FACTORS INFLUENCING QUALITY OF LIFE AMONG PATIENTS WITH CERVICAL SPONDYLOSIS ONGOING ACUPUNCTURE IN WENZHOU, CHINA

XIU HONG ZHANG

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR MASTER DEGREE OF NURSING SCIENCE
(INTERNATIONAL PROGRAM)
IN ADULT NURSING PATHWAY
FACULTY OF NURSING
BURAPHA UNIVERSITY
2023

-

XIU HONG ZHANG

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรพยาบาลศาสตรมหาบัณฑิต (หลักสูตรนานาชาติ)

คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา

2566

FACTORS INFLUENCING QUALITY OF LIFE AMONG PATIENTS WITH CERVICAL SPONDYLOSIS ONGOING ACUPUNCTURE IN WENZHOU, CHINA

XIU HONG ZHANG

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR MASTER DEGREE OF NURSING SCIENCE
(INTERNATIONAL PROGRAM)
IN ADULT NURSING PATHWAY
FACULTY OF NURSING
BURAPHA UNIVERSITY
2023

The Thesis of Xiu Hong Zhang has been approved by the examining committee to be partial fulfillment of the requirements for the Master Degree of Nursing Science (International Program) in Adult Nursing Pathway of Burapha University

Advisory Committee

Principal advisor

Chintana Wacharasin

(Associate Professor Dr. Chintana Wacharasin)

Co-advisor

Jinjutha

(Associate Professor Dr. Jinjutha Chaisena Dallas)

Examining Committee

Aporn Deenan Principal examiner

(Associate Professor Dr. Aporn Deenan)

Chintana Wacharasin Member

(Associate Professor Dr. Chintana Wacharasin)

Jinjutha Member

(Associate Professor Dr. Jinjutha Chaisena Dallas)

Niphawan Samartkit Member

(Associate Professor Dr. Niphawan Samartkit)

Pornchai Jullamate Dean of the Faculty of Nursing

(Associate Professor Dr. Pornchai Jullamate)

This Thesis has been approved by Graduate School Burapha University to be partial fulfillment of the requirements for the Master Degree of Nursing Science (International Program) in Adult Nursing Pathway of Burapha University

Witawat Jangiam Dean of Graduate School

(Associate Professor Dr. Witawat Jangiam)

20 NOV 2023

63910206: MAJOR: ADULT NURSING PATHWAY; M.N.S. (ADULT NURSING PATHWAY)
KEYWORDS: QUALITY OF LIFE/ CERVICAL SPONDYLOSIS/ ACUPUNCTURE, FACTORS INFLUENCING QUALITY OF LIFE

XIU HONG ZHANG : FACTORS INFLUENCING QUALITY OF LIFE AMONG PATIENTS WITH CERVICAL SPONDYLOSIS ONGOING ACUPUNCTURE IN WENZHOU, CHINA. ADVISORY COMMITTEE: CHINTANA WACHARASIN, Ph.D. JINJUTHA CHAISENA DALLAS, Ph.D. 2023.

Cervical spondylosis is a rising concern among young people these days while more and more patients choose acupuncture treatment to solve discomfort caused by cervical spondylosis. A cross-sectional study was conducted in the Second Affiliated Hospital of Wenzhou Medical University, China with 262 recruited participants through simple random sampling. The aim of the study was to investigate the predictive relationship between lifestyle, sleep quality, mental stress, knowledge about cervical spondylosis, social support and health behavior and the quality of life among patients with cervical spondylosis ongoing acupuncture in Wenzhou, China. Data were collected using sets of self-reported questionnaires consisting of Lifestyle Health Lifestyle Questionnaire, Pittsburgh Sleep Quality Index, Chinese Perceived Stress Scale, Self-Rated Abilities for Health Practices Scale, Social Support Rating Scale, Cervical spine disease health knowledge awareness questionnaire, The 12-item Short Form Health Survey. Descriptive statistics, testing assumption and multiple regression were used for data analysis.

Findings revealed that the mean score of total scores in quality of life scale was 37.77 ± 10.57 indicating relatively moderate levels among patients with cervical spondylosis ongoing acupuncture. The result also found that lifestyle (β =. 25, p<.01), health behavior (β =.379, p <.001), social support (β =.098, p <.01), knowledge about cervical spondylosis (β =. 107, p <.01) and sleep quality (β =-.196, p <. 001) explained 71% of the variance of quality of life. Nurses can use the findings to guide the patients avoid factors influencing cervical health and improve life quality.

ACKNOWLEDGEMENTS

The whole process of conducting this thesis has been worth every moment and this experience enhances my research competency in the near future. Certainly, all this could not have been possible without the help of my selfless advisor Associate Professor Dr. Chintana Wacharasin for her commitment, guidance, and encouragement from the time of the study's development till its publication. I would like to express my sincere gratitude toward her, but these words cannot justify the help rendered toward me.

I would also like to extend my heartfelt gratitude toward my co-advisor Assistant Professor Dr. Jinjutha Chaisena Dallas for her constant support and motivation to complete this study. My heartfelt gratitude goes toward the examining committee member Associate Professor Dr. Niphawan Smartkit for making time to review and providing insightful suggestions to improve this study.

My deepest gratitude towards Thailand International Development Corporation Agency and Ministry of Education of the People's Republic of China for providing me this international program which was a great career advancement opportunity. My gratitude goes to Faculty of Nursing, Burapha University, Thailand and Wenzhou Medical University, China for providing me with great learning experience.

My special gratitude towards head nurse Maiyun Ye as well as other cooperated medical staffs and recruited participants for their help and participation in this study despite their busy schedules. Lastly, I would like to express my deepest gratitude towards my parents and husband for all their support, encouragement and always believing in me, making me believe in my own capacity and making me dream big.

Xiu hong Zhang

TABLE OF CONTENTS

Page

ABSTRACT iv
ACKNOWLEDGEMENTS v
TABLE OF CONTENTS vi
LIST OF TABLES viii
LIST OF FIGURES ix
CHAPTER 1 INTRODUCTION 1
Statement and significant of research problem 1
Research Objectives 5
Research hypothesis 5
Scope of study 5
Conceptual framework 5
Definition of terms 7
CHAPTER 2 LITERATURE REVIEW 9
Situation of cervical spondylosis in China 9
Cervical spondylosis and treatments 11
Cultural practice related to cervical spondylosis 15
Concept of QOL among patients with CS ongoing acupuncture 17
Theory related to quality of life among patients with cervical spondylosis 19
Factors influencing quality of life among patients with cervical spondylosis 21
Summary 31
CHAPTER 3 RESEARCH METHODOLOGY 33
Research Design 33
Setting of the study 33
Population and participants 33
Sampling technique 34
Research instruments 35
Psychometric properties of the instruments 37
Human Subject Protection 38
Data collection procedures 38

Data analysis 39
CHAPTER 4 RESULTS 40
Description of demographic characteristics of the sample 40
Description of studied variables 42
Description of the Quality of life 43
Relationships between predicting factors and Quality of life 43
Factors influencing QOL among participants 44
CHAPTER 5 CONCLUSION AND DISCUSSION 46
Summary of the findings 46
Study findings 46
Discussions 47
Factors influencing QOL among patients with CS 48
Implications for Nursing 52
Strength and limitations 53
Conclusion 53
REFERENCES 54
APPENDICES 62
APPENDIX A 63
APPENDIX B 65
APPENDIX C 69
APPENDIX D 72
APPENDIX E 74
APPENDIX F 77
APPENDIX G 80
APPENDIX H 82
APPENDIX I 85
BIOGRAPHY 96

LIST OF TABLES

Page

Table 1 Description of demographic characteristics of the sample (n= 256). 40
Table 2 Description of studied variables.....43
Table 3 Description of the QOL variables (n=256) 43
Table 4 The relationship between factors and Quality of life (n=256) 44
Table 5 Factors predicting QOL among participants (n=256) 45

LIST OF FIGURES

Page

Figure 1 Conceptual framework 7

CHAPTER 1
INTRODUCTION

Statement and significant of research problem

Cervical spondylosis (CS) has become a global disease that endangers the quality of life among young people. In the world, the number of patients with cervical spondylosis reaches 900 million(CHU, Jin et al. 2017). In China, nearly 150 million people suffering from cervical spondylosis. People younger than 60 years were the focus of prevention for CS. It is reportedly associated with a 50% incidence of radiological evidence in individuals over the age of 40 years (Lv et al., 2018a). Numbness, weakness, and tingling in the neck and/or arms, pain in the neck and/or arms, neck stiffness, and headaches are the usual symptoms of CS. Neck pain ranked fourth globally and second in China, relatively. Neck pain is the most common symptom of CS (Wang, Tian et al. 2016) influencing patients' quality of life. According to the global burden of disease study of 2013, neck pain was one of the top 10 causes of years lived with disability (Vos et al., 2015). Cervical spondylosis not only brings various physical discomfort, but also affects patients' daily activities and mood. Physical discomfort affects mental health, which is a sign of reduced quality of life for patients with CS.

Quality of life (QOL) becomes a worthy concern among patients with CS. QOL is a perception of cognitive judgment of satisfaction with one's life. It has multi-dimensional evaluations of physical and mental health. Patients with CS are not satisfied with their daily life as their QOL is influenced by some unpleasant symptoms that not only bring the physical problems but also bring the psychological problems. Neck pain, neck stiffness, shoulder and arm pain, hand numbness, dizziness, nausea are the common symptom of CS. These symptoms can limit cervical vertebra or limb movement which then reduce working efficiency. These physical problems caused by CS are a performance of the declining QOL among patients with CS. Besides, CS is characterized by long duration, progressive development, recurrent attacks, and somatic pain, which often brings adverse emotions and psychological reactions to patients. Patients often feel that they do not have enough energy, sleep or rest, resulting in a decrease in their vitality and quality of life. The illness and

hospitalization often prevent the patients from assuming previous social functions and roles, severely impairing the patient's social functioning. (Zhao, Li et al. 2002, Lou, Han et al. 2006). These psychological problems caused by CS are another performance of the declining QOL among patients with CS. CS influences patients' physical functioning, role physical, bodily pain, general health, daily vitality, social functioning, role emotional and mental health and then declines patients' life quality.

Acupuncture is an important part of traditional Chinese medicine and has recently been widely used to treat CS in China. Recent studies have shown significant effect in reducing chronic pain and tissue fibrosis around the neck area(Ghesquiere, Wyka et al. 2019). Acupuncture can accelerate the central nervous system to produce endogenous opioid peptides and activate related receptors by stimulating related acupoints to achieve peripheral analgesia(Lu, Tsai et al. 2019). It has the effects of dredging meridians, stimulating qi and blood circulation, relaxing adhesions and correcting subluxation, ultimately correcting the vicious cycle of the imbalance between the dynamic system and the static cervical vertebral system and establishing the 'virtuous circle' instead which is beneficial to the rehabilitation of CS. Acupuncture can regulate the blood and blood balance of the human body, and the function of the body can also be improved by stimulating acupuncture points. Acupuncture at the cervical spinal acupuncture point regulates the dysfunction of the vegetative nerves and inhibits the conduction function of the spinal cord, which has an analgesic effect. It stimulates the sensory transmission of nerves and affects the signal transmission of nerve endings. It also affects the spinal nerves and the paravertebral sympathetic nerve trunks, improves local microcirculation, and improves the state of tissue hypoxia and ischemia, thus regulating the function of the internal organs, the operation of qi and blood, and restoring the nerves (Dai, Huang et al. 2021). In addition, it can achieve anti-inflammatory effects by increasing the level of β-Ep in inflammatory tissues and serum(Lu, Tsai et al. 2019). It can alleviate unpleasant symptoms caused by CS and then improve patients' life quality (Yang et al., 2016).

However, there is little literature described the quality of life among patients with CS ongoing acupuncture. As neck pain caused by CS is associated with slight degenerative changes within the intervertebral disc in early CS. CS is usually asymptomatic, but may present with symptoms of neck pain, neck stiffness, or even

shoulder pain and stiffness (Que, Ye et al. 2013). The factors influence quality of life among patients with CS and ongoing acupuncture are not clear. In order to improve their quality of life, patients with CS need to solve health problems of cervical vertebra and reduce discomforts. According to the theory of unpleasant symptoms (Lenz, Pugh et al. 1997), CS unpleasant symptoms are influenced by physiological, psychological and situational factors. Life quality is not only an outcome of the symptoms. It also recriprocal influences on factors. Combined the theory of unpleasant symptoms and literature review, quality of life is influenced by six factors those are lifestyle, sleep quality, stress, knowledge about cervical spondylosis, social support and health behavior.

Previous studies revealed that lifestyle, physical, psychological, social, and improper sitting postures were the risk factors associated with cervical and shoulder pain (Auvinen, Eskola et al. 2017, Wirth, Potthoff et al. 2018). In China, many studies related to QOL and influencing factors of CS found that the common influencing factors of QOL in CS were mainly related to poor sitting posture, deep late night, long time reading, long time using computer or cell phone, history of neck trauma, inappropriate pillow height, somatic fatigue, brain fatigue and depression level, short reading distance, and lack of physical activity (Zhang, Niu et al. 2014, Tian, Ma et al. 2019).

A fixed posture for a long time makes the cervical spine muscles and ligaments fatigue, which seriously affects the health of the cervical spine. The reduction of exercise and some unhealthy habits are also the most important cause of cervical spondylosis. These lifestyle have influenced the health of CS and then decline QOL (Gordon, Grimmer-Somers et al. 2011). Lifestyle has significantly negative effect on quality of life among patients with CS ($\beta = -5.38$, $p < .001$) (Tsai, 2012).

Sleep disorders are prevalent among patients suffering from neck pain, and approximately 40% of neck pain patients taking analgesics slept for less than 4 h per day (Artner, Cakir et al. 2013). Poor sleep quality bring less energy to patients, resulting in a decline in vitality and other quality of life (Sun, Sun et al. 2018). Sleep quality has significantly negative effect on experience of physical pain, psychological

reaction and spiritual situation, which lead to low quality of life among patients with CS (β = -0.32, p <.001) (Araghi et al., 2013).

Moreover, mental stress from life or work can change behavior, which can affect the health of the cervical spine. Mental stress will make patients with cervical spondylosis lack confidence in life and treatment, close themselves, and further decline in quality of life (Zhang, 2020; Jiang, 2021). Mental stress has significantly negative effect on QOL among patients with CS (β =-.13 p < .05) (Dehghan et al., 2020).

Knowledge about cervical spondylosis can effectively prevent or reduce the occurrence of cervical spondylosis. It can improve patient's awareness and correct bad habits, relieve patients' symptoms and psychological stress, and then improve the quality of life among patients with cervical spondylosis (Li, Li et al. 2013). Knowledge about CS has positive effect on quality of life among patients (β = 1.707, p < .05) (Qiu et al., 2017).

Social support can regulate the negative effects of adverse factors on physical and mental health, maintain a good physical and mental experience of individuals and promote mental health (Sun 2020). Social support can cushion the stress of cervical spondylosis patients, increase patients psychological satisfaction and gain confidence in life, thus improving patient's self-care ability and quality of life patients (Na and Li 2012). Social support can positively influence quality of life among patients with CS (β = .23, p < .05) (Zhang et al., 2014).

Correct posture and exercise methods are conducive to cervical health. Health behavior enables patients to be in the best condition to receive treatment in terms of physiology and psychology, which improves the treatment effect, effectively improves the discomfort of cervical spondylosis and enhances the quality of life (Ren, 2011). Health behavior has positive effect on quality of life among patients with CS (β = .127, p < .01) (Feng et al., 2020).

Previous research put much attention on risk factors related to cervical spondylosis, put less attention on relationship between factors and QOL among patients with CS when receiving acupuncture therapy. Though acupuncture therapy has been popular among patients with CS because of effectively reducing neck pain,

quality of life among these patients is not clear and little research pay attention on it. The influencing factors for quality of life are not clear among patients with CS ongoing acupuncture. QOL is a multidimensional concept, including four aspects: physical, psychological, social functioning and material state. It is not comprehensive to analyze the problem simply from one factor. This study aims to further describe quality of life and to examine the factors influencing the QOL among patients with CS.

Research Objectives

1. To describe the quality of life among patients with CS ongoing acupuncture in Wenzhou, China.

2. To investigate factors influencing the quality of life among patients with CS ongoing acupuncture in Wenzhou, China.

Research hypothesis

The lifestyle, sleep quality, stress, knowledge about cervical spondylosis, social support and health behavior were able to predict the quality of life among patients with cervical spondylosis ongoing acupuncture.

Scope of study

This predictive cross-sectional study was aimed to describe the quality of life among patients with CS ongoing acupuncture as well as factors influencing the quality of life among patients with CS ongoing acupuncture in Wenzhou, China. This research was conducted at Rehabilitation Clinic of the Second Affiliated Hospital of Wenzhou Medical University from September 5th to November 5th in 2022, located in Wenzhou, China.

Conceptual framework

The theory of unpleasant symptoms (Lenz, Pugh et al. 1997) and literature review informed the conceptual framework for this study. The theory of unpleasant symptoms has three main concepts: influencing factors, symptoms, and performance. Influencing factors include physiologic, psychologic, and situational factors.

Symptoms encompass four dimensions: intensity, timing, distress, and quality. Performance consists of functional and cognitive activities. Because of some unpleasant symptoms, cervical spondylosis patients having low QOL and looking for acupuncture treatment are the performance. According to the theory of unpleasant symptoms, physiologic, psychologic and situational factors directly influence clinical symptoms and indirectly influence QOL among patients with CS ongoing acupuncture.

Studies have shown that lifestyle bring neck pain and other physical discomfort that influence QOL among patients with CS. Besides, inadequate energy, sleep or rest, resulting in a decline in vitality and other quality of life among patients with CS (Sun, Sun et al. 2018). Long-term problems with CS can aggravate the economic burden of family and society and then lead to mental stress (Lin, Huang et al. 2018) . This psychological experience can cause mental stress which can badly influences QOL among patients with CS. The lack of knowledge about CS can increase the incidence or recurrence probability of CS and then make discount on quality life (Li and Wu 2006). Good family and social environment is the prerequisite and foundation to improve the quality of life (Na and Li 2012). Healthy behaviors can improve the ability of daily living activities of patients with cervical spondylosis, improve their cervical spine function, promote cervical health and then improve the quality of life (Yang and Sun 2020). These factors interact with each other and then bring the unpleasant symptoms which indirectly influence QOL among patients with CS.

