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Eun Jin Lee

University of Kentucky, ejlee3@uky.edu

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ABSTRACT OF DISSERTATION

Eun Jin Lee

The Graduate School

University of Kentucky

2010

THE EFFECT OF ACUPRESSURE ON CONSTIPATION, QUALITY OF LIFE,
AND DEPRESSIVE SYMPTOMS IN CANCER PATIENTS WITH
CONSTIPATION

ABSTRACT OF DISSERTATION

A dissertation submitted in partial fulfillment of
the requirements for the degree of the Doctor of Philosophy in the
College of Nursing
at the University of Kentucky

By

Eun Jin Lee

Lexington, Kentucky

Director: Dr. Sherry Warden, Associate Professor of Nursing

Lexington, Kentucky

2010

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ABSTRACT OF DISSERTATION

THE EFFECT OF ACUPRESSURE ON CONSTIPATION, QUALITY OF LIFE, AND DEPRESSIVE SYMPTOMS IN CANCER PATIENTS WITH CONSTIPATION

Constipation is the most common gastrointestinal complaint in the United States, resulting in about 2 million annual visits to the doctor.

The purposes of this dissertation were to: 1) describe four theories of traditional Korean medicine; 2) review mechanisms of acupuncture and moxibustion and develop a conceptual model; 3) review findings from randomized controlled trials that tested the effects of acupressure used for the management of symptoms such as nausea, pain, and dyspnea; 4) examine the reliability and validity of the Patient Health Questionnaire-9 (PHQ-9) in heart failure patients with constipation compared to those with gastrointestinal disease; 5) describe how Korean women experienced constipation and how constipation affected the quality of life and the experience of using complementary and alternative medicine for constipation; 6) test the effect of acupressure on constipation and to examine the quality of life and depressive symptoms in cancer patients with constipation.

Meridian theory explains that acupressure stimulates meridians, a network of energy pathways in the body to increase the flow of bio-energy. Authors of 48 studies supported that acupressure reduced nausea and vomiting during pregnancy, pain, fatigue, and dyspnea.

The Patient Health Questionnaire-9 (PHQ-9) was used to examine the depressive symptoms in cancer patients with constipation, but has not been tested in patients with constipation. Therefore, in this study, the psychometric properties of PHQ-9 were tested in patients with constipation. Cronbach's alphas for the Patient Health Questionnaire were .89 and the correlation between the PHQ-9 and the BDI-II (Beck Depression Inventory) was .81 ($p < .01$) in 382 heart failure patients with constipation.

Ten Korean women reported that living with constipation is a stressful and uncomfortable experience which impacts daily activity, lifestyle, social relationships, and diet.

In this pilot study, three out of five patients in the acupressure group reported that acupressure was effective in improving constipation. Cancer patients with less than a four-month history of constipation had less depressive symptoms and higher quality of life compared to patient with more than a four-month history of constipation. In conclusion, acupressure can be a safe and cost effective alternative medicine for constipation.

KEYWORDS: Acupressure, Constipation, Complementary and Alternative Medicine,

Depressive Symptoms, Quality of Life

Eun Jin Lee
Student Signature

5/25/2010
Date

THE EFFECT OF ACUPRESSURE ON CONSTIPATION, QUALITY OF LIFE,
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CONSTIPATION

By

Eun Jin Lee

Sherry Warden

Director of Dissertation

Terry A. Lennie

Director of Graduate Studies

5/25/2010

DISSERTATION

Eun Jin Lee

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ACKNOWLEDGEMENT

I would like to thank several people and groups who helped me with the dissertation. First of all, I would like to thank Dr. Warden, who is my advisor. I felt her warm love when I felt depressed and passed through difficult times. She gave me wise advice and guided me to the right way when I made mistakes during research. As an international student, I really appreciate that she spent her precious time on proofreading my papers. I would like to thank Dr. Hall. Her slow speaking was really helpful to understand. I felt that she considered the international students during her lecture. Even though she was not in good condition, she tried to help me. When I met a difficulty in recruitment during research, she made a wise decision for me. I really appreciate her deep concern and warm heart. I would like to thank Dr. Staten. I felt her encouragement whenever I met with her. She was thoughtfully kind. I would like to thank Dr. Wilson. He gave me insight to write the dissertation well. When I met him the first time, he encouraged me by listening to my proposal and agreeing with my research idea. I liked his warm smile and heart. I would like to thank Dr. Fraizer because she gave me quick responses and detailed comments. I appreciate that Dr. Dupont-Versteegden serves as an outsider examiner. I would also like to thank patients and staff of Markey Cancer Center. Monica Cox (supervisor), nurses, and staff helped me to recruit patients, even though they were busy.

