating Scale was used to measure social support factor.[26] There are 10 items with three dimensions namely objective support (3 items), subjective support (4 items), and utilization of social support (3 items). Items 1-4 and 8-10 are rated with a 4-point scale between 1 and 4 points. Item 5 is divided into five sub-items A, B, C, D, E of which each item scores 1 = none and 4 = full support. Items 6 and 7 are with a response of “no source” = 0 point or “the following sources” = 1 point. The higher the score, the higher the degree of social support. The Cronbach's alpha reliability coefficient of this scale was 0.86.

Cervical spine disease health knowledge awareness questionnaire was used to measures the knowledge about CS factor.[27] It consists of 10 questions. The score is calculated as follows: 2 for "know ", 1 for "partially know " and o for "don't know." The higher the score indicates the more knowledge about CS. The scale had a good internal consistency reliability (Cronbach's alpha coefficient of 0.807).

Chinese Perceived Stress Scale was used to measure mental stress factor.[28] The scale consists of 14 items, including 7 positive statements and 7 negative questions with reversed scoring. The scale has two dimensions, namely, the sense of tension and loss of control. The response was a 5-point rating scale ranging from 1-never, to 2-occasionally, 3-sometimes, 4-often, and 5-always. With the total score of 14 to 70 points, the higher score indicates higher mental stress. The scale has acceptable internal consistency reliability with a Cronbach’s alpha coefficient of 0.78.

Data collection procedure

Simple random sampling will be used for this study. The researcher randomly picked up about half eligible patients depending on number of patients on the day. If there were ten eligible patients receiving treatment on that day, the researcher would pick up 5 patients. Generally, there were about 5 - 8 patients participating in the daily survey. This method was used to select patients until the sample reached 262. The study was with a voluntary basis of which the participants could deny participation with no negative consequences on the health service they received. They could withdraw from the study at any time.

A face-to-face paper self-report survey was used to collect the information. The purpose, significance and content of the

investigation were explained, and the consent form was signed before completing the questionnaire. Following guidelines to prevent COVID-19, the participants completed the questionnaire independently.

Data analysis

Descriptive statistics including mean with standard deviation and frequency with percentage were used to summarize the participants' demographic characteristics and study variables. Correlations between study variables were tested using Pearson's product moment correlation analysis. Multiple linear regression analysis was used to quantify the predictive effect of each of independent variables on mental stress. Statistical significance level was set at a type I error of 5% (i.e., P-value < 0.05). All statistical analyses were performed using the SPSS version 20.

Results

Based on the expected 262 participants, a total of 256 participants completed the questionnaire resulting in an attrition rate of 2.30%. Participants' average age was 35.24 years. Only 41.40% of participants had a high level of education. Most participants (85.55%) were office clerks while 5.47% of them were unemployed. More than half of the participants were female (73.05%), married (58.02%), and with a household income per month of 5000 yuan or higher (75%). More than half of the participants had neck type cervical spondylosis (73.05%) and had been living with the health problem for more than one year (76.56%). Most participants (67.19%) reported mild pain, while 17.97% participants reported severe pain (Table 1).

Mental stress was not too high with a mean of 33.66 out of 70 points. The mean score of the lifestyle scale was 144.72 (SD = 20.9), suggesting that the lifestyle of participants was not sufficiently healthy. Sleep quality, health behavior, social support, knowledge about CS were at a moderate level (mean scores of 11.11 (SD = 3.22), 68.26 (SD = 6.33), 25.04 (SD = 6.06), 11.53 (SD = 4.97), and 33.66 (SD = 15.79), respectively) (Table 2).

Mental stress was **significantly negatively correlated** with lifestyle, health behavior, and knowledge about cervical spondylosis (r = -0.413, -0.390, and -0.280, respectively, P-value < 0.01 for all); while it was **significantly positively correlated** with sleep quality (r = 0.209, P-value < 0.01). Mental stress was also negatively correlated with social support but with no statistical significance (r = -0.108) (Table 3).

Table 1 Demographic characteristics of the participants (N = 256).