Integrating the components of theory of unpleasant symptoms theory (Lenz, Pugh et al. 1997) and literature review, sleep quality is a physical factor of the theory which influences physical discomfort among patients with CS. Mental stress is a psychological factor of the theory which influences psychological experience among patients with CS. Social support, lifestyle, health behavior and knowledge about CS are situational factors of the theory which are the aspects of social environment that affect CS patients' experience and symptoms. These factors interact with each other and then bring the unpleasant symptoms which indirectly influence QOL among patients with CS.

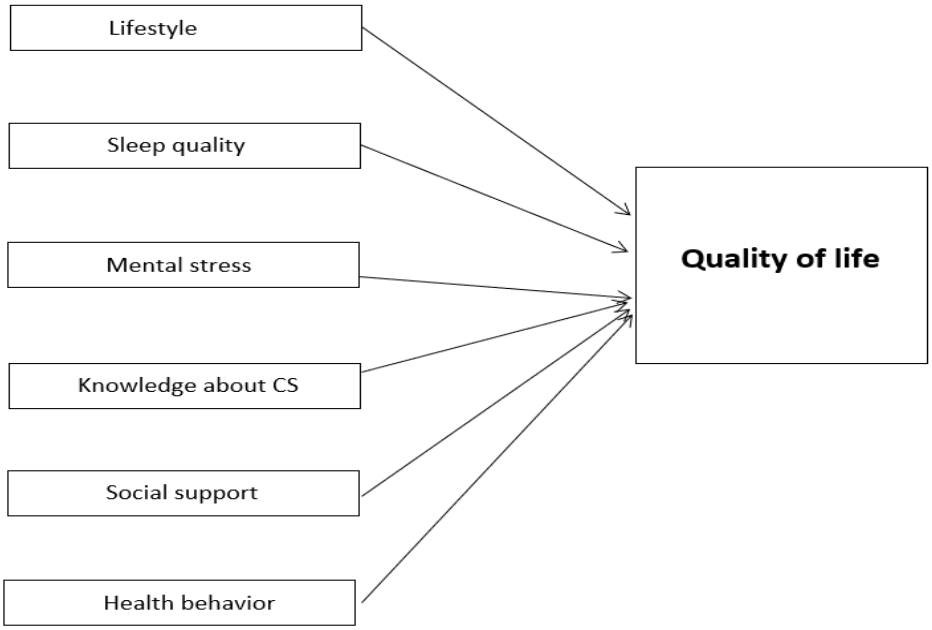


Figure 1 Conceptual framework

Definition of terms

Quality of life (QOL) refers to a perception of cognitive judgment of satisfaction with one's life. It has multi-dimensional evaluations of physical and mental health that mainly including physical functioning, role physical, bodily pain, general health, daily vitality, social functioning, role emotional and mental health. It was measured by the 12-Item Short Form Survey (SF-12) (Ware Jr, Kosinski et al. 1996).

Lifestyle refers to the characteristics of daily working and living style. It includes dietary habit, emotion and spirits, sleep habit, sporting, working mode and living environment. It was measured by Lifestyle Questionnaire (Feng, 2013).

Sleep quality refers to a perception of the situation and quality of sleep with one's whole night sleeping. It included the length of sleep, the situation after falling asleep and waking up. It was measured by Pittsburgh Sleep Quality Index translated by Liu and Tang (Liu, Tang et al. 1996).

Mental stress refers to a perception of ones' surrounding experience on itself psychological or mental situation. It was measured by the Chinese version of the Perceptual Stress Scale (Yang and Huang 2003).

Knowledge about CS refers to awareness related to symptoms of CS and health prevention or rehabilitation of cervical spondylosis. It was measured by the Cervical Spine Disease Health Knowledge Awareness Questionnaire (Du 2013)

Social support refers to perceptions of patients with CS receiving all kinds of support from families and friends. It was measured by Social Support Rating Scale (Xiao 1994).

Health behavior refers to the various activities that patients with CS perform to enhance and maintain their physical and mental fitness. It was measured by Self Rated Abilities for Health Practices Scale translated by College of Nursing of Sun Yat-sen University (Mao, You et al. 2007) .

CHAPTER 2
LITERATURE REVIEW

This chapter presents situation of cervical spondylosis in China, cervical spondylosis and treatments, cultural practice related to cervical spondylosis, concept of quality of life (QOL) among patients with CS ongoing acupuncture, theory related to quality of life among patients with cervical spondylosis ongoing acupuncture, and factors influencing quality of life. This chapter reviews the literature from the following five parts:

2.1 Situation of cervical spondylosis in China

2.2 Cervical spondylosis and treatments

2.3 Cultural practice related to cervical spondylosis

2.4 Concept of QOL among patients with CS ongoing acupuncture

2.5 Theory related to QOL among patients

2.6 Factors influencing QOL among people with CS

Situation of cervical spondylosis in China

As the prevalence of long-term desk work increases, the prevalence of cervical spondylosis also increases yearly. At present, the prevalence of cervical spondylosis in China is 3.8–17.6 % (Lv, Tian et al. 2018). A study reported nearly 150 million people in China suffering from cervical spondylosis, including 82% of people over 60 years old, 71% of people aged 50–60 years old and 59.1% of young adults aged 30–40 years old (Qian, Yu et al. 2020). Prevalence of cervical spondylosis was high in Chinese population. People younger than 60 years were the focus of prevention for cervical spondylosis. Moreover, the characters between male and female and among different age groups were different and required targeted interventions (Lv, Tian et al. 2018). Among all disease types, cervical spine pain caused the loss of healthy life expectancy in Chinese people, rising from 21st in 1990 to 9th in 2017 (Vos, Abajobir et al. 2017). The incidence character and adverse consequences of cervical spondylosis need to pay attention nowadays.

Cervical spondylosis is defined as age-related chronic disc degeneration. However, the incidence of cervical spondylosis increased with aging before age 50 years and decreased with aging after age 50 years, especially in the elderly after 60 years old. The imaging examination demonstrated that the occurrence rate of bulge or herniation at C3-C4, C4-C5, C5-C6, and C6-C7 increased with aging before age 50 years and decreased with aging after age 50 years, especially after 60 years. Moreover, the incidence of hyperosteogeny and spinal stenosis increased with aging before age 60 years and decreased with aging after age 60 years, although there was no obvious change in calcification. The age-related risk factors, such as hypertension, hyperlipidemia, diabetes, cerebral infarct, cardiovascular diseases, smoking, and drinking, have no relationship with the incidence of cervical spondylosis (Wang, Tian et al. 2016).

Cervical spondylosis is also defined as vertebral osteophytosis secondary to degenerative disc disease, which in the cervical spine may be asymptomatic or can present as pure axial neck pain, cervical radiculopathy, cervical myelopathy, or cervical myeloradiculopathy (Que, Ye et al. 2013). Spondylosis is defined as a noninflammatory process occurring primarily because of disk degeneration around the amphiarthrodial joint formed by adjoining vertebral bodies and the disk between them. Disk degeneration and development of spondylosis are part of the normal aging process (Takagi, Eliyas et al. 2011). However, patients with cervical spondylosis ignore some external factors, which lead to the unhealthy cervical spine and accelerate the degeneration and aging of intervertebral discs.

Cervical spondylosis has the characteristics of high incidence, repeated pain, long course of disease and difficult recovery. It is a common clinical disease, with symptoms such as dizziness, headache, upper limb weakness, shoulder pain, etc. Early and late symptomatic treatment and rehabilitation nursing will lead to aggravation of the condition and seriously affect the daily life of patients (Su, Feng et al. 2021). Cervical spondylosis is characterized by progressive development and recurrent episodes. Mild impairment of function may result in bedridden and inability to take care of oneself in severe cases, which may bring adverse effects to the patients. Various psychological disorders such as anxiety disorder, depression and phobia may

form as time goes on (Wen and Liu 2013). These problems will make cervical spondylosis patients have low quality of life.

Cervical spondylosis and treatments

Definition, type, signs and symptoms of cervical spondylosis

Cervical spondylosis is a disease in which the surrounding tissues (nerve roots, spinal cord, blood vessels, etc.) are involved due to degenerative lesions of the cervical disc tissues and other secondary pathological changes (e.g., narrowing of the vertebral space, osteophytes at the edge of the conus, cartilage degeneration, ligamentous hypertrophy and calcification, etc.), resulting in a variety of symptoms and signs. Cervical spondylosis, also called cervical spine syndrome, is not a single disease, but a collective term for many cervical spine diseases. The diagnosis of cervical spondylosis is not simply detected from the imaging of herniated discs and osteophytes, but is confirmed when these changes compress or stimulate the surrounding nerves, blood vessels and other tissues, producing the corresponding symptoms. There are seven types of cervical spondylosis depending on the area of involvement, and different types have different symptoms (Shen, Samartzis et al. 2014).

1. Neck type cervical spondylosis is the initial stage of all cervical spondylosis and is mainly caused by cumulative strain injury due to poor posture, such as prolonged desk work and frequent looking down at the cell phone, perhaps starting in adolescence, and is more prevalent in young adults aged 30 to 40. Main symptoms: discomfort, stiffness, pain and other symptoms in the neck, there may be limited movement of the neck and the corresponding pressure pain points, night sleep may also appear repeatedly fallen pillow situation.

2. Cervical radiculopathy is the most common type of cervical spondylosis, mostly compression of the cervical spinal nerve in the fourth to seventh cervical vertebrae, accounting for about 60% to 70% of all cervical spondylosis. It usually starts in youth, with a high incidence in the 30-50 age group. Main symptoms: Patients may experience pain or swelling in the occipital, neck, shoulder and arm, and numbness like electric shock or pins and needles in the arm, as well as muscle weakness and atrophy in the interosseous muscles of the hand.

3. Cervical Myelopathy causes patients suffering from pathological changes such as disc herniation, ligamentous hypertrophy or calcification in the spinal canal, and spinal stenosis, resulting in spinal cord compression, inflammatory edema, and impaired blood supply, which can lead to a series of serious symptoms. Although the incidence of cervical myelopathy is not high, accounting for only 10% to 15%, it is the most serious and dangerous cervical spondylosis, with a high incidence in the age of 40-60. Main symptoms: At the beginning of the disease, patients may experience numbness, pain, stiffness, weakness, trembling of the lower limbs, difficulty walking and walking like "stepping on cotton"; subsequently, the upper limbs may become numb, grip strength of the hands may decrease, finger dexterity may be reduced, and objects may be easily dropped; in addition, patients may also have a "girdle feeling" in the chest and abdomen, and serious patients may also become incontinent or even become paralyzed.

4. Sympathetic cervical spondylosis is mainly due to intervertebral disc degeneration and segmental instability leading to sympathetic nerve involvement in the neck, resulting in a series of symptoms of sympathetic nerve disorder. This type of cervical spondylosis accounts for about 10%, often coexists with vertebral artery type cervical spondylosis, and is highly prevalent in the age of 30 to 45. Main symptoms: Occipital and neck pain, migraine, dizziness, nausea, vomiting, panic, chest tightness, precordial pain, blood-pressure instability, hand swelling, hand numbness, fear of cold, blurred vision, excessive sweating, chills, etc. Patients can be triggered by fatigue, insomnia, and menstruation.

5. Vertebral artery type cervical spondylosis is caused by intervertebral disc degeneration and segmental instability, which leads to compression of the vertebral artery and disturbance of blood supply to the basilar artery system, resulting in a series of symptoms of insufficient blood supply to the vertebral artery. This type of cervical spondylosis is relatively rare, but the risk of sudden collapse is extremely high, mostly in middle-aged people. Main symptoms: Patients may experience episodic vertigo, which usually occurs when the cervical vertebrae move to a fixed position or over-rotate, accompanied by nausea, vomiting and other symptoms, in addition to migraine, tinnitus, deafness, memory loss, visual impairment, neurasthenia, slurred pronunciation, numbness of the mouth and tongue, abnormal

facial sensation and other symptoms, as well as sudden change of head position, sudden dizziness, headache, falling to the ground, or sudden collapse.

6. Cervical spondylosis with esophageal compression causes by disc degeneration secondary to anterior longitudinal ligament and subperiosteal tears, hemorrhage, mechanization, calcification and bone spurs. Bone spurs vary in size, with medium and small ones being the most common. This type of cervical spondylosis is also very rare and is easily misdiagnosed or missed in clinical practice. Main symptoms: The main symptom is difficulty in swallowing, especially when the neck is tilted up.

7. Mixed type cervical spondylosis is a mixture of two or more types of cervical spondylosis, and patients may have multiple tissue sites involved at the same time, which may produce symptoms of multiple subtypes.

Treatments for cervical spondylosis

1. The main treatment is non-pharmacological treatment. 90% of patients with cervical spondylosis can be cured or relieved through conservative rehabilitation without surgery. The first thing a patient should do during a cervical spine attack is to rest and reduce the load on the neck to avoid pain or aggravation by wearing a neck brace or neck brace to support the head and relax the neck muscles. When the acute phase of inflammation is over, patients can undergo physical therapy at home and in the hospital. At home, hot water bags and hot towels can be used to warm up the affected area, while in the hospital, physical therapy such as thermal magnetic therapy, ultrasound, laser, manual massage, acupuncture, etc. can be received, thus playing an anti-inflammatory and pain-relieving role. Physical therapy plays a very important role in the treatment of cervical spondylosis.

2. Drug therapy is used to treat cervical spondylosis. It includes anti-inflammatory and analgesic drugs, muscle relaxants, autonomic nervous drugs, vasodilators and improved blood supply drugs, nutritional nervous drugs, corticosteroids and dehydrating agents, traditional Chinese medicine and Chinese prescription drugs, etc., which can also be divided into external drugs and internal drugs. Specific drugs should be used under the guidance of doctors, and the disease monitoring and adverse reaction monitoring should be done. These drugs for the treatment of cervical spondylosis, generally can not be long-term, frequent use. For

example, muscle relaxants should not be taken continuously for several days or used frequently. Antipyretic and analgesic non-steroidal anti-inflammatory drugs have the risk of adverse reactions in gastrointestinal tract, heart, liver and kidney, etc. Even for vascular dilators and neurotrophic drugs, they should not be used for more than half a year. Therefore, patients must pay attention to the rationality of medication, not self-medication, random medication.

3. Surgical treatments follow the principle of comprehensive rehabilitation first, and then consider surgery when it is ineffective and meets the indications for surgery. The main purpose of surgery for cervical spondylosis is to relieve the compression of nerves, blood vessels, and spinal cord by protrusions such as intervertebral discs and bony bulges, and to fix the unstable spinal segments (Cunningham, Hershman et al. 2010).

4. Traditional Chinese Medicine (TCM) is extensively used to reduce neck pain. At present, acupuncture therapy is one of the main physical treatments for cervical spondylosis (CHU, Jin et al. 2017). Many research found that acupuncture has a preferable therapeutic effect on chronic neck pain or shoulder pain caused by cervical spondylosis (Xu, Liang et al. 2012, Zuo, Gao et al. 2019). The mechanism of acupuncture on pain is acupuncture can accelerate the central nervous system to produce endogenous opioid peptides and activate related receptors by stimulating related acupoints to achieve peripheral analgesia (Wang, Zuo et al. 2020). Patients who have neck pain caused by CS is associated with slight degenerative changes within the intervertebral disc in early CS and acupuncture has good effect on this time. Generally, acupuncture treatment for 6 times is one course of treatment. Acupuncture can effectively reduce acute pain when patients receive three times of this treatment (CHU, Jin et al. 2017). Though acupuncture shows good immediate effect in treating cervical spondylosis, its long-term effect is not satisfactory. The difference in syndrome type may have some impact on the effects of acupuncture in alleviating pain (Que, Ye et al. 2013). Acupuncture therapy can’t avoid the recurrence of cervical spondylosis. The life quality among patients with cervical spondylosis ongoing acupuncture is not clear. The factors that influencing quality of life among these patients is not clear either.

Cultural practice related to cervical spondylosis

The ancient medical books of Traditional Chinese Medicine (TCM) have long been recorded cervical spondylosis and acupuncture therapy. It is believed that cervical spondylosis belongs to the category of "arthralgia syndrome" and "strong neck pain". Several Traditional Chinese Medicine books have mentioned that "wind, cold and dampness are mingled with each other to form arthralgia", which indicates that the uncomfortable feeling of neck is caused by wind, cold and dampness. TCM holds that the key to cervical spondylosis lies in the invasion of wind, cold and dampness in the neck, leading to obstruction of meridians, qi and blood, dystrophy. Acupuncture is believed to cure this disease as it has the function of dredging the meridians and channels, harmonizing the qi and blood, and opening the joints. (Xia, Ding et al. 2013).

Acupuncture has treated cervical spondylosis for a long time since ancient China. With the development of acupuncture theory, the methods of acupuncture for cervical spondylosis are increasing as well. The main methods of treating cervical spondylosis and neck pain are acupuncture, moxibustion, acupuncture combined with moxibustion, scalp acupuncture, intradermal acupuncture, electroacupuncture and abdominal acupuncture. Many researches find acupuncture therapy has obtained good curative effects as it can reduce neck pain and then improve patients' life quality. One study used different scales for comparison of efficacy on 60 patients with cervical spondylosis and ongoing acupuncture. The result showed that acupuncture could relief neck pain in the early period and improve quality of life (Lin 2013). Another study in 60 patients with CS showed that the new heat-sensitive moxibustion could effectively reduce neck pain 95% (Zhu and Zhang 2012). A study treated 30 patients with cervical pain by acupuncture combined with intradermal acupuncture and the results showed that this treatment had better long-term efficacy (Ge 2010). Another study explored the clinical effect of electroacupuncture on 70 patients with cervical spondylosis and found that this treatment reduced pain effectively (Wang 2010).

Acupuncture has good therapeutic effect on neck pain caused by cervical spondylosis that relates to its mechanism. Acupuncture at the cervical spinal acupuncture point regulates the dysfunction of the vegetative nerves and inhibits the conduction function of the spinal cord, which has an analgesic effect; it stimulates the

sensory transmission of nerves and affects the signal transmission of nerve endings; it also affects the spinal nerves and the paravertebral sympathetic nerve trunks, improves local microcirculation, and improves the state of tissue hypoxia and ischemia. (Dai, Huang et al. 2021). Studies have shown that acupuncture can accelerate the central nervous system to produce endogenous opioid peptides and activate related receptors by stimulating related acupoints to achieve peripheral analgesia. In addition, it can achieve anti-inflammatory effects by increasing the level of β-Ep in inflammatory tissues and serum. TCM believes that acupuncture can regulate the blood and blood balance of the human body, and the function of the body can also be improved by stimulating acupuncture (Wang, Zuo et al. 2020).