Finally, I could not finish this dissertation without my family's help. My parents-in-law took care of my two children, Sumin and Youngmin. My parents-in-law did everything for me. They helped with laundry, cleaning, washing my two children, and feeding them. I appreciate my husband. He always encouraged me to study. He endured our messy environment at home. He tried to clean up instead of complaining. I would like to thank my parents in Korea who supported me financially,

emotionally, and spiritually. I am really blessed by having such devoted parents and parents-in-law. I thank God who loves me and provides everything for me.

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CHAPTER ONE

Introduction

Constipation is the most common gastrointestinal complaint in the United States. People with constipation spend \$725 million on laxatives annually. The prevalence of constipation was 4.4 million in 1983-1987 in the United States (National Institute of Diabetes and Digestive and Kidney Diseases, 2007). Women, elderly, and cancer patients have a higher prevalence of constipation compared to other groups (Godfrey & Rose, 2007; Schaeffer & Cheskin, 1998; Wirz & Klaschik, 2005). Constipation also decreases quality of life (Thomas, Cooney, & Slatkin, 2008). Older people with constipation have a poorer quality of life than older people without constipation (Norton, 2006). Constipation often coexists with depressive symptoms (Cheng, Chan, Hui, & Lam, 2003). Depressive symptoms with chronic diseases increase medical costs and mortality (O'Connor, et al., 2008). Therefore, screening for depressive symptoms is needed to decrease medical costs and increase the effectiveness of treatment. The Patient Health Questionnaire-9 (PHQ-9) is a screening tool for depressive symptoms. The validity and reliability of the PHQ-9 have not been tested in patients with constipation. Therefore, the psychometric properties of the PHQ-9 are needed to test in patients with constipation.

People with constipation have tried various methods to improve constipation. Medication, diet, exercises, and massage have been used. Recently, complementary and alternative medicine has been widely used to improve health. Acupressure is a kind of massage which uses the same points and theories as acupuncture. Acupressure uses the hands and fingers to press acupressure points, while acupuncture uses needles (National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS), 2009). Acupressure is based on the Meridian theory that a life force called Qi (pronounced chee) flows through the body along certain channels, which if blocked can cause illness. According to the theory, stimulation at precise locations along these channels by practitioners can unblock the flow of Qi, relieving pain and restoring health (NIAMS, 2009).

The purposes of this dissertation were to: 1) describe four theories of traditional Korean medicine; 2) review mechanisms of acupuncture and moxibustion and develop a conceptual model; 3) review findings from randomized controlled trials that tested the effects of acupressure used for the management of symptoms such

nausea, pain, and dyspnea; 4) examine the reliability and validity of the Patient Health Questionnaire-9 (PHQ-9) in heart failure patients with constipation compared to those with gastrointestinal disease; 5) describe how Korean women experienced constipation and how constipation affected their quality of life and the experience of using complementary and alternative medicine for constipation; 6) test the effect of acupressure on constipation and to examine quality of life and depressive symptoms in cancer patients with constipation.

Overall hypotheses were: 1) patients with constipation were expected to have a higher prevalence of depression compared to cardiac patients without constipation; 2) patients with gastrointestinal disease were expected to have a higher prevalence of depression compared to cardiac patients without gastrointestinal disease; 3) the PHQ-9 is strongly associated with the BDI-II; 4) depression measured by the PHQ-9 is strongly associated with anxiety and hostility; patients who have greater perceived social support have lower depression scores as measured by the PHQ-9; 5) compared to patients in the placebo group, patients who use left Abdominal Bind (SP14) acupressure for 7 days will report: (a) a lower mean score on Constipation Assessment Scale (CAS); (b) more frequent bowel movements for 7 days; and/or (c) less use of laxatives, suppositories, or enema compared to the placebo group; 6) the severity of constipation and duration of constipation will be positively associated with depressive symptoms and negatively associated with quality of life in cancer patients with constipation.

Conceptual Framework

This pilot study is based on a biopsychosocial model (Engel, 1997). Engel (1997) explains that illness is a result of interacting mechanisms at the cellular, organismic, interpersonal and environmental levels. Halligan and Aylward (2006) explain that the biopsychosocial model involves the treatment of disease processes. For example, type two diabetes and cancer require the health care team to consider with biological, psychological, and social influences upon a patient's functioning. The biopsychosocial model explains that the workings of the body can affect the mind, and the workings of the mind can affect the body. Psychological factors such as stress increased vulnerability to illness (McEwen, 1998). Fatigue in patients with spondyloarthritis was related to worse functional capacity, greater perceived stress, more depressed mood and less physical activity (Da Costa, Zummer, & Fitzcharles, 2009). Bruera and colleagues (2001) studied the effect of a multidisciplinary approach

on various symptoms in 110 cancer patients. The multidisciplinary team consisted of a nurse, pharmacist, physician, psychologist, physiotherapist, occupational therapist, social worker, respiratory therapies, and chaplain. This team visited patients/family twice for a total of 5-6 hours, discussed, and gave written recommendations. This multidisciplinary approach improved pain, depression, anxiety, and sense of wellbeing (Bruera et al., 2001).