Variables	N (%)	
Age (years), range = 20 – 50; mean = 35.24, SD = 8.74		
20 - 30	76	29.70
31 - 40	92	35.90
41 - 50	88	34.40
Gender		
Male	69	26.95
Female	187	73.05
Marital status		
Single	81	31.64
Married	158	61.72
Divorce	17	6.64
Level of education		
Junior high school or below	52	20.32
Highschool/technical school	98	38.28
Bachelor's degree or above	106	41.40
Occupation		
Workers	35	13.67
Teacher	86	33.59
Medical staff	39	15.23
Civil servant	59	23.05
Unemployed	14	5.47
Others	23	8.98
Household income (Yuan)		
< 1000	5	1.95
1001 - 5000	59	23.05
> 5001	192	75.00
Duration of disease		
< 12 months	60	23.44
> 13 months	196	76.56
Type of cervical spondylosis		
Neck type Cervical spondylosis	187	73.05
Cervical radiculopathy	61	23.83
Cervical Myelopathy	6	2.34
Other types of cervical spondylosis	2	0.78
Pain level		
Slight pain	172	67.19
Moderate pain	38	14.84
Severe pain	46	17.97

Table 2 Levels of mental stress and its predictive factors (N = 256).

Factors	Possible range	Actual range	Mean	S.D.
Mental stress	14 - 70	14 - 70	33.66	15.79
Lifestyle	42 - 210	104 - 182	144.72	20.90
Sleep quality	0 - 21	2 - 19	11.11	3.22
Health behavior	0 - 112	52 - 84	68.26	6.33
Social support	12 - 66	15 - 35	25.04	6.06
Knowledge about cervical spondylosis	0 - 20	4 - 20	11.53	4.97

Assumptions of the multiple linear regression analysis were met since the variance inflation factors of lifestyle (VIF = 5.946), sleep quality (VIF = 1.100), health behavior (VIF = 5.699), social support (VIF = 1.013), and knowledge about CS

(VIF = 1.400) were all smaller than 10, indicating that there was no severe multicollinearity. In addition, there were no outliers, and homoscedasticity test was significant (P-value < 0.05). The only significant predictive factor for mental stress was lifestyle (β = 0.288, P-value = 0.040); while sleep quality, health behavior, social support, and knowledge about cervical spondylosis were not (Table 4).

Table 3 Correlations[§] between study variables (N = 256).

	1	2	3	4	5	6
1. Lifestyle	1.000	-0.511*	0.907*	0.328*	0.513*	-0.413*
2. Sleep quality		1.000	-0.484*	-0.190*	-0.206*	0.209*
3. Health behavior			1.000	0.287*	0.484*	-0.390*
4. Social support				1.000	0.191*	-0.108
5. Knowledge about CS					1.000	-0.280*
6. Mental stress						1.000

§ Pearson's product moment correlation coefficients.

* P-value < 0.01.

CS = cervical spondylosis.

Table 4 Factors predicting mental stress among participants (N = 256).

Predicting factors	B	SE	β	t	P-value
Lifestyle	.217	.106	.288	2.060	.040
Sleep quality	-.020	.295	-.004	-.069	.945
Health behavior	.020	.032	.088	.647	.518
Knowledge about cervical spondylosis	.285	.215	.090	1.322	.187
Social support	.111	.150	.043	.738	.461

R = 0.424, R^2 = 0.180, Adjusted R^2 = 0.163, P-value < 0.05.

Discussions and Conclusion

Patients with cervical spondylosis were found to have high mental stress in this study. Mental stress was defined as "physical, mental, or emotional strain or tension as well as a condition or feeling experienced when a person perceives that demands exceed the personal and social resources the individual is able to mobilize."[29] In this study, 76.56% of participants reported to suffer neck pain more than 13 months. Suffering neck pain for a long time can increase depression or anxiety symptoms[30] and increase patients' economic burden.[31] Though acupuncture therapy can effectively reduce neck pain, the recurrence rate of cervical spondylosis is high and the fee of treatment is not cheap.[32] Besides, the investigation was conducted during COVID-19 pandemic, which might affect mental stress[33] among patients with cervical spondylosis undergoing acupuncture. During the pandemic, the medical resource became limited, and most patients usually could not receive the treatment in time. In addition, as the result showed that most participants were office workers who faced different stress at their work, the intensity of work can also increase mental stress.[8]