Compared with other treatments, acupuncture therapy has more advantage for treating cervical spondylosis. There is evidence that nonoperative treatment is more effective that operative for treating cervical spondylosis, and acupuncture is one of common therapy with advantages such as low risk, good therapeutic effect, ease of operation and its economics. It has the effects of dredging meridians, stimulating qi and blood circulation, relaxing adhesions and correcting subluxation, ultimately correcting the vicious cycle of the imbalance between the dynamic system and the static cervical vertebral system and establishing the ‘virtuous circle' instead which is beneficial to the rehabilitation of cervical spondylosis and thus alleviates clinical symptoms (Yang, Li et al. 2016).

Acupuncture is becoming more and more popular for treating cervical spondylosis due to its unique advantages of simplicity, convenience, efficacy, and low cost (Wang et al., 2020). Having significant effect on reducing neck pain, to some extent, acupuncture can improve quality of life among patients with cervical spondylosis. It is believed that acupuncture can improve quality of life among patients with cervical spondylosis as it can reduce some unpleasant symptoms. One study used the Northwick Park Neck Pain Questionnaire, McGill Pain Questionnaire and Short-Form 36 scale to conclude that acupuncture has some benefits to CS patients, and also enhance their signs and symptoms (Sun, Yue et al. 2013). Another results suggest that 4-week optimized acupuncture treatment alleviates CS-related neck pain and improves the quality of life, with the effects persisting for minimum 3 months(Chen, Li et al. 2021). In addition, Acupuncture was proved to be the efficacy and safety

treatment for cervical vertigo. Acupuncture was more effective than conventional medicine therapy in effectiveness, improvement rate of vertigo and headache, and increased average blood flow velocity of vertebral-basilar artery(Hou, Xu et al. 2017).

However, neck pain is just one of unpleasant physical symptoms that influencing quality of life among patients with cervical spondylosis. Quality of life is a multidimensional concept that many factors can influence it. With acceleration of the pace of modern life, computers, air conditioning, fans, and cars have become widely used, and cervical spondylosis has become a common health problem worldwide. Its etiological factors are multifactorial and involve poor posture, anxiety, depression, neck strain, and sporting or occupational activities (Que, Ye et al. 2013). But the factors influencing quality of life among patients with cervical spondylosis ongoing acupuncture are not clear.

Concept of QOL among patients with CS ongoing acupuncture

Quality of life (QOL) is an important concept in health care. The WHO (2014) defined health as ‘‘a state of complete physical, mental and social well-being, and not merely the absence of disease and infirmity’’ (Karimi and Brazier 2016). QOL has a broader definition including domains not as influenced by health care or disease (Unruh and Hess 2007). Some scholars considered QOL as "an individual" perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns". This is a subjective definition of QOL. QOL is a comprehensive evaluation of life's strengths and weaknesses. QOL is "an overall general well-being that comprises objective descriptors and subjective evaluations of physical, material, social, and emotional well-being together with the extent of personal development and purposeful activity, all weighted by a personal set of values". It is acknowledged that "quality of life is more than health status, clinical symptoms, or functional ability... health is only one dimension of quality of life" (Karimi and Brazier 2016). For this study, QOL is defined as a perception of cognitive judgment of satisfaction with one's life. It has multi-dimensional evaluations of physical and mental health that mainly including physical functioning, role physical, bodily pain, general health, daily vitality, social functioning, role emotional and mental health.

Patients with CS usually work under high pressure, live in a stressful rhythm, and usually do not pay attention to rest and exercise. In the long run, the strain on the neck muscles becomes serious and even compresses the cervical nerve, and finally various clinical symptoms and discomfort appear, thus affecting the QOL. The initial symptoms of cervical spondylosis are not obvious and do not affect the QOL, and patients with CS can relieve neck pain through rest and physical therapy (Que, Ye et al. 2013). However, most patients do not understand the pathogenesis of cervical spondylosis and are not aware of the factors affecting cervical spondylosis. They do not know how to reduce the strain on the neck muscles. It is when patients perceive that their QOL is reduced because of cervical spine problems that patients actively seek solutions to cervical spine problems.

The QOL of patients with CS is decreased because of the discomfort in the neck and shoulders. With cervical spondylosis, not only does the neck and back of the shoulders become sore, but the neck also becomes stiff, and in severe cases, this may even lead to restricted movement. Besides, patients with CS may experience soreness in the neck and shoulders, along with dizziness and swelling, and may even experience nausea and vomiting and sudden collapse. In addition, cervical spondylosis also affects the sympathetic nerves, resulting in blurred vision and dizziness, headache, and deafness. Cervical spondylosis also causes the patient's shoulders and back to feel heavy, the upper limbs to become weak, and the sensation of the limbs and skin to diminish. Patients may experience numbness in the fingers and have trouble holding things (Shen, Samartzis et al. 2014). These physiological discomforts caused by cervical spondylosis can lead to a decrease in the quality of life of patients.

With the passage of time, the condition of patients with CS will be more and more serious. Without prompt treatment, cervical spine problems can cause more damage to the body. Sympathetic patients will often feel cold hands and feet, sometimes also palpitation chest tightness. Toothache occurs when a degenerative lesion of the cervical spine compresses the cervical fifth vertebra and the cervical sympathetic nerve in front of the transverse process of the fifth vertebra. Cervical spondylosis can also induce stroke, paralysis, cerebral infarction and other diseases that seriously affect the QOL(Shen, Samartzis et al. 2014). A variety of physical

discomfort caused by cervical spine problems can also cause psychological harm to patients. Patients will suffer from insomnia, irritability, irritability, anxiety, depression and other bad emotions because of the problem of cervical spondylosis, which further affects the physical health and QOL of patients. Besides, the illness and hospitalization often prevent the patients of CS from assuming previous social functions and roles, severely impairing the patient's social functioning and inability to quickly adapt to role changes, limiting normal social activities with family, friends, neighbors, or co-workers, and leading to a decrease in QOL on several relevant dimension (Na & Li, 2012).

Above all, CS not only brings various physical discomfort, but also affects patients' daily activities and mood. CS reduces satisfaction with patients' life and then decline QOL. According to the performance caused by CS, this study defines QOL as a perception of cognitive judgment of satisfaction with one's life. It has multi-dimensional evaluations of physical and mental health that mainly including physical functioning, role physical, bodily pain, general health, daily vitality, social functioning, role emotional and mental health.

Theory related to quality of life among patients with cervical spondylosis

Theory of unpleasant symptom (TOUS) was first proposed by Lenz et al. in 1995 to describe the factors influencing the symptom experience and to identify the interrelationships among the factors. The TOUS has three main concepts: influencing factors, symptoms, and performance. Influencing factors include physiologic, psychologic and situational factors. Symptoms encompass four dimensions: intensity, timing distress, and quality. Performance consists of functional and cognitive activities. Lenz et al. (1995) pointed out that the causes of symptoms can be divided into physiological, psychological and background levels, and the three levels interact and influence each other, jointly determining the symptoms, and to a certain extent, are affected by the symptoms. Physiologic factors include normally functioning bodily system, the existence of any pathology, including the occurrence of trauma, and the individual's level of energy. Psychologic factors include the individual's mental state or mood, affective reaction to illness and degree of uncertainty and knowledge about the symptoms and their possible meaning. Situational factors

include aspects of the social and physical environment that may affect the individual's experience and reporting of symptoms. Potentially relevant social situational considerations include employment status, marital and family status, social support, availability of and access to health care resources, and lifestyle behaviors such as diet and exercise(Lenz, Pugh et al. 1997).

Because the symptom experience of patients with CS is multi-dimensional, TOUS can be used as a guiding framework for the symptom management of cervical spondylosis. The symptoms of CS usually present with neck pain, neck stiffness, or even shoulder pain and stiffness (Que, Ye et al. 2013). According to TOUS, there should be physiologic, psychologic, situational factors influencing these CS symptoms. The physiological factors of cervical spondylosis include degenerative changes of cervical intervertebral disc tissue, intervertebral stenosis, osteophytes along the conical edge, cartilage degeneration, ligament hypertrophy, calcification and other pathological changes, cervical spine trauma, and sleep quality problems. The psychologic factors of cervical spondylosis include mental stress, anxiety and depression. The situational factors of cervical spondylosis include type of jobs, lifestyle, health behavior, social support and knowledge about CS. These factors interact and influence each other. Changes in the physiological structure and abnormal function of the cervical spine can cause neurological weakness in patients with cervical spondylosis, which in turn can affect sleep quality. Sleep quality, in turn, affects the experience of physiological symptoms of the patient and also affects the treatment effect and recovery, which in turn affects the mood of cervical spondylosis patients (Dong & Xie, 2021).

The symptoms of CS directly influence functional and cognitive activities. Cervical pain can limit cervical movement, which in turn reduce work or study efficiency (Cunha et al., 2018). Cervical pain can also influence sleep quality, patients with CS often feel inadequate energy, sleep or rest, resulting in a decline in vitality and bad memory (Sun et al., 2018). Sleep quality problem leads to an increase of the symptoms of depression for people with neck pain (Juan et al., 2020). Pathological changes in the cervical spine lead to spinal cord compression and blood supply disorders which eventually lead to incontinence and even paralysis (Shen, Samartzis et al. 2014). QOL among patients with CS is reduced by these performances.

QOL among patients with CS is a perception of cognitive judgment of satisfaction when patients suffering unpleasant symptoms caused by CS. With guidance of TOUS, the factors influencing QOL among patients with CS include physiologic, psychologic and situational aspects. Through knowing these influencing factors, manage symptoms and then improve QOL.

Factors influencing quality of life among patients with cervical spondylosis

For this study, six factors are taken into consideration in explaining the compact on quality of life among patients with cervical spondylosis, these factors can influence quality of life individually or their combined effect can influence quality of life. These factors are lifestyle, sleep quality, stress, knowledge about cervical spondylosis, social support, and health behavior. All the factors and their association with quality of life is provided in detail as follows.

Lifestyle

Sociologists view lifestyles as the characteristic patterns of behavior, dress, speech, thought, and attitudes that different social groups exhibit, and which form the qualities of a group. Anthropologists, on the other hand, see lifestyle and culture as parallel and incompatible concepts, emphasizing that they are holistic, including both tangible and intangible aspects of human existence, not just social structures and personality traits. Some scholars believe that lifestyle is a reflection of human influences on the environment and the appropriate choices made in response to socio-economic conditions (Wang, 2009). For this study, lifestyle is defined as the characteristics of daily working and living style. It includes dietary habit, emotion and spirits, sleep habit, sporting, working mode and living environment.

Among these habits and choices are the ingestion of alcoholic beverages, smoking, diet, physical exercise and others. The absence of smoking, low alcohol consumption and the practice of physical exercise are associated with a better Quality of Life. The other components such as diet and social aspects have uncertain influence on quality of life (Ferreira et al., 2018). For this study, lifestyle refers to the

characteristics of daily working and living style. It includes daily behaviors and working mode, activities, diet, emotion and spirits.

From the theory of unpleasant symptom (TOUS), physiologic factors influence different symptoms and performance which lastly influence QOL. Lifestyle factor comes from situational factors of TOUS. Lifestyles has direct effect on the health and life quality in the short or long term (Apostu, 2013). A study showed that there was a significant relationship between lifestyle and quality of life ($r = .061$, $p < .001$) (Rajabi & Khodabandelou, 2018). Previous study suggested that the increasing incidence of CS is due to the aging of the population, the change of lifestyle and the increase of work or life pressure. These factors can lead degenerative changes, cause stimulation and compression to spinal nerve root and even dysfunction which seriously affects the quality of life (Zhou, Wang et al. 2021). Lifestyle has effect on clinical manifestation among patients with CS and their life quality.

Prolonged flexion of the neck when bent over these electronic devices (such as smart phone and computer) resulting in the neck pain. Looking down at electric products too much can lead to upper back pain ranging from chronic, nagging pain to sharp and severe upper back muscles spasm (Neupane, Ali et al. 2017). Some jobs required employees to look down or forward all day. Job requirement makes them easy to have neck pain. The forward pull of the weight of the head puts undue stress on the vertebrae of the lower neck, contributing to degenerative disc disease and other degenerative neck problems (Neupane, Ali et al. 2017). Work intensity and the duration of keeping the same work posture were both indicators of neck loading (Lv, Tian et al. 2018). A data revealed a significant association between work-related stress and neck pain ($r = -.53$ $p < .05$), while neck pain negatively impacted PCS scores of the SF-36 ($\beta = -5.38$, $p < .001$). Previous reports also demonstrated strong relationships between psychologic distress, job demands (stressful work, hectic work), low job control, and pain at multiple sites (Tsai, 2012). Less sporting can lead to poor blood circulation in the neck and local tissue ischemia and hypoxia, which can easily lead to dizziness (Zhang 2013). The habits of enjoying staying at cool air-conditional room, sleeping with a high hard pillow, reading with head down for more than 2 hours a day play negative effect on health of cervical spine (Wu & Zhao, 2015). A study on 60 patients with CS found that changing mode of life can promote rehabilitation for

the patients with CS of arteria vertebral is - type and of radix nervi - type ($p < .05$). Changing mode of life is one of the important methods for CS to improve life quality (Gong, Yang et al. 2008).

Lifestyle as above negatively compacts on physiological curvature and bony structure of cervical spine. Lifestyle has effect on the muscular tissues of the neck compressing which causes inadequate oxygen and blood supply to the local tissues. Then lifestyle brings neck pain, shoulder pain, numbness, and other physical discomfort symptoms, which in turn affects the QOL of patients. Lifestyle has negative effect on quality of life among patients with CS.

Sleep quality

Sleep quality is defined as an individual's self-satisfaction with all aspects of the sleep experience (Wu et al., 2012). Sleep quality is influenced by physiological, psychological, and environmental factors, and family/social commitments. Good sleep quality has positive effects such as feeling rested, normal reflexes, and positive relationships. Good sleep quality is necessary for good physical and mental health and a good quality of life. Poor sleep quality causes hosts of adverse medical and mental dysfunctions, adds to the existing burden of diseases. Poor sleep quality increases incidences of cardiovascular morbidity, increased chances of diabetes mellitus, obesity, derailment of cognitive functions, vehicular accidents, and increased accidents at workplaces (Chattu et al., 2018). For this study, sleep quality refers to a perception of the situation and quality of sleep with one's whole night sleeping. It included the length of sleep, the situation after falling asleep and waking up.

From the theory of unpleasant symptom, sleep quality factor comes from physiologic factors which influence different symptoms and then indirectly influence life quality. Poor sleep quality was found to be significantly associated of quality of life($\beta = -.32$, $p < .01$) (Araghi et al., 2013). Changes in the physiological structure and abnormal function of the cervical spine can cause neurological weakness in patients with cervical spondylosis, which in turn can affect sleep quality. Sleep quality, in turn, affects the experience of physiological symptoms of the patient and also affects the treatment effect and recovery, which in turn affects the quality of life of cervical spondylosis patients (Dong and Xie 2021).

There have been many studies on the relationship between sleep quality and life quality. Although the survey scale and the population are different, the conclusions all show that the total score of sleep quality and the score of each factor are negatively correlated with the score of life quality in all dimensions (Fan and Sun 2014, Yu, Zhu et al. 2015). Patients with cervical spondylosis are often accompanied by sleep disorders, and their quality of life is poor. It may be related to the following factors: long course of disease, gradual development, repeated attacks, often accompanied by physical pain to patients with adverse emotional and psychological reactions. Suffering from physical pain and psychological stress, patients often feel inadequate energy, sleep and rest, leading to a decline in vitality and other quality of life (Sun, Sun et al. 2018). Short hours of sleep per day increased the weight loading time of the spine, thus accelerating its degeneration. Shorter sleep duration per day was associated with emotional stress. Emotional stress was associated with neck pain (Lv, Tian et al. 2018).

A study on 100 patients with cervical spondylosis were examined with SF-36 and PSQI, and they were compared with 100 people without cervical spondylosis with the same gender, age and occupation. The results showed that the scores of SF-36 and the total scores of PCS and MCS in the patients were lower than those in the control group. The scores of GH and MCS in female patients were lower than those in male patients. The scores and total scores of PSQI in the patients were higher than those in the control group. The total scores of sleep time, sleep disorders, hypnotic factor and PSQI in female patients were higher than those in male patients, the factors that significantly predicted PCS scores were PSQI total score and sleep quality; factors that significantly predicted MCS scores were sleep disorders, sleep time, and hypnotic drugs. The study concluded the quality of life of patients with cervical spondylosis is closely related to the quality of sleep (Sun et al., 2018).

Poor sleep quality increased the weight loading time of the cervical spine (Cote, van der Velde et al. 2009), leading to an increase of the symptoms of depression for people with neck pain (Juan, Rui et al. 2020). Sleep quality has negative effect on experience of physical pain, psychological reaction, and spiritual situation, which lead to low quality of life among patients with CS.

Mental stress

Some scholars define mental stress as "a given individual in a given life situation with perceived lack of control over the situation, reacts with specific emotions, reduced efficiency of performance, and psychosomatic symptoms". The American Institute of Stress defines mental stress 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" (Hange et al., 2013). For this study, mental stress refers to a perception of ones' surrounding experience on itself psychological or mental situation.

Theoretically, psychological factors include the individual's mental state or mood, affective reaction to illness and degree of uncertainty and knowledge about the symptoms and their possible meaning(Lenz, Pugh et al. 1997), mental stress factor comes from psychological factors which influence different symptoms and then indirectly influence life quality. Mental stress can increase the descending facilitation of pain via sensitization and over activation of a number of pain-related areas in the forebrain and brainstem regions, a process called Cognitive Emotional Sensitization, finally facilitating the perception of pain (Ortego, Villafañe et al. 2016). Mental stress increases patients' pain feeling and brings other negative emotion which affects quality life. A study showed that perceived stress was significantly associated with quality of life ($\beta = -.13$， $p < .05$) (Dehghan et al., 2020).

Mental stress from life or work can change patients' behaviour, such as eating, playing video games, working long hours at a desk. High mental stress also changes the nature of blood flow, which can affect the health of the cervical spine. Mental stress will make patients with cervical spondylosis lack confidence in life, lower satisfaction with life, close themselves, and further decline in quality of life (Zhang 2020).The cost of treatment, cervical spondylosis progression and complications can increase mental stress. Then mental stress in turn affects patients confidence in treatment, which in turn has an impact on QOL (Jiang 2021). Long-term problems with cervical spondylosis can aggravate the economic burden of family and society and then lead to mental stress, which in turn can lead to disharmony in interpersonal relationships and dissatisfaction with work efficiency. As a result,

psychological disorders are exacerbated, repeated and vicious circles develop(Lv, Tian et al. 2018).