For this dissertation, the biopsychosocial model for constipation was used. Constipation is related to age, gender, depressive symptoms, and serotonin (Bosshard, Dreher, Schnegg, & Bula, 2004; Jovanovic, et al., 2008; Ohayon, 2009; Spiller, 2008). Wu and colleagues (2007) found that acupressure improved depression and dyspnea in patients with chronic obstructive pulmonary disease (n = 44) when compared to a placebo group (p < 0.05). Therefore, acupressure may have a biopsychosocial effect which may include constipation relief via increasing serotonin as well as positive impact on quality of life and depressive symptoms.

The relation between constipation and depressive symptoms can be understood by serotonin levels. Low serotonin decreases peristalsis, decreases the pain threshold, and increases depressive symptoms (Ohayon, 2009; Spiller, 2008; Tack & Muller-Lissner, 2009). Too much serotonin also might cause constipation due to desensitization of the serotonin receptors (Costedio et al., 2009). Constipation for a long period might worsen depressive symptoms by interrupting absorption of food from the intestine which contains serotonin from the intestine (Feldman & Lee, 1985). Women and the elderly have more constipation than other groups. Women are three times more likely to suffer from constipation than men. Prevalence of constipation in elderly people was 15% to 50% (Bosshard et al., 2004). There is also a sex difference in serotonin. Women had higher stress responses compared to men in the hypothalamic-pituitary-adrenal stress axis (Goel & Bale, 2010). Women had significantly higher 5-HT (1A) receptor and lower 5-HTT binding potentials in brain regions measured by PET scan compared to men (Jovanovic et al., 2008). Serotonin fiber density decreased with aging (Aznar et al., 2010) (Figure 1).

Overview of Chapters Two, Three, and Four

Recently, complementary and alternative medicine has been widely used throughout the world. However, theories on complementary and alternative medicine have not been described well in published journals. In chapter two, four theories in traditional Korean medicine are described. Data sources were the Cumulative Index to

Nursing and Allied Health Literature (CINAHL), Dissertations and Theses (ProQuest), Google scholar, Korean Educational Research Information Service (KERIS), and National Institute of Health (NIH). The purpose of this review was to examine major concepts of Yin-Yang theory, Five Element theory, Sasang constitutional medicine theory, and Meridian theory and to understand the relationship between the four theories. This article also includes a critical reflection of the four theories.

Lately, Western efforts to examine the mechanisms of acupuncture and moxibustion have begun. In chapter three, mechanisms of acupuncture and moxibustion are introduced. A conceptual model for acupuncture and moxibustion is also introduced. Medline and Pubmed were searched for articles published from 1997 to 2009 using key words acupuncture or moxibustion, experimental, and mechanism. Forty seven studies were identified using these keywords. Experimental studies which examined the mechanism of acupuncture or moxibustion were included when they were written in English. When there was only one study to examine a mechanism for a symptom, it was excluded because it is difficult to make a conclusion based on one study. After application of the exclusion criteria, 42 studies remained.

In chapter four, a literature review on the effect of acupressure for various symptoms is introduced. Acupressure is a kind of massage using the same acupressure points and theories as acupuncture. Acupressure uses fingers and hands instead of using needles. A systematic review was performed to examine the effect of acupressure on nausea, pain, fatigue, and dyspnea. The primary literature search was conducted using Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medline, and PubMed. Key words used were acupressure, clinical trial, or/and randomized. Randomized controlled trials which used acupressure as the sole intervention were included when they were written in English. Studies were included when there were 5 or more studies of the effect of acupressure on that particular symptom.