The study revealed that lifestyle factor could positively predict mental stress among patients with cervical spondylosis undergoing acupuncture. Lifestyle refers to the characteristics of daily working and living style. It includes daily behaviors and working mode, activities, diet, emotion and spirits.[23] Regular diet and good nutrition help strengthening the immune system and reducing inflammation[34] thus reducing mental stress when cervical spondylosis happens. Poor sleep quality causes bad memory and low work efficiency5, increasing mental stress at daily work. Besides, long time working without suitable rest or exercise will increase mental stress.[35] Unhealthy lifestyle can increase mental stress level. In this study, 85.55% of participants were office workers who usually used computer for a long time, and this working mode was found to result in high mental stress.[36]

The findings suggested that sleep quality, health behavior, knowledge about cervical spondylosis had correlation with mental stress, while social support had no correlation with it among research population. Sleep quality refers to a perception of the situation and quality of sleep with one's whole night sleeping. It includes the length of sleep, the situation after falling asleep and waking up.[37] Evidence showed that poor sleep quality increased the weight loading time of the cervical spine, leading to an increase of mental stress for people with neck pain.[38] Health behavior refers to the various activities that patients with cervical spondylosis perform to enhance and maintain their physical and mental fitness.[39] Unhealthy behavior can disrupt the normal cervical curvature and limit cervical movement, which in turn affects the physical health and mental health of cervical spine patients.[40] Knowledge about cervical spondylosis refers to awareness related to symptoms of CS and health prevention or rehabilitation of cervical spondylosis.[27] Knowledge about cervical spondylosis can enhance strong confidence of overcoming disease and reduce mental stress among the patients.[15] Social support refers to perceptions of patients with cervical spondylosis receiving all kinds of support from families and friends.[26] Social support can maintain a good physical and mental experience of individuals and promote mental health.[41] Because of characteristics of the research population, 75% participants had high household income and 67.19% of participants reported to have mild pain. Our study found that social support had no correlation with mental stress. The

research population received treatments at an early stage of cervical spondylosis, they didn't need much support as they had normal activity. Social support played an important role among patients who had limbs disfunction and severe neck pain.[32] The investigation was conducted during COVID-19 pandemic, some kinds of social support were thus limited. This affected the relationship between social support and mental stress in this study.

Strengths of this study included the research setting which is a tertiary level hospital in Wenzhou, China. The researcher could recruit participants who met the inclusion criteria within a short period of time. In addition, with self-report surveys the study could get most participants' cooperation since the response rate was as high as 97.70%. To some extent, the quality of the questionnaire was guaranteed which was helpful to the authenticity of the data analysis. One of limitation of this study was the research setting during COVID-19, which might influence patients' mental stress. In addition, the single research setting could lead to a lack of representativeness for a wider patient population. Another limitation of this study was that its cross-sectional design could lead to a low confidence in the effect of various factors on mental stress. This was because the independent and dependent variables were measured at the same time. Therefore, a longitudinal study is needed to confirm if there actually is a causal relationship between influencing factors and mental stress.

Acupuncture therapy can effectively reduce neck pain and mental stress among patients with cervical spondylosis. However, identifying factors influencing mental stress can also promote mental health and rehabilitation of cervical spine among these patients. Lifestyle factor positively predicts mental stress. Therefore, evaluating patients' lifestyle is necessary when they have acupuncture treatment. The patients should be helped in identifying their unhealthy lifestyle and make reasonable lifestyle adjustments. This is helpful to promote their health of cervical spine and reduce mental stress as well.

In conclusion, as patients with cervical spondylosis pay more attention on mental health and quality life, nurses need not only evaluate the effect of treatments but also put more attention on factors influencing mental health and life quality. We found that sleep quality, lifestyle, health behavior, knowledge about cervical spondylosis were correlated with mental stress. Nurses can develop effective intervention through these findings. Actively knowing about what cervical spondylosis patients misunderstanding on their health problems, nurses can give more professional intervention to promote their quality life and reduce mental stress. Based on the results, nurses can provide useful interventions such as adjusting patients with unhealthy lifestyle and unhealthy behavior, helping them get useful health information. The study findings are not only beneficial to the patients with cervical spondylosis, but also to the nursing practice and health education.

Acknowledgement

The authors would like to acknowledge the research participants for their kind cooperation as well as the medical staffs of rehabilitation department, Longxi Wu, Jinfei Zhuang and Jinming Li for their friendly support.

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