A study on 80 patients with cervical spondylosis and the result showed that the score of quality of life of cervical spondylosis in the experimental group given psychological nursing was higher than that in the control group, while numeric rating scales (NRS) and psychological scale compiled by Hamilton were lower than those in the control group, while the satisfaction of nursing in the experimental group was higher than that in the control group. The bad psychological state and psychological pressure in control group has lower life quality (Xia, 2020).

Mental stress influences the experience of feeling and daily activities among patients with CS. Besides, mental stress influence confidence on overcoming the disease and rehabilitation among patients with CS. In conclusion, mental stress has negative effect on QOL among patients with CS.

Knowledge about cervical spondylosis

Knowledge is the act of "perceiving" and "recognizing" a subject by means of convinced perceptions, and these perceptions have the potential ability to be used for specific purposes (Ochola et al., 2015). Knowledge about health is a theoretical construct that includes detailed and specific information about etiology, prevalence, risk factors, prevention, transmission, symptomatology and disease treatment, as well as on health services and patient rights (Trevethan, 2017). For this study, knowledge about CS refers to awareness related to symptoms of CS and health prevention or rehabilitation of cervical spondylosis.

According to the theory of unpleasant symptoms, potentially relevant social situational considerations include employment status, marital and family status, social support, availability of and access to health care resources, and lifestyle behaviors such as diet and exercise(Lenz, Pugh et al. 1997). Knowledge factor about CS is a kind of health care resource that comes from situational factors which influence different symptoms and then influence life quality. Previous evidence has demonstrated the positive effects of appropriate levels' health knowledge by community in general in health promotion and disease prevention (Al-Shaikh et al., 2017). Knowledge about CS has potential effect on the occurrence and development of cervical spondylosis disease which indirectly influence patient’s health and life

quality. A study showed that illness perceptions and personal control (β =.707, P=.003) as well as illness comprehensibility (β =.489, P=.014) were significantly correlated to the quality of life (Qiu et al., 2017).

A research found that 47.0% patients with cervical spondylosis have a serious lack of awareness of their own diseases, and there is a slight lack of awareness of the risk factors that may induce the occurrence of cervical spondylosis as well as related preventive measures (Zhao 2015). Another survey was conducted among 190 copywriters and found that the copywriters who lack of knowledge about CS usually had bad behavior habits, which affected the health of cervical vertebra, and the prevalence of neck discomfort was at a high level (Guan, Yang et al. 2017). A study proved that patients can regulate their own behavior and improve the success rate of cure and quality of life through understanding the causes of cervical spondylosis (Sun 2020).

Health education is one way to improve patient's knowledge about CS. It has certain influence value on the behavior of patients with occupational cervical spondylosis. Through the popularization of health knowledge and psychological education, patients can have confidence and highly cooperate with treatment, restrain their own bad behaviors in work and bad habits in daily life, so as to improve the cervical spine rehabilitation and quality of life (Zheng and Guan 2017). A study found that the recurrence rate of cervical spondylosis was as high as 92.7% in patients who had not received dimensional health education. The recurrence of cervical spondylosis itself, the lack of health knowledge of patients is difficult to restrain the bad habits of their own life, so the patients can't get rid of the long-term treatment of cervical spondylosis (Sun 2020).

The result of a study on health education intervention for 90 patients with cervical spondylosis showed a significant improvement in the assessment of symptoms and signs, NDI cervical dysfunction index scores and quality of life index scores in the intervention group, with statistically significant differences between the groups(Qin, Zhang et al. 2014). Knowledge about cervical spondylosis can effectively prevent or reduce the occurrence of cervical spondylosis. Improved patients' awareness can correct bad habits, relieve patients' symptoms and psychological stress,

and then improve the quality of life among patients with cervical spondylosis(Li, Li et al. 2013). Knowledge about CS has positive effect on quality of life among patients.

Social support

Social support is defined as the "various forms of aid and assistance supplied by family members, friends, neighbors, and others" , which broadly encompasses a multitude of social interactions (Siedlecki et al., 2014). Social support has been viewed as integral to health promotion because of its assistance in reaching an individual's physical and emotional needs, as well as buffering the effects of stressful events on the quality of life. According to Pender (1996), social support is identified as "a subjective feeling of belonging, being loved, esteemed, valued, and needed for oneself, not for what one can do for others" (Baheiraei et al., 2011). For this study, social support refers to perceptions of patients with CS receiving all kinds of support from families and friends.

Theoretically, situational factors include aspects of the social and physical environment that may affect the individual’s experience and reporting of symptoms. Potentially relevant social situational considerations include employment status, marital and family status, social support, availability of and access to health care resources, and lifestyle behaviors such as diet and exercise(Lenz, Pugh et al. 1997). Social support factor comes from situational factors which influence different symptoms and then indirectly influence life quality. Social support is one of the emotion-oriented coping mechanisms with the potential power for influencing life quality. Social support and health have a significant relationship, people who receive higher social support have better health. Social support leads to the improvement in health functions and even immunity performance. Social support can prevent the emergence of non-optimum physiological complications in the person, increase the level of self-care and self-confidence, and positively affect physical, mental, and social conditions (Rad, Bakht et al. 2013). A study showed that social support (β =0.23, $p<0.05$) was significantly correlated to the quality of life(Zhang et al., 2014)

Support and care from family members can bring great encouragement to patients, enhance the confidence to overcome the disease which are more conducive to the treatment and care of the disease (Shi, 2017).Social support can't improve patient body symptoms, but can obviously improve the patient's mental state. Good

family and social environment is the prerequisite and foundation to improve the quality of life (Na and Li 2012). A study investigated 304 patients and the result found that patients with cervical spondylosis who have more social support will have higher quality of life (Na & Li, 2012). A good family relationship can provide better psychological support and medical support for patients. The abundant scientific knowledge in social media as well as community health lectures and science fairs can help patients gain knowledge about the prevention and treatment of neck and back pain, provide objective social support and increase patients' scientific understanding of the disease (Sun 2020).

A study on 304 cases of cervical spondylosis patients were investigated with questionnaires on social support and quality of life by using Social Support Rating Scale (SSRS) and Short Form Health Survey Scale (SF-36). The results showed that the social support total score in patients with cervical spondylosis was 37. 23+6. 78 which was higher than the national norm; scores of 8 dimensions in the SF-36 scale were lower than the healthy population. In addition to the physiological functions, the remaining seven dimensions were positively correlated with three dimensions of social support. The study concluded that social support of patients with cervical spondylosis is closely related to quality of life (Na & Li, 2012).

On one hand, social support can regulate the negative effects of adverse factors on physical and mental health, thus maintaining or improving the physical and mental health of individuals. On the other hand, social support can maintain a good physical and mental experience of individuals and promote mental health(Sun 2020). Social support can cushion the stress of cervical spondylosis patients, increase patients' psychological satisfaction and gain confidence in life, thus improving patients' self-care ability and quality of life patients (Na & Li, 2012). Social support can positively influence quality of life among patients with CS.

Health behavior

Health behaviours have been defined as 'overt behavioral patterns, actions and habits that relate to health maintenance, to health restoration and to health improvement" (Gochman, 1997). A variety of behaviours fall within such a definition including smoking, alcohol use, diet, physical activity, sexual behaviours, physician visits, medication adherence, screening and vaccination (Conner & Norman, 2017).

Health behaviors, sometimes called health-related behaviors, are actions taken by individuals that affect health or mortality. These actions may be intentional or unintentional, and can promote or detract from the health of the actor or others (Short & Mollborn, 2015). For this study, health behavior refers to the various activities that patients with CS perform to enhance and maintain their physical and mental fitness.

From the theory of unpleasant symptoms, potentially relevant social situational considerations include employment status, marital and family status, social support, availability of and access to health care resources, and lifestyle behaviors such as diet and exercise (Lenz, Pugh et al. 1997) . Health behavior factor comes from situational factors which influence different symptoms and then influence life quality. The establishment of healthy behaviors and the enhancement of self-care awareness can prevent the recurrence of cervical spondylosis, improve the function of the cervical spine and enhance the ability of daily life activities of patients with cervical spondylosis (Yang and Sun 2020). When people understand their own health status, learn to manage their own health, and change the bad daily lifestyle and behavior, it will help to promote health, improve the quality of life, reduce the incidence of disease (Yuan, Jiang et al. 2015). A study showed that health behaviour (β =.127, P<.01) was significantly correlated to the quality of life(Feng et al., 2020).

The habits of using incorrect postures while reading and entertaining can disrupt the normal cervical curvature, which in turn compresses the muscle tissues of the neck and causes insufficient oxygen and blood supply to the local tissues. This leads to cervical pain and limited cervical movement, which in turn affects the quality of life of cervical spine patients (Cunha, Souza et al. 2018). A study of 100 patients with cervical spondylosis proved that maintaining correct postures and taking moderate physical activity were effective in relieving cervical pain(Han, Hai et al. 2021). Another study of 210 patients with cervical spondylosis found that the establishment of self-health management awareness and self-health management behavior could improve patients' confidence in recovery, effectively improve cervical spine function, reduce pain and promote recovery (Xiao, Yi et al. 2020).

Health behavior for cervical spondylosis is suggested as below. Seek medical consultation and treatment in a timely manner when experience neck discomfort, arm numbness and other symptoms. Take the initiative to learn about

cervical spondylosis and cooperate as well as adhere to treatment. It is best to sleep in a side-lying or supine position so that the head, the chest and waist are kept in a natural curvature. Avoid improper sleep position to induce or aggravate the occurrence of cervical spondylosis. Choose the right height pillow to sleep, generally 8 to 15 cm is appropriate. Avoid sleeping with a high pillow for a long time, which will not only increase the incidence of cervical spondylosis, while aggravating cervical spondylosis. The correct postures should maintain the normal physiological curve of the head, neck and chest. Shoulders and necks should have proper movements after 1~2h of work. Avoid prolonged close viewing of objects, reasonable arrangements for low head work and upper extremity weight-bearing time can help prevent and reduce the incidence of cervical spondylosis. Regular exercise of neck and shoulder muscles is conducive to the stability of the cervical spine. Avoid excessive fatigue and prevent neck strain can reduce the incidence and recurrence of cervical spondylosis (Yuan, Jiang et al. 2015).

Health behavior means that the patient has mastered the correct posture and exercise methods, and consciously adopts behavior and lifestyles that are conducive to health. This enables patients to be in the best condition to receive treatment in terms of physiology and psychology, which improves the treatment effect, effectively improves the discomfort of cervical spondylosis and enhances the quality of life (Ren 2011). A study found that the patients recurrence rate of cervical spondylosis was lower in the experimental group (who mastered health behavior) than the control group after discharged for 6 months and the rate of satisfaction was higher in the experimental group than the control group (Yuan, Jiang et al. 2015). Health behavior has positive effect on quality of life among patients with CS.

Summary

Quality of life is influenced by many factors. During the course of the disease, patients may experience negative psychological feelings due to the cost of treatment, disease progression, complications and other factors, or their own coping style may affect their confidence in treatment, which in turn has an impact on quality of life.

According to the theory of unpleasant symptoms (Lenz, Pugh et al. 1997), sleep quality plays as physical factors, mental stress plays as psychological factors, while lifestyle, knowledge about cervical spondylosis, social support and health behavior play as situational factors that influence QOL among patients with CS. From the physiological factors, neck and shoulder pain affect the movement of the neck or limbs, and then limit daily activities and working efficiency. Sleep quality directly influence the recovery of neck tissue and then influence daily energy. From psychological factors, mental stress increases the feeling of pain, numbness, and weakness. Patients have a long disease duration, and the pain caused by long-term symptoms has a greater psychological impact on the patient. From situational factors, lifestyle and health behaviours can change the structure of the cervical spine, accelerates intervertebral disc degeneration, and leads to the occurrence of cervical spondylosis. These changes finally influence symptoms and performance among patients with CS. Besides, the lack of social support causes stress, anxiety and other emotions to the patients which further impact on quality of life.

CHAPTER 3
RESEARCH METHODOLOGY

A cross-sectional predictive research approach was used for this study. The purpose of this study was to describe the quality of life among patients with cervical spondylosis ongoing acupuncture, to investigate factors influencing the quality of life among patients with cervical spondylosis and ongoing acupuncture in Wenzhou. This chapter presents study setting, population, sampling method, sample, measurement, ethic, data collection, and data analysis.

Research Design

A predictive study, cross-sectional design was used for this study, since this research involved establishing strength and direction of relationships between independent variables (lifestyle, sleep quality, mental stress, knowledge about cervical spondylosis, social support and health behavior) and quality of life. A cross-sectional study is appropriate for describing the status of phenomena or for describing relationships among phenomena at a fixed point in time (Spector 2019).

Setting of the study

This study was conducted at Rehabilitation Clinic of the Second Affiliated Hospital of Wenzhou Medical University from September 5th to November 5th in 2022, located in Wenzhou, China. This hospital is a general hospital with about 2,667 beds. The hospital has more than 130 clinical departments, 12 provincial key medical disciplines and 18 university-level research institutes. The Rehabilitation Clinic has about 600 patients per month, about 20% of whom has cervical spondylosis problem. Most patients came to see a doctor with neck pain impacting their daily work even their sleeping and they were willing to cooperate with doctor by acupuncture therapy.

Population and participants

This study population were patients with CS who were receiving acupuncture treatment in outpatient department of the Second Affiliated Hospital of

Wenzhou Medical University. Sample size for this study was calculated by using G*Power 3.1 software. Using a-power estimate of 90% with an alpha of .05, an small effect size 0.055 (Yang, Li et al. 2016). It generated total sample size of 239 subjects. Considering the 10% invalid questionnaire, the total sample for this study was 262 subjects. Therefore, this study sample was 262 patients with CS who have acupuncture treatment from the Second Affiliated Hospital of Wenzhou Medical University.

Inclusion criteria of the participants:

1) Aged 20 to 50 years old,

2) Have been receiving acupuncture therapy at least six times (one course is six time)(CHU, Jin et al. 2017),

3) Have no history of neck injury,

4) Have no problem related to cardiac, hepatic and renal dysfunction, coagulation dysfunction, immune system diseases, malignant tumor, cognitive, behavioral dysfunction,

5) Non pregnant women or preparing to become pregnant or lactating women, and

6) Have no skin allergy or skin disease at the treatment site.

Sampling technique

With approve of the hospital, the researcher searched for eligible patients who were willing to participate in this study from the clinic. The researcher assigned each patient a number on a small piece of paper and mix it in a box. 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 participate in the daily survey. This method was used to select patients until the sample reached at 262.

Research instruments

1. Demographic Data Record Form

Demographic data record form: Demographic data record form was used to assess demographic characteristics of the participants including age, gender, marital status, education level, type of occupation, household income, medical payment method, duration of illness, type of cervical spondylosis, type of comorbidity, and pain level.

2. Lifestyle Questionnaire

Lifestyle Questionnaire (Feng, 2013) was used to measure Lifestyle. The questionnaire consists of 42 items comprised of six subscales which are diet, sleep, psychology, exercise, stress control, environment. It is 5-point rating scale (1 = Never; 2 = seldom; 3 = sometimes; 4 = often; 5 = always). The higher score indicates healthier lifestyle. The Cronbach's alpha coefficient was .82 (Feng, 2013).

3. Pittsburgh Sleep Quality Index (PSQI)

Pittsburgh Sleep Quality Index (PSQI) (Buysse, Reynolds et al. 1989) translated into Chinese by Liu and Tang (Liu, Tang et al. 1996). It was used to assess the sleep quality. 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. Domestic and international tests have good reliability and validity. The split-half reliability coefficient of PSQI was .824. The overall Cronbach's alpha coefficient was .845 (Lu, Li et al. 2014).

4. Chinese Perceived Stress Scale

The Chinese version of the Perceptual Stress Scale (CPSS) (Yang and Huang 2003) was used to measure mental stress. It was developed by introducing the foreign version of the Perceptual Stress Scale (PSS) (Cohen, Kamarck et al. 1983) and was translated into Chinese language by Yang and Wang (Yang and Huang 2003). The scale consists of 14 items, including 7 forward questions and 7 reverse questions, among which the reverse scoring questions are 4, 5, 6, 7, 9, 10 and 13 respectively. The scale has two dimensions, namely, the sense of tension and the sense of loss of control. A 5-point scoring method is adopted to calculate the total score of the scale.

The score is calculated as follows: 1 for "never", 2 for "occasionally", 3 for "sometimes", 4 for "often" and 5 for "always", with the final total score ranging from 14 to 70. The higher the score indicates higher mental stress. The scale has been proved to be reliable and valid with a coefficient of .78.

5. Self-Rated Abilities For Health Practices Scale (SRAHP)

Self-Rated Abilities for Health Practices Scale (SRAHP) (Becker, Stuifbergen et al. 1993) translated by College of Nursing of Sun Yat-sen University (Mao, You et al. 2007) was used to measure health behavior. SRAHP contains 28 items and four subscales: 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 0-112. Higher scores indicate more health behavior. The Cronbach's alpha coefficient of the total scale was .95, and the Cronbach's alpha coefficients of the four dimensions were .86~ .89.

6. Social Support Rating Scale (SSRS)

Social Support Rating Scale (SSRS) (Xiao, 1994) was used to measure the level of social support. There are 10 items, including three dimensions: objective support (3 items), subjective support (4 items), and utilization of social support (3 items). Scoring method of the scale: items 1-4, 8-10: each item is only one choice, choose 1, 2, 3, 4 respectively, 1, 2, 3, 4 points, item 5 is divided into five items A, B, C, D, E total score, each item from none to full support respectively, 1-4 points, item 6, 7 if you answered "no source" would be 0 points, answer If you answered "the following sources", you would be given several points if you have several sources. The higher the score, the higher the degree of social support. The Cronbach's alpha reliability coefficient of this scale was .86 (Na & Li, 2012)

7. Cervical Spine Disease Health Knowledge Awareness Questionnaire

Cervical spine disease health knowledge awareness questionnaire (Du 2013) was used to measures the knowledge about cervical spondylosis. 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 reliability of the scale was good, with a Cronbach coefficient of .807.

8. The12-Item Short Form Survey (SF-12)

The12-Item Short Form Survey (SF-12) (Ware Jr, Kosinski et al. 1996) translated by Quality Metric company was used to measure quality of life. The SF-12 scale is divided into Physical Component Summary (PCS) and Mental Component Summary (MCS). The PCS consists of four dimensions which respond to the physical discomfort and illness of the subjects. The MCS consists of four dimensions which respond to the mental or psychological discomfort or illness of the subjects. A mental component score (MCS-12) and a physical component score (PCS-12) are reported from the SF-12. The scores reported as Z-scores. Each item response into both physical and mental need to be converted standardized values. Then sum the physical standardized values from the formula across all 12 items and add 56.57706 to create the SF-12 PCS score. Sum the mental standardized values in similar fashion and add 60.75781 to create the SF-12 MCS score. The SF-12 scale has good reliability and validity, with Cronbach's alpha coefficients of .92 and .88 for the PCS and MCS components, respectively. The intrinsic consistency Cronbach's alpha coefficient was .895 (Yang, 2018).