Overview of Chapter Five

Constipation is often correlated with depression (Bengtsson & Ohlsson, 2005; Emmanuel, Mason, & Kamm, 2001). However, screening for depressive symptoms in people with constipation is often ignored. The Patient Health Questionnaire-9 (PHQ-9) is a screening tool for depressive symptoms. The PHQ-9 was used to examine the depressive symptoms in cancer patients with constipation in the chapter seven. The PHQ-9 had not been tested in patients with constipation. Therefore, the psychometric

properties of PHQ-9 were tested in patients with constipation. In chapter five, psychometric properties of the Patient Health Questionnaire-9 were examined in heart failure patients with gastrointestinal disease or constipation. The aims of the study were to: 1) compare the prevalence of depression in heart failure patients with constipation versus those without constipation and heart failure patients with gastrointestinal disease versus those without gastrointestinal disease; 2) examine the internal consistency reliability of the PHQ-9 and evaluate concurrent and construct validity of the measure. Cross-sectional data from 382 heart failure patients were used for this secondary analysis of data from four longitudinal studies. The Beck Depression Inventory-II (BDI), the Brief Symptom Inventory (BSI), and the Multidimensional Scale of Perceived Social Support (PSSS) were used to examine concurrent and construct validity.

Overview of Chapter Six and Seven

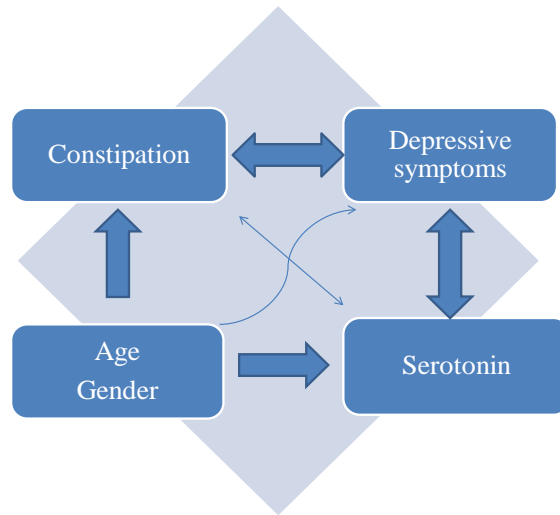
Constipation decreases quality of life. The direct impact of constipation on patients' quality of life has been assessed in a number of studies, using a variety of validated quality-of-life assessment scales (Irvine, Ferrazzi, Pare, Thompson, & Rance, 2002). However, the experience of living with constipation has scarcely been described. In chapter Six, experiences of ten Korean women with constipation are introduced. A phenomenological approach was used with in-depth, semi-structured interviews with ten Korean women in the United States who had constipation. The experience of living with constipation and using complementary and alternative medicine for constipation was examined. Each interview was fully transcribed and read several times to gain an overall impression of the participants' experiences. Next, significant statements were extracted from the transcriptions and, using an interpretative approach, a meaning was formulated for the given extract. The statements were clustered to support the development of themes, which captured the essence of the experience described. To obtain a sense of wholeness, a descriptive statement was written for each theme.

The effect of acupressure on various symptoms has been examined. However, the effect of acupressure on constipation has not been examined in the United States. In chapter seven, the effect of acupressure on constipation was examined in cancer patients with constipation. A pilot study using a double-blind, randomized clinical trial design was conducted with eight patients who reported constipation. In this pilot study, the experimental group performed 5-minute acupressure at Spleen (SP) 14 for 7

days; the placebo group performed 5-minute acupressure at Pericardium (PC) 6 for 7 days.

Figure 1.1

Conceptual Model of Constipation and Depressive Symptoms



CHAPTER TWO

Theories of Traditional Korean Medicine: A Literature Review

Introduction

Recently, complementary and alternative medicine has been widely used throughout the world. However, theories on complementary and alternative medicine have not been described well in journals. The purpose of this article is to describe four theories of traditional Korean medicine. Traditional Korean medicine is based on Yin-Yang theory, Five Element theory, Sasang constitutional medicine theory, and Meridian theory. The founders of Yin-Yang theory, Five Element theory, and Meridian theory are not clear. However, these theories were introduced in the book “The yellow emperor's classic of internal medicine.” in the first century BC (Veith, 2002). Yin and Yang are the two interrelated forces which together with the concept of qi form the foundation of Oriental medicine. Yin and Yang are mutually exclusive and together form a whole so that when they are in balance there is a state of harmony and health and when out of balance there is illness. The Five Element theory is based on the observation of the natural cycles and interrelationships in both our environment and within ourselves. The foundation of the theory rests in the correspondence of each element to a variety of phenomena (Yinyanghouse, 2007). Human beings also maintain a balance of Yin and Yang in the five elements and this relationship is very important in approaching Oriental medicine. The meridians are the channels in the body through which the life force flows throughout the body. In Oriental medicine the meridians are seen as the railroad, the acupuncture points on the meridians as the stations and energy as the train. In the normal healthy organism, all are maintained in balance and in a continuous circulation of energy. Illness is the result of the energy flow becoming disarranged (Kang, 1993). Sasang constitutional medicine theory emphasizes the importance of harmonizing food and herb according to body types (Koh, 2006).