Psychometric properties of the instruments

Validity

All the research instruments were used in this research are not tested for the validities since all the instruments are extensively use and their validities have been established.

Reliability

All the research instruments were tested for their reliability using Cronbach alpha coefficient analysis before conducting the actual study. A pilot study was conducted to measure reliability in 30 patients with the same characteristics as the study sample in Rehabilitation Clinic of the Second Affiliated Hospital of Wenzhou Medical University. The acceptable value using Cronbach alpha coefficient analysis will be at least .70 (Taber, 2018). At the pilot study the reliability test of each questionnaire had been tested. The Cronbach's alpha coefficient of each questionnaire is the following: Health Lifestyle Questionnaire (.909), Pittsburgh Sleep Quality Index (.723), Chinese version of the Perceptual Stress Scale (.893), Self-Rated

Abilities for Health Practices Scale (.976), Social Support Rating Scale (.867), Cervical spine disease health knowledge awareness (.923), and The 12-item Short Form Survey (.808).

Human Subject Protection

Research proposal was approved from the Institutional Review Board (IRB), Burapha University (IRB # G-HS037/2565), Thailand. Upon approval, proposal was forwarded to the Research Ethics Board of the Second Affiliated Hospital of Wenzhou Medical University (IRB #2022-K-87-01). After the approval, the study was carried out in the Rehabilitation Clinic of the Second Affiliated Hospital of Wenzhou Medical University. Before the investigation, the purpose, significance and content of the investigation were explained to the participants first, and the informed consent was signed with the participant's consent and then investigation was carried out. Those refusal or incomplete answering questionnaires were considered as invalid questionnaire. Information related to the questionnaire was kept strictly confidential and only used in this study.

Data collection procedures

Data collection was carried out after getting approved of the Institutional Review Board from Burapha University in Thailand and the Second Affiliated Hospital of Wenzhou Medical University in China. Data collection process was consisted of following:

1. The permission from hospital leadership and rehabilitation clinic leadership was required before the questionnaire was conducted, and the researcher was required to complete daily nucleic acid testing and present a valid 2019-nCoV Nucleic Acid Test report daily.

2. The researcher obtained the list of participants receiving daily treatment from the acupuncturist one day in advance, selected patients who met the inclusion criteria on that day by simple random sampling, and obtained the participants' consent before administering the questionnaire.

3. Before the survey started, the researcher needed to assess the participants' condition and surroundings. After the participants completed the acupuncture

treatment, a suitable place was chosen for the participants to sit down and start the questionnaire. In addition, self-introduction and questionnaire survey was explained to the sample recruitment. The purpose, significance and content of the investigation were explained before starting the questionnaire. After obtaining the consent form, the researcher distributed paper questionnaires to the sample recruitment after finishing acupuncture treatment and start the questionnaire survey in the treatment room. It took about 45-60 minutes for the participants to fill out the questionnaires.

4. During the survey before the patient discharged from the hospital, this study followed guidelines to prevent COVID-19: 1) The participant and the researcher needed to wear masks; 2) The participant and the researcher needed to disinfect hands with quick hand disinfectant or wash hands with soap solution before and after the interview; 3) The participant and the researcher needed to maintain a safe distance of at least 1 meter; 4) The pens and other objects were cleaned and disinfected before being handed over to the participant; 5) The completed questionnaires and unfilled questionnaires were stored separately by the researcher.

5. During the survey, the researcher would sit next to the participant and the participant would complete the questionnaire independently. If the participant had a question about an item, he or she could ask the researcher for an explanation, but the researcher did not induce the participant to answer a question. so that the results would be biased.

6. After the questionnaire was completed, the participant had to put the paper questionnaire and the pen in the prescribed box before leaving. The researcher did not look at the questionnaire in front of the participant or mark the questionnaire. The unfilled questionnaires were considered as invalid which were not included in the data analysis.

Data analysis

Descriptive statistics, frequency, percentage, mean and standard deviation were used to describe demographic and other variables. The factors that influenced patients' quality of life was analyzed by multiple regressions. Testing assumption of multiple regression was conducted. Statistical significance level was set up at $p < .05$.

CHAPTER 4
RESULTS

This chapter presents the results of the study including demographic characteristics of the sample, description of studied variables, and factors affecting quality of life among 262 patients with cervical spondylosis who have acupuncture treatment at the Rehabilitation outpatient department, the Second Affiliated Hospital of Wenzhou Medical University in Wenzhou, China.

Description of demographic characteristics of the sample

A total of 262 sets of questionnaires were distributed in the Second Affiliated Hospital of Wenzhou Medical University in China. Of which 256 completed and returned the questionnaires making the response rate 97.70%. The demographic characteristics of the participants are presented in Table 1.

Table 1 Description of demographic characteristics of the sample (n= 256).

Variables		Frequency	Percentage (%)
Age(years)	(Range=20-50years, 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		149	58.20
Divorce		17	6.64
Remarriage		9	3.52
Level of education			
Primary school and below		9	3.52
Junior high school		43	16.80
Highschool/technical school		98	38.28
Junior college		54	21.09
Bachelor degree or above		52	20.31
Occupation			
Workers or staff		35	13.67

Table 1 (Continued)

Variables	Frequency	Percentage (%)
Farmer	21	8.20
Teacher	86	33.59
Medical staff	39	15.23
Civil servant	59	23.05
Freelancer	9	3.52
Unemployed	5	1.95
Other	2	0.78
Household income (Yuan)		
< 1000 ¥	5	1.95
1000-3000 ¥	46	17.97
3001-5000 ¥	13	5.08
>5000 ¥	192	75.00
Insurance		
Medical insurance for urban residents	30	11.72
Medical insurance for employees	219	85.55
Self pay	7	2.73
Duration of disease		
< 12 months	60	23.44
12-60 months	150	58.59
> 60 months	46	17.97
Type of cervical spondylosis		
Neck type Cervical spondylosis	187	73.05
Cervical radiculopathy	61	23.83
Cervical Myelopathy	6	2.34
Other type of Cervical spondylosis	2	0.78
Number of comorbidities		
≤ 3	170	66.41
> 3	86	33.59
Pain level		
Slight pain	172	67.19
Moderate pain	38	14.84
Severe pain	31	12.11
Unbearable pain	15	5.86

Table 1 presents the characteristics of 256 participants, majority of them was female (73.05%) and the rest comprised of male participants (26.95%). The average age of the participant is 35.24 (SD = 8.74) years and ranged from 20 to 50 years. Majority of the participants were married (58.20%), followed by unmarried people (31.64%). In terms of education background, the proportion of participants with high

school and technical school is the highest (38.28%), and the number of participants with Junior college and bachelor degree or above college education background is close, 54 and 52 respectively. It can be seen that majority of participants have good education background, which is generally at or above the technical secondary school level; In terms of occupation type, various occupations among the participants are widely distributed, including workers, farmers, teachers, medical staffs, civil servants and other occupations. Teachers and civil servants accounted for the largest proportion, 33.59% and 23.05% respectively. From the perspective of family income, there are fewer people with income below 1000 yuan and 3000-5000 yuan, and the largest number with monthly income above 5000 yuan, 192 participants, accounting for 75%. Of the 256 participants included in the study, 58.59% had a course of 12-60 months, and 23.44% had a course of less than 12 months. In terms of the type of cervical spondylosis, the majority of participants are cervical spondylosis (73.05%), which is consistent with the actual clinical situation. The number of comorbidities among 170 patients was ≤ 3, and the number of comorbidities among 86 participants was >3. In terms of pain degree, 67.19% of the patients chose mild pain, 14.84% chose moderate pain, 12.11% chose severe pain, and 5.86% chose unbearable pain. It shows that most participants have obvious pain affecting their daily life.

Description of studied variables

Table 2 illustrates that score of possible range, actual rang, mean and standard deviation among studied variables. Lifestyle ranged from 104 to 182, with mean of 144.72 (SD = 20.9), according to the scoring criteria provided by the scale author, the score of the respondents was higher than that of the basic population, indicating that the lifestyle of the respondents was not healthy enough. Sleep quality ranged from 2 to 19 with mean score of 11.11 (SD =3.22). Mental stress ranged from 14 to 70 with mean score of 33.66 (SD =15.79). The scores of health behavior ranged from 52 to 84, with mean score of 68.26 (SD = 6.33), the scores of social support ranged from 15 to 35, with mean score of 25.04 (SD = 6.06). Knowledge about cervical spondylosis ranged from 4 to 20 with mean score of 11.53 (SD =4.97).

Table 2 Description of studied variables

Factors	Possible range	Actual range	Mean	*S.D.*
Lifestyle	42-210	104-182	144.72	20.90
Sleep quality	0-21	2-19	11.11	3.22
Mental stress	14-70	14-70	33.66	15.79
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

Description of the Quality of life

This part contains the description of the study variables in the quality of life (QOL) which consists of physical component summary (PCS) and mental component summary (MCS). As shown in table 3, the mean score of total scores in QOL scale was 37.77 ± 10.57 indicating relatively moderate levels in quality of life among the participants. The mean score of PCS scale was 37.44 ± 10.41 indicating having upper moderate levels of physical health status reported by the participants. The mean score of MCS scale was 38.10 (SD = 12.13) indicating having upper moderate levels of mental health status reported by the participants. According to the scoring criteria of SF-12 scale, the higher scores indicated higher quality of life.

Table 3 Description of the QOL variables (n=256)

Factors	Possible range	Actual range	Mean	*S.D.*
PCS	13-56	13-56	37.44	10.41
MCS	9-60	10-60	38.10	12.13
Total scores	11-58	14-55	37.77	10.57

Relationships between predicting factors and Quality of life

The Pearson's correlation test was performed to test the relationships between lifestyle, sleep quality, mental stress, health behavior, social support,

knowledge about cervical spondylosis and quality of life. The correlation results between variables showed that scores of sleep quality was negatively correlated with quality of life (r = -.558, p < .01). lifestyle, mental stress, health behavior, social support, knowledge about cervical spondylosis were positively correlated with quality of life (r = .800, p <.01; r = .380, p <.05; r = .799, p <.01; r = .352, p <.01; r =.491, p <.01, respectively).

Table 4 The relationship between factors and Quality of life (n=256)

	Lifestyle	Sleep quality	Mental stress	Health behavior	Social support	Knowledge about cervical spondylitis	Quality of life
Lifestyle	1.000	-.511**	.413**	.907**	.328**	.513**	.800**
Sleep quality		1.000	-.209**	-.484**	-.190**	-.206**	-.558**
Mental stress			1.000	.390**	.108	.280**	.380**
Health behavior				1.000	.287**	.484**	.799**
Social support					1.000	.191**	.352**
Knowledge about cervical spondylosis						1.000	.491**
Quality of life							1.000

** p < .01

Factors influencing QOL among participants

Before proceeding with the analysis, the assumptions of the multiple regression tests were tested. The dependent variable is QOL, the six independent variables are lifestyle, sleep quality, mental stress, health behavior, social support and knowledge about cervical spondylosis. Multicollinearity among the independent variables was tested using variance inflation factor (VIF). All VIFs < 10 indicate that the model is well constructed. There is a linearity of independent variables and log odds. Regression residuals, P-P plots and scatter plots were used to demonstrate that the data are normally distributed. The variance inflation factors of lifestyle (VIF = 6.376), sleep quality (VIF = 1.367), mental stress (VIF = 1.218), health behavior (VIF = 5.673), social support (VIF = 1.125) and knowledge about cervical spondylosis

(VIF = 1.38) were all smaller than 10 without severe multicollinearity, no outliers, and homoscedasticity test yields was significant ($p < .001$).

Table 5 presents the result obtained from multiple regression analysis. An alpha of < .05 was considered statistically significant.

In table 5, lifestyle ($\beta =. 25$, $p<.01$), health behavior ($\beta =.379$, $p <.001$), social support ($\beta =.098$, $p <.01$), knowledge about cervical spondylosis ($\beta =. 107$, $p <.01$) significantly and positively predict the level of quality of life. Scores of sleep quality ($\beta =-.196$, $p <. 001$) negatively predicted quality of life. Mental stress ($\beta =.047$, $p >.05$) could not predict the level of quality of life.

R is an important index to judge the linear relationship between them, and also reflects the degree of regression fitting. Generally speaking, R values are distributed between 0 and 1, and the larger the value, the stronger the linear relationship. In this study, R = .847, indicating a correlation between medium and higher levels. R^2 is the degree to which the variation in the dependent variable in the regression is explained by the independent variable. In this study, $R^2 = .717$, suggesting that the independent variable could explain 71.7% of the dependent variable variation. However, R^2 will exaggerate the interpretation degree of independent variable to dependent variable variation, so the adjusted $R^2 = .710$.

Table 5 Factors predicting QOL among participants (n=256)

Predicting factors	B	SE	β	t	p-value
Lifestyle	0.126	.043	.25	2.941	.004
Sleep quality	-0.709	.143	-.196	-4.973	.000
Mental stress	0.032	.025	.047	1.267	.206
Health behavior	0.059	.012	.379	4.724	.000
Social support	0.579	.211	.098	2.747	.006
Knowledge about cervical spondylosis	0.226	.084	.107	2.692	.008

$R = .847$, $R^2= .717$, Adjusted $R^2 = .710$, $p < .05$, Constant = -9.32

CHAPTER 5
CONCLUSION AND DISCUSSION

This chapter presents summary of the study and findings in relation to those previously reported in the literature. Subsequently, the implications for nursing, recommendations for future research, limitations and conclusion are presented.

Summary of the findings

This cross-sectional predictive study was designed to describe the quality of life among patients with cervical spondylosis ongoing acupuncture in Wenzhou and to investigate the predictive relationship between lifestyle, sleep quality, mental stress, knowledge about cervical spondylosis, social support and health behavior and the quality of life among patients with cervical spondylosis ongoing acupuncture.

The target population of this study was 262 patients with cervical spondylosis who had acupuncture treatment from the Second Affiliated Hospital of Wenzhou Medical University. A total of 262 sets of questionnaires were distributed. Of which 256 completed and returned the questionnaires making the response rate 97.70%. Data were collected using Health Lifestyle Questionnaire, Pittsburgh Sleep Quality Index, Chinese version of the Perceptual Stress Scale, Self-Rated Abilities for Health Practices Scale, Social Support Rating Scale, Cervical spine disease health knowledge awareness questionnaire, 12-item Short Form Survey and their Cronbach's alpha coefficients were .909, .723, .893, .976, .867, .923 and .808 respectively. Data were analyzed using descriptive statistics, testing assumption and multiple regression to determine relationship between the variables. The results of this study are as presented below.

Study findings

Among 256 participants in this study, majority of them (73.05%) were female The average age of the participant was 35.24 years (SD = 8.74) and ranged from 20 to 50 years. 41.40% participants received high level education. 58.20% participants were married having a steady job with good household income. 75% participants had more than 5000 yuan as household income per month. Only 2.73%

participants paid for health care by themselves. The result also concluded that 73.05% participants had simply type cervical spondylosis and 76.56% of them had suffer this health problem for more than one year. 67.19% participants got slight pain and only 5.86% unbearable pain when participants complete one course treatment. 66.41% participants had less than three kinds of comorbidities before they got the cervical spondylosis.

Most of participants have little care about factors affecting their health while they have acupuncture treatment. They seldomly consider factors as lifestyle, sleep quality, mental stress, knowledge about cervical spondylosis, social support and health behavior that affecting their quality of life.

The result indicated that lifestyle of participants was not healthy enough as the mean score of Lifestyle scale is 144.72 (SD = 20.9). The mean scores of sleep quality, mental stress, health behavior, social support, knowledge about cervical spondylosis are 11.11 (SD =3.22), 33.66 (SD =15.79), 68.26 (SD = 6.33), 25.04 (SD = 6.06), 11.53 (SD =4.97) respectively. Besides, the mean score of total scores in QOL scale was 37.77 ± 10.57. Using Pearson's correlation test, the result showed that sleep quality was negatively correlated with QOL (r = -.558,). lifestyle, mental stress, health behavior, social support, knowledge about cervical spondylosis are positively correlated with QOL (r = .800; r = .380; r = .799; r = .352; r =.491, respectively). The result also found that lifestyle (β =. 25), health behavior (β =.379), social support (β =.098), knowledge about cervical spondylosis (β =.107) significantly and positively predict the level of quality of life. Sleep quality (β =-.196,) negatively predicted quality of life. Mental stress (β =.047, p >.05) could not predict the level of quality of life.

Discussions

Quality of life (QOL) among patients with CS ongoing acupuncture

The selection of a scientific research instrument to assess the QOL is the key to the study. In this study, the SF-12 scale was selected to assess QOL and the reliability test confirmed that it could be independently applied to assess the QOL among patients with CS ongoing acupuncture. This study found that patients with CS ongoing acupuncture were young group, with an average age of 35.24, and their

quality of life was at a moderate level. Most of these patients were women, married and had stable jobs and incomes. These patients had moderate level of QOL they had good social support. As good family and social environment was the prerequisite and foundation to improve the quality of life (Na and Li 2012). This study found that patients with CS ongoing acupuncture were generally highly educated and had moderate level of QOL. These patients could perceive stress and regulate their mood. The study found that patients with slight cervical pain within 5 years had moderate level of QOL. Their quality of life was not affected by the long course of the disease, most of them had less than three kind of complications, most of them were neck type cervical spondylosis patients. Their neck pain could be relieved by acupuncture therapy. This finding is different from Lv et al. study. Their study considered that long-term problems with cervical spondylosis could aggravate the economic burden of family and society and then lead to mental stress, which in turn could lead to disharmony in interpersonal relationships and dissatisfaction with work efficiency, then finally influenced QOL (Lv, Tian et al. 2018). This study found that patients with neck type cervical spondylosis or nerve root type cervical spondylosis had a higher quality of life compared to patients with spinal cord type cervical spondylosis, mainly in terms of milder clinical symptoms (e.g., headache and dizziness, shoulder pain), patients' daily activities being less affected as well as a shorter course of acupuncture treatment, showing that the type of cervical spondylosis and clinical manifestations affect the level of QOL. This finding is same with previous study. The clinical symptoms and the type of cervical spondylosis can impact on QOL among patients with CS (Wen and Liu 2013). Patients with cervical myelopathy usually have low quality life before they get the effect treatment (Singh, Gnanalingham et al. 2006).

Factors influencing QOL among patients with CS

This study found that lifestyle factor had positive effect on QOL ($\beta = .25$, $p < .01$), which was confirmed by the theory of unpleasant symptom (Lenz, Pugh et al. 1997). Lifestyle leads changes on physiological curvature and bony structure of cervical spine and has effect on the muscular tissues of the neck compressing which causes inadequate oxygen and blood supply to the local tissues. Then lifestyle brings neck pain, shoulder pain, numbness, and other physical discomfort symptoms, which

in turn affects the quality of life among patients with CS. This finding is same with previous studies. Living habits and working mode are main lifestyle influencing health of cervical vertebra. Avoid heavy working and having good rest is benefit for cervical vertebra. Good sleeping posture and sitting posture can effectively avoid cervical dislocation or neck muscle injury. Doing sports regularly and have good diet is good for neck blood circulation and neck muscle. This lifestyle can effectively avoid cervical spondylosis coming and having better health and life (Su et.al, 2021). However, most patients with cervical spondylosis do not choose health lifestyle before they come to see a doctor. Sun et.al (2017) found that lifestyle has affected quality of life as their study result showed that occupation, smoking, life events (β=.248, -.170, -.169) could affect physical health of patients with cervical spondylosis. It is believed that lifestyle has effect on cervical spine muscles and ligaments fatigue, which will finally affects the health of the cervical spine and patients' quality life (Gordon, Grimmer-Somers et al. 2011).

This study found that sleep quality factor had negative effect on QOL(β = -.196, p <.001), which was confirmed by the theory of unpleasant symptom (Lenz, Pugh et al. 1997). Patients with CS often have problems with sleep quality because the cervical vertebra has appeared pathological changes. And sleep quality will further affect the health of the cervical spine, thus affecting the quality of life of patients. This finding is same with previous studies. Good sleep quality has positive effects such as feeling rested, normal reflexes, and positive relationships and plays necessary role in good physical and mental health and a good quality of life (Chattu et al., 2018). Good sleep quality was found to be effectively reduce anxiety and depression in the patients with cervical spondylosis (r =.340, .358, p <.01) (Sun et al., 2017). On the other hand, poor sleep quality was found to be negatively significantly associated of quality of life (β= -.32, p <.01)(Araghi et al., 2013). Approximately 40% of neck pain patients had sleep disorder and then got worse work efficiency that affecting their quality life (Artner et al., 2013). This is related to changes in the physiological structure and abnormal function of the cervical spine. These changes can cause neurological weakness in patients with cervical spondylosis, which in turn can affect sleep quality. Besides, sleep quality affects the experience of physiological symptoms of the patient and also affects the treatment effect and recovery, which in turn affects

the quality of life of cervical spondylosis patients (Dong and Xie 2021). To enhanced sleep quality is benefit for reducing bodily discomfort and then improve mental health dimension of quality life ($\beta = .98$, $p < .01$) (Tang, Liou et al. 2010).

This study found that knowledge about CS factor had positive effect on QOL ($\beta = .107$, $p < .01$). Knowledge of CS helps patients better understand the influencing factors of cervical spondylosis and help patients how to prevent and recover, so as to reduce the recurrence of cervical spondylosis. This finding is same with previous studies. Du found that patients with cervical spondylosis obviously lacked of disease-related health knowledge, especially the induced factors of cervical spondylosis, the correct posture of the neck and the prevention methods of recurrence (Du 2013). Whether having enough knowledge about CS has potential effect on the occurrence and development of cervical spondylosis disease. Knowing more about disease-related health knowledge is positively affected individual health and quality life ($\beta = .489$, $p < .05$) (Qiu et al., 2017). 76.9% participants lacking of knowledge about CS usually had bad behavior habits, which affected the health of cervical vertebra, and the prevalence of neck discomfort was at a high level (Guan, Yang et al. 2017). Illness knowledge is proved to be correlated with both self-care behaviors ($r = -.42$, $p < .01$) and quality of life ($r = -.22$, $p < .01$) (Liu, Wang et al. 2014). Those patients getting well known about disease- related knowledge usually have low level of anxiety and depression ($r = -.57$, $p < .001$) while have more feelings of optimism ($r = .39$, $p < .001$), that was positively affects quality of life (Wang, Hay et al. 2014).

This study found that social support factor had positive effect on QOL ($\beta = .098$, $p < .01$), which was confirmed by the theory of unpleasant symptom (Lenz, Pugh et al. 1997). Social support can regulate the negative effects of adverse factors on physical and mental health, can cushion the stress of CS patients, improving patients' quality of life. This finding is same with previous studies. Social support can reduce stress, increase patients psychological satisfaction and gain confidence in life, thus improving patient's self-care ability and quality life (Na and Li 2012). In Na and Li study, the result showed that the social support total score in patients with cervical spondylosis was 37. 23+6. 78 which was higher than the national norm in China; scores of 8 dimensions in the SF-36 scale were lower than the healthy population ($p < .05$); in addition to the physiological functions, the remaining seven dimensions were

positively correlated with three dimensions of social support (p <. 05) (Na and Li 2012). Adequate social support help patients build optimism attitude and improve mental health dimension of quality life (r = .27, p < .01) (Wang, Hay et al. 2014). Social support can prevent the emergence of non-optimum physiological complications in the person, increase the level of self-care and self-confidence, and positively affect physical, mental, and social conditions (Rad, Bakht et al. 2013). Previous study showed that social support (β = .23, p <.05) was significantly affected the quality of life (Zhang et al., 2014). Social support helps patients receive through social connections that can reduce psychological stress reactions, relieve mental tension, and improve adaptive capacity. Suffering discomfort caused by cervical spondylosis, most patients usually have not enough energy and even have difficulty in doing daily work. Support from family members can help patients face less anxiety caused by disease and adjust themselves to changes so that patients build confidence to recover soon. Other support such as medical support also has positive effect on improving mental health dimension of quality life (Na and Li 2012).

This study found that health behavior factor had positive effect on QOL (β =.379, p < .001), which was confirmed by the theory of unpleasant symptom (Lenz, Pugh et al. 1997). Patients with cervical spondylosis need to master health behaviors conducive to the health of the cervical spine, because unhealthy behaviors often lead to pathological changes of the cervical spine. These pathological changes can lead to a variety of unpleasant symptoms and reduce the quality of life. This finding is same with previous studies. The establishment of healthy behaviors and the enhancement of self-care awareness can prevent the recurrence of cervical spondylosis, improve the function of the cervical spine and enhance the ability of daily life activities of patients with cervical spondylosis (Yang and Sun 2020). When people understand their own health status, learn to manage their own health, and change the bad daily lifestyle and behavior, it will help to promote health, improve the quality of life, and reduce the incidence of disease (Yuan, Jiang et al. 2015). Health behavior such as correct posture and exercise methods (β =.127, P<.01) was significantly affected to the quality of life (Feng et al., 2020). Health behavior for cervical spondylosis patients is suggested as below: Seek medical consultation and treatment in a timely manner when experience neck discomfort, arm numbness and other symptoms. Take the initiative to learn

about cervical spondylosis and cooperate as well as adhere to treatment. Avoid improper sleep position. Avoid sleeping with a high pillow for a long time. Avoid keeping stable posture for more than 2 hours. Avoid excessive fatigue and prevent neck strain. Patients who realize and master these health behaviors have low incidence rate and recurrence of cervical spondylosis (Yuan et al., 2015). Health behavior has positive effect on physical health dimension of quality life among patients with cervical spondylosis ($\beta = .156$, $p < .01$) (Sun et al., 2017).

This study found that mental stress factor could not predict quality of life among participants ($\beta = .047$, $p > .05$). This finding is different from previous study. Long-term problems with cervical spondylosis can aggravate the economic burden of family and society and then lead to mental stress(Lv, Tian et al. 2018).Besides, the cost of treatment, cervical spondylosis progression and complications can increase mental stress. The correlation result of this study showed that mental stress is positively correlated with quality of life ($r = .380$, $p < .01$). However, mental stress could not predict quality of life among participants. The level of mental stress mainly depends on pain level ($r = .469$, $p < .01$) and duration of disease ($r = .209$, $p < .01$) (Sun, 2020a). Sun (2017) found that anxiety and depression have correlation to sleep quality among patients with cervical spondylosis ($r = .340$, $r = .358$, $p < .01$) and this result related to the characteristic of the disease. From multiple regression analysis of this study, mental stress ($\beta = .047$, $p > .05$) could not predict the level of quality of life. As there were 67.19% participants got slight pain, and 75% participants had more than 5000 Yuan as household income per month while most of them just have neck pain bothering their daily life, they don't have much stress in this study. Previous study pointed out that high mental stress increases patients' pain feeling and brings other negative emotion which affects quality life (Dehghan et al., 2020). However, mental stress can not change the structure of cervical vertebra and then it can not influence the symptoms caused by cervical spondylosis.

Implications for Nursing

As patients with cervical spondylosis pay more attention on quality life, nurses need not only evaluate the effect of treatments but also put more attention on factors influencing quality of life. The result found that lifestyle, health behavior,

social support, knowledge about cervical spondylosis significantly and positively predicted the level of quality of life while sleep quality negatively predicted quality of life. 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. Based on the results, nursed can provided useful intervention such as adjusting patients with unhealthy lifestyle and unhealthy behavior, helping them to get social support and knowledge about cervical spondylosis as well as avoiding bad sleeping quality. This study develops nursing intervention on how to promote quality of life among patients with cervical spondylosis ongoing acupuncture, which can provide further basis for experimental research design.

Strength and limitations

Strengths of this study included the research setting 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, this study using self-report surveys gets most participants' cooperation as the response rate is 97.70%. To some extent, the quality of the questionnaire is guaranteed which is helpful to the authenticity of the data analysis. This study suggested that lifestyle, sleep quality, health behavior, social support and knowledge about CS have strongly influent on QOL. However, this study used self-report surveys, which might not capture accurate factors affecting the quality of life among patients with CS ongoing acupuncture if they chose not to provide accurate data. This study is only in the Wenzhou area and can not represent all Chinese patients with CS ongoing acupuncture.

Conclusion

This study focuses on factors affecting quality of life among patients with cervical spondylosis and the findings found that the quality of life was significantly related to lifestyle, sleep quality, health behavior, social support, and knowledge about CS. This study would be benefit for nurses to apply the results to improve QOL among patients with CS ongoing acupuncture.

REFERENCES

Artner, J., et al. (2013). "Prevalence of sleep deprivation in patients with chronic neck and back pain: a retrospective evaluation of 1016 patients." J Pain Res 6: 1-6.

Auvinen, J., et al. (2017). "Long-term adolescent multi-site musculoskeletal pain is associated with psychological distress and anxiety." Journal of Psychosomatic Research 93: 28-32.

Becker, H., et al. (1993). "Self-rated abilities for health practices: A health self-efficacy measure." Health Values: The Journal of Health Behavior, Education & Promotion.

Buysse, D. J., et al. (1989). "The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research." Psychiatry Res 28(2): 193-213.

Chen, L., et al. (2021). "Optimized acupuncture treatment (acupuncture and intradermal needling) for cervical spondylosis–related neck pain: a multicenter randomized controlled trial." Pain 162(3): 728-739.

CHU, H.-r., et al. (2017). "Clinical practice guidelines of acupuncture-moxibustion for cervical spondylotic radiculopathy." World journal of acupuncture-moxibustion 27(1): 3-11.

Cohen, S., et al. (1983). "A global measure of perceived stress." J Health Soc Behav 24(4): 385-396.

Cote, P., et al. (2009). "The burden and determinants of neck pain in workers: results of the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders." J Manipulative Physiol Ther 32(2 Suppl): S70-86.

Cunha, J., et al. (2018). "Dose calculation with MCNPX code for Total Body Irradiation technique in sitting and lying postures." Radiation Physics and Chemistry 149: 1-6.

Cunningham, M. R., et al. (2010). "Systematic review of cohort studies comparing surgical treatments for cervical spondylotic myelopathy." Spine 35(5): 537-543.

Dai, P., et al. (2021). "[Effects of electroacupuncture at "Jiaji"(EX-B2) on autophagy and endoplasmic reticulum stress in spinal cord injury mice]." Zhen Ci Yan Jiu 46(1): 45-51.

Dong, X. and Y. Xie (2021). "Effect of focal solution model on psychological resilience, sleep quality and nursing satisfaction of patients with neurogenic cervical spondylosis." Henan Medical Research 30(2): 348-350.

Du, Y. (2013). "Survey on situation of health knowledge cognition in patients with cervical spondylosis and corresponding nursing strategy." Modern Medicine & Health 29(6): 847-848.

Fan, E. and F. Sun (2014). "An analysis of the correlation between sleep quality and quality of life among community residents." Journal of Nurse Advancement(12): 1132-1133.

Ge, X. (2010). Clinical study on the treatment of neck pain in cervical spondylosis with intradermal acupunture, Guangzhou University of Traditionl Chinese Medicine.

Ghesquiere, A., et al. (2019). "Associations between psychological symptoms and treatment outcomes of a massage therapy intervention: secondary analyses of a randomized controlled trial." Complementary Therapies in Medicine 46: 116-122.

Gong, S., et al. (2008). "Rehabilitation Effect of Cervical Spondylopathy by Changing Mode of Life." Chinese General Practice 11(19): 1780-1781.

Gordon, S. J., et al. (2011). "A randomized, comparative trial: does pillow type alter cervico-thoracic spinal posture when side lying?" Journal of multidisciplinary healthcare 4: 321. Guan, F., et al. (2017). "

Comparative Study on Cognition of Cervical Spondylosis in Different Professional Backgrounds." Chinese Medical Innovation 14(29): 102-105.

Han, B., et al. (2021). "Effectiveness of a care model based on the theory of planned behaviour in patients with cervical spondylosis." Chinese National Health Medicine 33(12): 189-190.

Hou, Z., et al. (2017). "The efficacy of acupuncture for the treatment of cervical vertigo: a systematic review and meta-analysis." Evidence-Based Complementary and Alternative Medicine 2017.

Jiang, L. (2021). A study on the correlation between self-perceived burden, coping style and quality of life in patients with radicular cervical spondylosis, Yan'an University.

Juan, W., et al. (2020). "Chronic neck pain and depression: the mediating role of sleep quality and exercise." Psychol Health Med 25(8): 1029-1035.

Karimi, M. and J. Brazier (2016). "Health, health-related quality of life, and quality of life: what is the difference?" Pharmacoeconomics 34: 645-649.

Lenz, E. R., et al. (1997). "The middle-range theory of unpleasant symptoms: an update." Advances in nursing science 19(3): 14-27.

Li, L., et al. (2013). "Research progress of health education for patients with cervical spondylosis." Journal of Bethune Military Medical College(4): 361-362.

Li, S. and S. Wu (2006). "Observation on the effect of functional exercise on the healing of patients with cervical spondylosis." New Chinese Medicine 38(11): 60-61.

Lin, W. S., et al. (2018). "Association between Cervical Spondylosis and Migraine: A Nationwide Retrospective Cohort Study." Int J Environ Res Public Health 15(4): 587.

Lin, Z. (2013). Clinical study on the treatment of cervical pain in cervical spondylosis by acupuncture with the Ziwu Liujiao Najia method, Guangzhou University of Traditionnal Chinese Medicine.

Liu, M.-H., et al. (2014). "A correlational study of illness knowledge, self-care behaviors, and quality of life in elderly patients with heart failure." Journal of Nursing Research 22(2): 136-145.

Liu, X., et al. (1996). "Reliability and validity study of the Pittsburgh Sleep Quality Index." China Journal of Psychiatry 29(2): 103-107.

Lou, Y., et al. (2006). "A survey on the mental health status and quality of life of patients with cervical spondylosis." Chinese Medicine Orthopedics 18(11): 15-16.

Lu, T., et al. (2014). "Analysis on reliability and validity of the Pittsburgh sleep quality index." Chongqing medicine: 260-263.

Lu, W.-P., et al. (2019). "The beneficial effects of massage on motor development and sensory processing in young children with developmental delay: a randomized control trial study." Developmental neurorehabilitation 22(7): 487-495.

Lv, Y., et al. (2018). "The prevalence and associated factors of symptomatic cervical Spondylosis in Chinese adults: a community-based cross-sectional study." BMC Musculoskelet Disord 19(1): 325.

Lv, Y., et al. (2018). "The prevalence and associated factors of symptomatic cervical Spondylosis in Chinese adults: a community-based cross-sectional study." BMC Musculoskelet Disord 19(1): 1-12.

Mao, X., et al. (2007). "A study on relativity between self-efficacy and health behaviors of senile people." Chinese Nursing Research 21(16): 1437-1439.

Na, H. and L. Li (2012). "Study on correlation between social supports and quality of life of patients with cervical spondylosis." Chinese General Practice 2012: 22.

Neupane, S., et al. (2017). "Text neck syndrome-systematic review." Imperial journal of interdisciplinary research 3(7): 141-148.

Ortego, G., et al. (2016). "Is there a relationship between psychological stress or anxiety and chronic nonspecific neck-arm pain in adults? A systematic review and meta-analysis." Journal of Psychosomatic Research 90: 70-81.

Qian, Y., et al. (2020). "Optimal Time Period of Wearing Protective Collar After Anterior Cervical Discectomy and Fusion."

Qin, C., et al. (2014). "Analysis of the intervention effect of the health education on the community elderly patients with the cervical disease." Shanghai Medical & Pharmaceutical Journal(22): 58-60.

Que, Q., et al. (2013). "Effectiveness of acupuncture intervention for neck pain caused by cervical spondylosis: study protocol for a randomized controlled trial." Trials 14: 1-7.

Rad, G. S., et al. (2013). "Importance of social support in diabetes care." J Educ Health Promot 2: 62.

Ren, Y. (2011). "Application of health belief educational mode for patients with vertebral artery type of cervical spondylosis." Nursing Research 25(30): 2793-2793.

Shen, F. H., et al. (2014). Textbook of the Cervical Spine E-Book, Elsevier Health Sciences.

Singh, A., et al. (2006). "Quality of life assessment using the Short Form-12 (SF-12) questionnaire in patients with cervical spondylotic myelopathy: comparison with SF-36." Spine 31(6): 639-643.

Spector, P. E. (2019). "Do not cross me: Optimizing the use of cross-sectional designs." Journal of Business and Psychology 34(2): 125-137.

Su, S., et al. (2021). "Analysis of the effect of acupuncture and moxibustion rehabilitation nursing on clinical indexes, quality of life and rehabilitation effect of patients with cervical spondylosis." China Community Physicians 37(15): 143-144.

Sun (2020). "The effect of dimensional health education on the cognitive behavior and recurrence rate of cervical spondylosis patients in the occupational population." Shanxi Medicine 49(16): 2203-2204.

Sun (2020). A study on the correlation between psychological stress and social support and non-specific neck and low back pain.

Sun, Z.-r., et al. (2013). "Electroacupuncture at Jing-jiaji points for neck pain caused by cervical spondylosis: a study protocol for a randomized controlled pilot trial." Trials 14(1): 1-6.

Sun, Z., et al. (2018). "A study on sleep quality and related factors in patients with cervical spondylosis." Journal of Changzhi Medical College 32(3): 191-194,207.

Takagi, I., et al. (2011). "Cervical spondylosis: an update on pathophysiology, clinical manifestation, and management strategies." Disease-a-Month 57(10): 583-591.

Tang, M.-F., et al. (2010). "Improving sleep quality for cancer patients: benefits of a home-based exercise intervention." Supportive care in cancer 18(10): 1329-1339.

Tian, Z., et al. (2019). "Epidemiological status of cervical spine sub-health in college students and its influencing factors." Journal of Weifang Medical College 41(1): 72-74.

Unruh, M. L. and R. Hess (2007). "Assessment of health-related quality of life among patients with chronic kidney disease." Advances in chronic kidney disease 14(4): 345-352.

Vos, T., et al. (2017). "Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016." The Lancet 390(10100): 1211-1259.

Wang, C., et al. (2016). "The incidence of cervical spondylosis decreases with aging in the elderly, and increases with aging in the young and adult population: a hospital-based clinical analysis." Clin Interv Aging 11: 47-53.

Wang, P., et al. (2020). "Meta-analysis of the therapeutic effect of acupuncture and chiropractic on cervical spondylosis radiculopathy: a systematic review and meta-analysis protocol." Medicine 99(5).

Wang, Q., et al. (2014). "Associations between knowledge of disease, depression and anxiety, social support, sense of coherence and optimism with health-related quality of life in an ambulatory sample of adolescents with heart disease." Cardiology in the Young 24(1): 126-133.

Wang, W. (2010). A controlled clinical study of electroacupuncture and acupuncture in the treatment of cervical pain in cervical spondylosis, Guangzhou University of Traditional Chinese Medicine.

Ware Jr, J. E., et al. (1996). "A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity." Medical care: 220-233.

Wen, J. and M. Liu (2013). "Investigation research and nursing measures on depression and social supports for cervical spondylosis patients." Nursing Practice and Research 10(3): 6-9.

Wirth, B., et al. (2018). "Physical risk factors for adolescent neck and mid back pain: a systematic review." Chiropr Man Therap 26(1): 36.

Xia, Y., et al. (2013). Current research in acupuncture, Springer.

Xiao, L., et al. (2020). "Effect of behavior change intervention on cervical spine function in patients with cervical spondylosis." Journal of Nursing Management 20(11): 799-802.

Xiao, S. (1994). "Theoretical foundations and research applications of the Social Support Inventory." Journal of Clinical Psychiatry(2): 98-100.

Xu, S. J., et al. (2012). "[Chronic neck pain of cervical spondylosis treated with acupuncture and moxibustion in terms of the heart and kidney theory: a randomized controlled trial]." Zhongguo Zhen Jiu 32(9): 769-775.

Yang, F., et al. (2016). "Balance chiropractic therapy for cervical spondylotic radiculopathy: study protocol for a randomized controlled trial." Trials 17(1): 1-6.

Yang, T. and H. Huang (2003). "An epidemiological study on stress among urban residents in social transition period." Chinese Journal of Epidemiology 24(9): 760-764.

Yang, X. and Y. Sun (2020). "Effect of cognitive-behavioural interventions on the rehabilitation of patients with cervical spondylosis." Practical Integrative Chinese and Western Medicine Clinics 20(9): 148-149.

Yu, E., et al. (2015). "Correlation among sleep quality, living quality and mental state among gerontal patients in hospital." Chinese Electronic Journal of Geriatric Research(1): 20-23.

Yuan, C., et al. (2015). "Effect of systematic rehabilitation nursing on health management behavior in patients with cervical spondylosis." Journal of Qilu Nursing(6): 30-32.

Zhang, M., et al. (2014). "Survey on the cervical spine subhealth condition of adolescents in Shanghai and analysis of influencing factors." Shanghai Journal of Traditional Chinese Medicine 48(3): 7-9.

Zhang, Q. (2020). "The construction of cervical vertebra sub-health education program for college students based on “prevention theory”in TCM."

Zhang, Y. (2013). "Self-care for cervical spondylosis." Medical Information(9): 36-36.

Zhao, J., et al. (2002). "The Present and the Future on Quality of Life Assessment for Tumors Patients." China Oncology 11(6): 321-323.

Zhao, L. (2015). "Survey on health knowledge awareness and nursing countermeasures for patients with cervical spondylosis." China Modern Drug Application(9): 209-211.

Zheng, Y. and L. Guan (2017). "Research progress on relationship between occupational factors and cervical spondylosis." China Modern Drug Application 30(2): 112-114.

Zhou, Y., et al. (2021). "Efficacy and safety of electroacupuncture in treatment of cervical spondylosis: A protocol of randomized controlled trial." Medicine (Baltimore) 100(18): e25570.

Zhu, L. and J. Zhang (2012). "Clinical observation of 60 cases of cervical pain in cervical spondylosis treated with thermosensitive moxibustion." Journal of Guiyang College of Traditional Chinese Medicine 34(2): 150-151.

Zuo, G., et al. (2019). "Assessment of the efficacy of acupuncture and chiropractic on treating Cervical spondylosis radiculopathy: A systematic review and meta-analysis." Medicine (Baltimore) 98(48): e17974.

APPENDICES

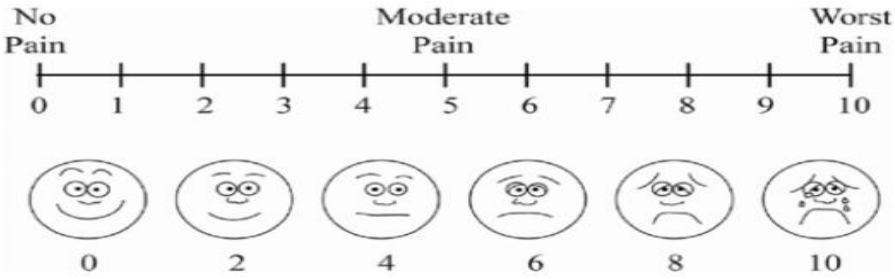
APPENDIX A

Demographic Questionnaire

Dear patient friend,

Hello! The following is a survey about your personal general situation, please read carefully and fill in according to your actual situation or mark "√" in the □. Thank you for taking time out of your busy schedule to fill in this questionnaire, your information will be kept confidential, thank you for your cooperation and support.

1. Years of age:
2. Gender: □Male □Female
3. Marital Status: □Unmarried □Married □Divorced □Remarried
4. Education: □Primary school or below □Junior middle school □senior high school/technical secondary school □Junior college □bachelor or above
5. Occupation: □Worker or staff □Farmer □Teacher □Medical staff □Civil servant □Freelancer □Unemployed □Other
6. Living area: □Urban district □County □Village □Rural
7. Monthly income: □Less than 1000 yuan □1000-2999 yuan □3000-5000 yuan □More than 5000 yuan
8. Medical treatment payment method: □Resident medical insurance □Employee medical insurance □Self-pay
9. Duration of illness (since diagnosis): □<12 months □12~60 months □>60 months
10. Number of going to see the doctor (times): □<=3 □>3
11. Type of comorbidity (kind): □<=3 □>3
12. Pain level: □Mild pain □Moderate pain □Severe pain □Intense pain



APPENDIX B

Lifestyle Questionnaire

Please read carefully and fill in according to your actual situation or mark "√" in the table.

Part I:Diet

1、Do you like to eat fried and roasted food? ☐Never, ☐seldom, ☐sometimes, ☐often, ☐always

2、Do you like to eat ice-cream, cold drinks and other frozen food? ☐Never, ☐seldom, ☐sometimes, ☐often, ☐always

3、How much water do you drink every day? (In an ordinary glass, the capacity of each cup is about 150ml) ☐2 cups or less ☐2-4 cups or less ☐4-6 cups or less ☐6-8 cups or less ☐8 cups or more

4、Do you eat breakfast? ☐Never, ☐seldom, ☐sometimes,☐ often, ☐always.

5、Do you have a snacking habit? ☐Never, ☐seldom, ☐sometimes, ☐oftern, ☐always.

6、Which of the following food groups do you eat mainly? ☐Rice, ☐noodles, ☐fish, ☐meat, ☐eggs, ☐beans, ☐milk, ☐vegetables, ☐fruits, ☐coarse grains, ☐other, please describe (multiple choice)

7、Do you eat three meals a day at regular intervals? ☐Never, ☐seldom, ☐sometimes, ☐often, ☐always

8、Do you have a regular total of three meals a day? ☐Never, ☐seldom, ☐sometimes, ☐often, ☐always

9、Do you eat only seven percent of your dinner? ☐Never, ☐seldom, ☐sometimes, ☐often, ☐always.

10、Do you overeat? ☐Never, ☐seldom, ☐sometimes,☐often,☐ always

11、Do you always choose the right food according to your health condition? ☐Never, ☐seldom, ☐sometimes, ☐often, ☐always

12、Are you a picky eater? ☐Never ☐rarely ☐sometimes ☐often ☐always

Part II:Nourishing the soul

1、Do you understand others and take into account their feelings? ☐Never ☐rarely ☐sometimes ☐often ☐always

2、Do you manage conflicts with others through negotiation and tolerance? ☐Never ☐Seldom ☐Sometimes ☐Often ☐Always

3、Would you say you are a compassionate person? ☐Never , ☐rarely , ☐sometimes , ☐often , ☐always

4、Do you take the initiative to help and care for others around you? ☐Never , ☐rarely, ☐sometimes, ☐often , ☐always

5、Are you confident and do you think life is full of hope? ☐Never , ☐rarely , ☐sometimes , ☐often , ☐always .

6、In general, are you optimistic? ☐Never, ☐seldom, ☐sometimes, ☐often, ☐always.

7、When you have negative emotions, do you adjust them in time? ☐Never , ☐rarely , ☐sometimes , ☐often , ☐always

8、Do you usually have mood swings? ☐Never , ☐rarely , ☐sometimes , ☐often , ☐always

9、Can you stay calm in an emergency situation? ☐Never,☐rarely, ☐sometimes, ☐often, ☐always

10、Do you like to keep in touch with people close to you? ☐Never , ☐rarely , ☐sometimes , ☐often , ☐always

11、Do you have a good network of people? ☐Never ☐Rarely ☐Sometimes ☐Often ☐Always

12、If you are treated unfairly, do you quickly forget about it and look to the future? ☐Never , ☐rarely , ☐sometimes , ☐often , ☐always .

13、In general, are you satisfied with your current life? ☐Very dissatisfied ☐ Not satisfied ☐little satisfied ☐ moderately satisfied ☐ very satisfied

Part III:Sleep

1、Do you usually go to bed late and get up early in the spring and summer, and go to bed early and get up late in the fall and winter? ☐Never ,☐ rarely , ☐sometimes , ☐often , ☐always

2、What time do you usually go to bed?☐Before 22:00 ☐22:00-23:00 ☐23:00-00:00 ☐ 0:00-01:00 ☐after 01:00

3、Do you take regular lunch breaks? ☐Never, ☐seldom, ☐sometimes, ☐often,☐ always.

4、Do you stay up late? ☐Never, ☐seldom, ☐sometimes, ☐always, ☐always.

5、Do you feel that you get enough sleep every day? ☐Never, ☐seldom, ☐sometimes, ☐often, ☐always

Part IV:Campaign

1、Which of the following exercises do you do regularly? ☐Running, ☐swimming, ☐ball games, ☐cycling, ☐aerobics, ☐yoga, ☐body dance, ☐Badaunjin, ☐taijiquan, ☐other, please describe (multiple choice)

2、How many times a week do you exercise? ☐Less than 1 time per week ☐1-2 times per week ☐3-4times per week ☐5-6times per week ☐Every day

3、How tired do you feel after exercise? ☐No tired ☐a little tired, ☐ moderate tired, ☐very tired ☐unbearable tired

Part V: Labor

4、Do you have a lot of energy? ☐Never ☐Rarely ☐Sometimes ☐Often ☐Always

5、Do you constantly recharge to take on the challenges of the future? ☐Never ☐Seldom ☐Sometimes ☐Often ☐Always

6、Do you easily relieve stress from work, school or life? ☐Never ☐Rarely ☐Sometimes ☐Often ☐Always

7、Do you need to maintain one of the following actions for a long time during your work or study? ☐Sitting for a long time, ☐standing for a long time, ☐walking for a long time, ☐seeing for a long time, ☐not needing to maintain a certain action for a long time, ☐other, please describe

8、How tired do you feel from work or study? ☐Not fatigued, ☐moderately fatigued, ☐ fatigued, ☐very fatigued, ☐unbearable

Part VI: Environment and alcohol and tobacco

1、You are often in a heated environment in winter? ☐Never, ☐seldom, ☐sometimes, ☐often, ☐always

2、Do you have the habit of sunbathing regularly (actively or passively)? ☐Never, ☐seldom, ☐sometimes, ☐often, ☐always

3、Your current average daily smoking intake?☐0 puffs ☐1-5 puffs ☐6-10 puffs ☐11-20 puffs ☐20 or more puffs

4、You are currently drinking an average of two (50ml) and/or bottles per drink (compared to 600ml of beer in a bottle) ☐No drinking ☐1-20 ml ☐21-50 ml ☐51-100 ml ☐ more than 100ml

APPENDIX C

Pittsburgh Sleep Quality Index

1.During the past month, when have you usually gone to bed at night?

USUAL BEDTIME:

2.During the past month, how long (in minutes) has it usually take you to fall asleep each night?NUMBER OF MINUTES:

3.During the past month, when have you usually gotten up in the morning?

USUAL GETTING UP TIME:

4.During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spend in bed.)

HOURS OF SLEEP PER NIGHT:

5.During the past month, how often have you had trouble sleeping because you...

	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
(a) ...cannot get to sleep within 30 minutes	☐	☐	☐	☐
(b) ..wake up in the middle of the night or early morning	☐	☐	☐	☐
(c) ..have to get up to use the bathroom	☐	☐	☐	☐
(d) ...cannot breathe comfortably	☐	☐	☐	☐
(e) ...cough or snore loudly	☐	☐	☐	☐
(f) ...feel too cold	☐	☐	☐	☐
(g) ...feel too hot	☐	☐	☐	☐
(h) ...had bad dreams	☐	☐	☐	☐
(i) ... have pain	☐	☐	☐	☐
(j)Other reason(s), please describe How often during the past month have you had trouble sleeping because of this?	☐	☐	☐	☐

	Very good	Fairly good	Fairly bad	Very bad
6. During the past month, how would you rate your sleep quality overall?	☐	☐	☐	☐

	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
7. During the past month, how often have you taken medicine (prescribed or "over the counter") to help you sleep?	☐	☐	☐	☐
8. During the past month, how often have you had trouble staying awake while driving. Eating meals, or engaging in social activity?	☐	☐	☐	☐

	No problem at all	Only a very slight problem	Somewhat of a problem	A very big problem
9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?	☐	☐	☐	☐

	No bed partner or roommate	Partner/Partner in other room	Partner in same room,but not same bed	Partner in same bed
10. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?	☐	☐	☐	☐

If you have a roommate or bed partner, ask him/her how often in the past month you have had...

	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
(a) ...loud snoring	☐	☐	☐	☐
(b) ..long pauses between breaths while asleep	☐	☐	☐	☐
(c) ..legs twitching or jerking while you sleep	☐	☐	☐	☐
(d) ..episodes of disorientation or confusion during sleep	☐	☐	☐	☐
(e) Other restlessness while you sleep; please describe	☐	☐	☐	☐

APPENDIX D

Chinese Perceived Stress Scale

Please read carefully and fill in according to your actual situation or mark "√" in the table.

NO.	Stress problems	Never	Occasionally	Sometimes	Often	Always
1	Feeling uneasy about something unexpected happening?					
2	…….					
3	…….					
4	…….					
5	…….					
6	…….					
7	…….					
8	…….					
9	…….					
10	…….					
11	…….					
12	…….					
13	…….					
14	Feel like problems are accumulating and not being solved?					

CPSS Perceptual Stress Scale scoring criteria:
(1) 1, 2, 3, 8, 11, 12, and 14 are sequential scoring questions, with scores of 1, 2, 3, 4, and 5, respectively.
(2) 4, 5, 6, 7, 9, 10, 13 questions are reverse scoring questions, respectively, 5, 4, 3, 2, 1 points. The final score was the total score minus 14.
The Chinese version of the Perceptual Stress Scale was divided into two levels, with scores of 25 and below being considered as no stress, and scores of 26 and above being considered as stressful.

APPENDIX E

Self-rated Abilities for Health Practices Scale (SRAHP)

Please read carefully and fill in according to your actual situation or mark "√" in the table.

NO.	Contents of the scale	Scoring				
		0	1	2	3	4
1	Find healthy foods that are within my budget					
2	…….					
3	…….					
4	…….					
5	…….					
6	…….					
7	…….					
8	…….					
9	…….					
10	…….					
11	…….					
12	…….					
13	…….					
14	…….					
15	…….					
16	…….					
17	…….					
18	…….					
19	…….					
20	…….					
21	…….					
22	…….					
23	…….					
24	…….					
25	…….					

NO.	Contents of the scale	Scoring				
		0	1	2	3	4
26	…….					
27	…….					
28	Get help from others when I need it					

APPENDIX F

Social Support Rating Scale (SSRS)

1、How many close friends do you have that you can get support and help from? (Choose only one) （ ）
① None.
② 1-2.
③ 3-5.
④ 6 or more.

2、In the past year, you: (choose only one) （ ）
① Away from your family and living alone in one room.
② The place of residence changes frequently, and you live with strangers most of the time.
③ Live with classmates, colleagues or friends.
④ Living with family members.

3、You and your neighbours: (choose only one) （ ）
① Never cared for each other, just nodded to each other.
② May be slightly concerned when encountering difficulties.
③ Some of your neighbours are very concerned about you.
④ Most of your neighbours are concerned about you.

4、You and your colleagues (choose only one) （ ）
① Never cared for each other, just nodded to each other.
② May be slightly concerned when encountering difficulties.
③ Some of your colleagues are very concerned about you.
④ Most of your colleagues are very concerned about you.

5、Support and care received from family members (tick the appropriate box) (select only one)

	None	Very little	I manner	Full Support
A. Husband and wife (lovers)				
B. Parents				
C. Children				
D. Siblings				
E. Other members (e.g. Sister-in-law)				

6、In the past, you have received financial support or help with practical problems in emergency situations from the following sources （ ）
① No source.
② The following sources are available (more than one can be selected)
（ ）
A. Spouse. B. Other family members. C. Friends.
D. Relatives. E. Colleagues. F. Workplace. G. Official or semi-official organizations such as parties and unions. H. Unofficial organizations such as religious and social groups. I. Others.

7、In the past, when you were in a difficult or emergency situation, the sources of comfort and concern you used to receive were: （ ）
① No source.
② The following sources are available (more than one can be selected)
（ ）
A. Spouse. B. Other family members. C. Friends.
D. Relatives. E. Colleagues. F. Workplace. G. Official or semi-official organizations such as parties and unions. H. Unofficial organizations such as religious and social groups.

8、The way you confide in when you encounter troubles (choose only one)
（ ）
① Never talk to anyone.
② Tell only 1-2 people who are extremely close to you.
③ Say it if your friend initiates the inquiry.
④ Take the initiative to talk about your troubles to get support and understanding.

9、When you encounter troubles, the way you seek help (choose only one)
（ ）
① Rely only on yourself and do not accept help from others.
② Seldom ask for help.
③ Sometimes ask for help.
④ Frequently ask for help from family, relatives, and organizations when in trouble.

10、For groups (such as party and group organizations, religious organizations, trade unions, student unions, etc.) to organize activities, you: (choose only one) （ ）
① Never attend.
② Occasional participation.
③ Participate regularly.
④ Take the initiative to participate and be active.

APPENDIX G

Cervical spine disease health knowledge awareness questionnaire

Contents	Scoring		
1、Do you know that cervical spondylosis can be triggered by cold in the neck?	2	1	0
…….	2	1	0
…….	2	1	0
…….	2	1	0
…….	2	1	0
…….	2	1	0
…….	2	1	0
…….	2	1	0
…….	2	1	0
…….	2	1	0
10、Are you aware that cervical spondylosis is prone to recurrence?	2	1	0
Notes: Notes: The score is calculated as follows: 2 for "know ", 1 for "partially know " and o for "don't know ". The higher the score, the more knowledge about CS.			

APPENDIX H

The 12-item short-form health survey (SF-12)

1. In general, would you say your health is:

O 1- Excellent
O 2- Very good
O 3-Good
O 4- Fair
O 5- Poor

The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

	Yes, limited a lot	Yes, limited a little	No, not limited at all
2. Moderate activities such as moving a table, pushing a vacuum cleaner, bowling, or playing golf.	O 1	O 2	O 3
3. Climbing several flights of stairs.	O 1	O 2	O 3

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

	Yes	NO
4. Accomplished less than you would like	O 1	O 2
5. Were limited in the kind of work or other activities	O 1	O 2

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	Yes	NO
6. Accomplished less than you would like	O 1	O 2
7. Did work or activities less carefully than usual.	O 1	O 2

8. During the past 4 weeks, how much did pain interfere with your normal work (including work outside the home and housework)?

O1- Not at all
O2- Slightly
O3- Moderately
O4-Quite a bit
O5- Extremely

These questions are about how you have been feeling during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling.
How much of the time during the past 4 weeks..

	All of the time	Most of the time	A good bit of the time	Some of the time	A little of the time	None of the time
9. Have you felt calm and peaceful?	O 1	O 2	O 3	O 4	O 5	O 6
10. Did you have a lot of energy?	O 1	O 2	O 3	O 4	O 5	O 6
11. Have you felt downhearted and blue?	O 1	O 2	O 3	O 4	O 5	O 6

12. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?
O1- All of the time
O2- Most of the time
O3- Some of the time
O4-A little of the time
O5-None of the time

APPENDIX I

Documents related to IRB, permission of using questionnaires, permission for data collection

IRB of Burapha University

สำเนา

ที่ IRB3-069/2565

เอกสารรับรองผลการพิจารณาจริยธรรมการวิจัยในมนุษย์

มหาวิทยาลัยบูรพา

คณะกรรมการพิจารณาจริยธรรมการวิจัยในมนุษย์ มหาวิทยาลัยบูรพา ได้พิจารณาโครงการวิจัย

รหัสโครงการวิจัย : G-HS034/2565

โครงการวิจัยเรื่อง : Factors influence quality of life among patients with cervical spondylosis and ongoing acupuncture and moxibustion

หัวหน้าโครงการวิจัย : MRS.XIU HONG ZHANG

หน่วยงานที่สังกัด : คณะพยาบาลศาสตร์

BUU Ethics Committee for Human Research has considered the following research protocol according to the ethical principles of human research in which the researchers respect human's right and honor, do not violate right and safety, and do no harms to the research participants.

Therefore, the research protocol is approved (See attached)

1. Form of Human Research Protocol Submission Version 2 : 28 June 2022
2. Research Protocol Version 2 : 28 June 2022
3. Participant Information Sheet Version 2 : 28 June 2022
4. Informed Consent Form Version 2 : 28 June 2022
5. Research Instruments Version 2 : 28 June 2022
6. Others (if any) Version - : -

วันที่รับรอง : วันที่ 9 เดือน สิงหาคม พ.ศ. 2565

วันที่หมดอายุ : วันที่ 9 เดือน สิงหาคม พ.ศ. 2566

ลงนาม นางสาวรมร แย้มประทุม

(นางสาวรมร แย้มประทุม)

ประธานคณะกรรมการพิจารณาจริยธรรมการวิจัยในมนุษย์ มหาวิทยาลัยบูรพา

ชุดที่ 3 (กลุ่มคลินิก/ วิทยาศาสตร์สุขภาพ/ วิทยาศาสตร์และเทคโนโลยี)

IRB of the Second Affiliated Hospital of Wenzhou Medical University

伦理委员会审查批件

批件号：伦审（2022-K-87-01）

科室：神经内科	主要研究者：叶迈蕴		职称：副主任护师
项目名称	接受针灸治疗的颈椎病患者的生活质量影响因素研究		
项目来源	横向课题		
审查类别	初始审查	审查方式	简易审查
审查日期	2022 年 7 月 10 日	审查地点	/
审查委员	王爱霞 吴小莲		
审查材料	1. 临床课题研究初始审查申请 2. 研究者简历 3. 试验方案（版本号：V2.0；版本日期：2022.7.5） 4. 知情同意书（版本号：V2.0；版本日期：2022.7.5） 5. 病例报告表（版本号：V2.0；版本日期：2022.7.5）		
审查意见	经过我院医学伦理委员会审查，审查结果为：同意		
年度/定期跟踪审查	审查频率为该研究批准之日起每 12 月一次，首次请于 2023 年 7 月 10 日前 1 个月递交"定期/年度研究进展报告"。 本伦理委员会有根据实际进展情况改变跟踪审查频率的权利。		
批件有效期	2022 年 7 月 11 日——2023 年 7 月 10 日（逾期未实施，自行废止）		
主任委员签字： 日　期：2022 年 7 月 11 日 温州医科大学附属第二医院 温州医科大学附属育英儿童医院 医学伦理委员会（盖章）			

地址：浙江省温州市龙湾区温州大道东段 1111 号　电话：0577-85676879　邮编：325000

声明：

本伦理委员会的职责、人员组成和工作程序均遵循 ICH-GCP、NMPA-GCP、中国相关法律和法规。

注意事项：

1）修改试验方案、知情同意书、招募广告及其他提供给受试者的相关材料，请及时提交"修正案审查申请"。

2）本中心发生的医疗器械严重不良事件或药物可疑且非预期严重不良反应及研发期间安全性更新报告须按照 NMPA/GCP 最新要求及时递交我院伦理委员会，国内外其他中心发生的严重不良事件或药物可疑且非预期严重不良反应需定期汇总后递交伦理委员会，伦理委员会有权对其评估做出新的决定。

3）研究纳入了不符合纳入标准或符合排除标准的受试者，符合中止试验规定而未让受试者退出研究，给予错误治疗剂量，给予方案禁止的合并用药等没有遵从方案的情况；或可能对受试者的权益\健康以及研究的科学造成不良影响等偏离 GCP 原则的情况，请发现者及时提交"不依从或违背方案报告"。

4）自批件签发之日起，请研究者在规定的跟踪审查截止日期前 1 个月提交"定期/年度研究进展报告"，本伦理委员会有根据实际进展情况改变跟踪审查频率的权利。

5）暂停或提前终止临床研究，请及时提交书面申请。

6）完成试验请及时提交"结题报告"。

7）凡涉及中国人类遗传资源采集标本、收集数据等研究项目，必须获得中国人类遗传资源管理办公室批准后方可在本中心开展研究。

8）凡经我院伦理委员会批准的研究项目在实施前，申请人应按相关规定在国家卫健委、药审中心等的临床试验登记备案信息系统平台登记研究项目相关信息。

Permission of using questionnaires

Permission of using questionnaire of knowledge about CS

回复：想参考您的颈椎病患者健康知识的问卷量表 ☆

发件人：**1185932714** <1185932714@qq.com>
时　间：2022年5月4日（星期三）上午10：14
收件人：279567120 <wabbmm-sandwich@qq.com>

秀红同学好:

可以使用我的问卷！祝学业有成!

---原始邮件---

发件人: "279567120"<wabbmm-sandwich@qq.com>
发送时间: 2022年4月23日(周六) 晚上10:27
收件人: "1185932714"<1185932714@qq.com>;
主题: 想参考您的颈椎病患者健康知识的问卷量表

Permission of using questionnaire of health behaviour

Re:可以借您论文中的汉化的健康行为自评量表吗 ☆

发件人：**mao2002xq** <mao2002xq@126.com>
时　间：2022年4月30日（星期六）下午3：16
收件人：279567120 <wabbmm-sandwich@qq.com>

可以

Permission of using questionnaire of Pittsburgh Sleep Quality Index

RE: 可以借您论文中的汉化的匹兹堡睡眠指数量表吗 ☆

发件人：**kelinresearch6** <kelinresearch6@gmail.com>
时　间：2022年4月28日（星期四）下午8：42
收件人：279567120 <wabbmm-sandwich@qq.com>

You are welcome to use it. Good luck with your study.

Dr. Liu Xianchen

Sent from Mail for Windows

From: 279567120
Sent: Wednesday, April 27, 2022 9:34 PM
To: kelinresearch6
Subject: 可以借您论文中的汉化的匹兹堡睡眠指数量表吗

Permission of using questionnaire of social support

Re(2): 可以借用肖教授您的社会支持量表吗 ☆

发件人：**xiaosy** <xiaosy@csu.edu.cn>
时　间：2022年4月27日（星期三）下午8：19
收件人：279567120 <wabbmm-sandwich@qq.com>; 肖水源 <802377@csu.edu.cn>

没问题

Permission of using questionnaire of Chinese Perceived Stress Scale

Re: 可以借教授您论文中的心理压力量表吗 ☆

发件人: **tingzhongyang** <tingzhongyang@zju.edu.cn>
时　间: 2022年4月27日（星期三）上午5：06
收件人: 279567120 <wabbmm-sandwich@qq.com>
附　件: 2 个 (知觉心理压力量表.doc...)

秀红,你好,
欢迎使用知觉心理压力量表(CPSS),

Please see the attahced,

Regards,

Permission of using questionnaire of SF-12

QualityMetric
We measure health.

NON-COMMERCIAL LICENSE AGREEMENT
Office of Grants and Scholarly Research (OGSR)

License Number: QM059005

Licensee Name: Xiuhong Zhang c/o Burapha University

Licensee Address: 169 Long Had Bangsaen Rd, Chon Buri District, TH

Approved Purpose:
Purpose: Cervical spondylosis Shenzhen China
Study Name: Factors influencing quality of life among patients with cervical spondylosis and onging acupuncture and moxibustion
Study Type: Non-commercial academic research and/or thesis – Unfunded Student
Data Collection Method: Paper

Therapeutic Area: Wellness & Lifestyle

Royalty Fee: None, because this License is granted in support of the non-commercial Approved Purpose

Study Term: 05/17/22 and ending on 08/16/22

A. Effective Date: This Non-Commercial License Agreement (the "Agreement") from the Office of Grants and Scholarly Research (OGSR) is made by and between QualityMetric Incorporated, LLC, a Delaware limited liability company, with offices at 1301 Atwood Avenue, Suite 216E, Johnston, RI 02919 dba QualityMetric ("QualityMetric") and Licensee. This Agreement is entered into as of the date of last signature below and is effective for the Study Term set forth on page one of this agreement.

B. Appendices: Capitalized terms used in this Agreement shall have the meanings assigned to them in Appendix A, Appendix B and Appendix D. Licensee agrees the study information completed on Appendix D – Project details form (Questionnaire) is for non-commercial use. The appendices attached hereto are incorporated into and made a part of this Agreement for all purposes.

C. Grant of License: Subject to the terms of this Agreement, QualityMetric Incorporated, LLC grants to Licensee a non-exclusive, non-transferable, non-sublicensable worldwide license to use, solely for the Approved Purpose and during the Study Term. The Licensed Surveys, Software, SMS Scoring Solution, and all intellectual property rights related thereto ("Survey Materials"), in the authorized Data Collection Method, Modes of Administration, and Approved Languages indicated on Appendix B; and to administer the Licensed Surveys only up to the total number of Administrations (and to make up to such number of exact reproductions of the Licensed Surveys necessary to support such Administrations) in any combination of the specific Licensed Surveys and Approved Languages, Data Collection Method, and Modes of Administration.

D. Electronic Signature: The parties agree that execution of this Agreement by e-Signatures (as defined below) shall have the same legal force and effect as the exchange of original signatures.
Pursuant to this Agreement, e-Signatures shall mean a signature that consists of one or more letters, characters, numbers or other symbols in digital form incorporated in, attached to or associated with the electronic document, that (a)is unique to the person making the signature; (b) the technology or process used to make the signature is under the sole control of the person making the signature; (c) the technology or process can be used to identify the person using the technology or process; and (d) the electronic signature can be linked with an electronic document in such a way that it can be used to determine whether the electronic document has been changed since the electronic signature was incorporated in, attached to or associated with the electronic document.

QualityMetric
We measure health.

EXECUTED by the duly authorized representatives as set forth below.

QualityMetric Incorporated, LLC

Signature: Gus Gardner
Electronically signed by: Gus Gardner
Reason: I have reviewed this document and, to the best of my knowledge, it is complete and accurate.
Date: Jul 29, 2022 16:50 EDT

Name: Gus Gardner
Title: CEO
Date: 29-Jul-2022

Xiuhong Zhang c/o Burapha University

Signature: Xiuhong Zhang
Name: Xiuhong Zhang
Title: Student of Burapha University
Date: 21 July 2022

QualityMetric Incorporated, LLC Reviewer

Signature: Maria Williams
Electronically signed by: Maria Williams
Reason: I have reviewed this document and, to the best of my knowledge, it is complete and accurate.
Date: Jul 29, 2022 11:09 EDT

Name: Maria Williams
Title: OGSR Client Support/Leads Qualifier
Date: 29-Jul-2022

Permission for data collection

MHESI 8137/1251

Graduate School, Burapha University
169 Longhaad Bangsaen Rd.
Saensuk, Muang, Chonburi
Thailand, 20131

September 1st, 2022

To The president of the Second Affiliated Hospital of Wenzhou Medical University,

Enclosure: 1. Certificate ethics document of Burapha University
2. Research Instruments (Try out)

On behalf of the Graduate School, Burapha University, I would like to request permission for Mrs. Xiu Hong Zhang to collect data for testing the reliability of the research instruments.

Mrs. Xiu Hong Zhang, ID 63910206, a graduate student of the Master of Nursing Science program (International Program) in Adult Nursing Pathway, Faculty of Nursing, Burapha University, Thailand, was approved her dissertation proposal entitled: "Factors influencing quality of life among patients with cervical spondylosis and ongoing acupuncture and moxibustion" under supervision of Assist. Prof. Dr. Jinjutha Chaisena Dallas as the principle advisor. She proposes to collect data from 30 patients with cervical spondylosis who are receiving acupuncture and moxibustion therapy in Outpatient Department of the Second Affiliated Hospital of Wenzhou Medical University.

The data collection will be carried out from August 29 to September 2, 2022. In this regard, you can contact Mrs. Xiu Hong Zhang via mobile phone +86-1812-4507-660 or E-mail: wabbmm-sandwich@qq.com

Please do not hesitate to contact me if you need further relevant queries.

Sincerely yours,

(Assoc. Prof. Dr. Nujjaree Chaimongkol)
Dean of Graduate School, Burapha University

Carbon Copy: Songhe Jiang
Director of the Rehabilitation Clinic

Graduate School Office
Tel: +66 3810 2700 ext. 701, 705, 707
E-mail: grd.buu@go.buu.ac.th
http://grd.buu.ac.th

MHESI 8137/1252

Graduate School, Burapha University
169 Longhaad Bangsaen Rd.
Saensuk, Muang, Chonburi
Thailand, 20131

September 1st, 2022

To The president of the Second Affiliated Hospital of Wenzhou Medical University,

Enclosure: 1. Certificate ethics document of Burapha University
2. Research Instruments

On behalf of the Graduate School, Burapha University, I would like to request permission for Mrs. Xiu Hong Zhang to collect data for conducting research.

Mrs. Xiu Hong Zhang, ID 63910206, a graduate student of the Master of Nursing Science program (International Program) in Adult Nursing Pathway, Faculty of Nursing, Burapha University, Thailand, was approved her dissertation proposal entitled: "Factors influencing quality of life among patients with cervical spondylosis and ongoing acupuncture and moxibustion" under supervision of Assist. Prof. Dr. Jinjutha Chaisena Dallas as the principle advisor. She proposes to collect data from 256 patients with cervical spondylosis who are receiving acupuncture and moxibustion therapy in Outpatient Department of the Second Affiliated Hospital of Wenzhou Medical University.

The data collection will be carried out from September 5 to November 5, 2022. In this regard, you can contact Mrs. Xiu Hong Zhang via mobile phone +86-1812-4507-660 or E-mail: wabbmm-sandwich@qq.com

Please do not hesitate to contact me if you need further relevant queries.

Sincerely yours,

(Assoc. Prof. Dr. Nujjaree Chaimongkol)
Dean of Graduate School, Burapha University

Carbon Copy: Songhe Jiang
Director of the Rehabilitation Clinic

Graduate School Office
Tel: +66 3810 2700 ext. 701, 705, 707
E-mail: grd.buu@go.buu.ac.th
http://grd.buu.ac.th

เอกสารนี้ลงนามด้วยลายมือชื่ออิเล็กทรอนิกส์ ตรวจสอบได้ที่ (https://e-sign.buu.ac.th/verify)