Methods

Search Strategy

Databases were searched from September, 2007 to August, 2008. Data sources are CINAHL, Dissertation and Theses (ProQuest), Google scholar, KERIS, and NIH. The search strategy with combined words included: (theory) and (Oriental medicine or five element or Yin-Yang or Ki or Qi or Sasang).

Selection Criteria

Journals which described the theory of Oriental medicine were rare. Therefore, all journals which explained the theory were included.

Review Method

Review methods were to examine the major concepts of Yin-Yang theory, five element theory, Sasang constitutional medicine theory, and meridian theory and to understand the relationship among the four theories. This article also includes a critical reflection of the four theories.

Results

Yin- Yang Theory

Yin and Yang are opposite forces that work together to form a whole. Yin is defined as negative, dark, and feminine. Yang is defined as positive, bright, and masculine (National Institute of Health, 2007). The forces of Yin and Yang depend on each other and are made from each other in an unending cycle, such as hot and cold, day and night, and health and disease. Nothing is ever all Yin or all Yang, both exist in all things, including people. Many of the major organs of the body are believed to be Yin-Yang pairs that must be in balance to be healthy (National Cancer Institute, 2007). The Yin and Yang qualities of a person's constitution or the character of one's illness is an important process in making a diagnosis. However, the applications of Yin-Yang are relative. For example, the front of the body is Yin compared to the back which is Yang. Yet on the front of the body itself, the chest is Yang in relation to the abdomen which is Yin (Bensky, 1997).

Five Element Theory

There are five universal elements (wood, fire, earth, metal, and water) that affect a person's emotions, personality, health, and response to treatment. Each person is affected by one element more than the others all the time (National Cancer Institute, 2007). Within the Five Element theory there are four main relationships or ways in which the elements interact. There are the generating cycle, controlling cycle, overacting cycle, and insulting cycle (figure 1) (Yinyanghouse, 2007). In the generating cycle, water generates wood like rain nourishes a tree. Wood generates fire like burning wood generates fire. Fire generates earth like ash is created from the fire. Earth generates metal like metal is mined from the earth. Metal generates water like water condenses on metal (BIOM., 2007). For a practical example, in the generating cycle, people develop digestive problems from irregular eating, excessive

worry and overwork which lead to a proliferation of dampness in the earth element which then affects the metal element. Within this case, a combination of bloating, gas and poor energy with the development of metal (lung) symptoms such as sinusitis or phlegm type asthma can be observed. In the control cycle, for example, metal controls wood (Yinyanghouse, 2007). For a practical example, if a person has symptoms related to wood element, a doctor can use metal element to control the symptoms. In overacting cycle, if metal controls wood too much, it may cause another problem when the person is over-treated. In insulting cycle, it works the opposite way of the control cycle. This theory expounds that everything is maintained in kinetic balance under the movement of five elements. As shown in table 1, the five element theory can be applied widely to different aspects of man and the environment, including organs and emotions. The colors in the five element theory can be applied to symptoms when making a diagnosis, and depending on the tastes and sometimes the colors, herbs were also classified by the five-element theory, which determined their usage in traditional Korean medicine. For example, an herb with a white color would be assumed to affect the function of the lung which has metal element (Cheng, 2000).

Sasang Constitutional Medicine Theory

Sasang constitutional medicine (SCM) theory was developed by Lee, Jea-ma in 1894 . He explained the individual differences of vulnerability to pathology and proposed guidelines for the safe and effective use of medical herbs depending on individual traits (Chae et al., 2003). The *SCM* theory categorizes people into four body types according to their physical constitutions: *Tae Yang* (TY), *Tae Eum* (TE), *So Yang* (SY), and *So Eum* (SE). Eum is Korean, while Yin is Chinese. *Tae-Yang* means large-sun and the strength of Yang is at its peak. *So-Yang* means small-sun and the strength of Yang is currently small and at an increasing stage. *Tae-Eum* means full-moon and it represents the strongest strength of Yin (Eum). *So-Eum* means decrescent-moon and it symbolizes the weakest strength of Yin (Eum) (Chae et al., 2003). This theory emphasizes the importance of harmonizing food and herb according to body types (Koh, 2006). The diagnosis of constitutional types includes the external appearance and somatotype, personality, general health condition and symptoms, and the reaction to medication (Yoo, Kim, Kim, Koh, & Lee, 2007). The Sasangin Diagnosis questionnaire was developed by Yoo and his colleagues to determine constitutions (Koh, 2006). Kuan developed a diagnostic method to determine eight constitutions which was differentiated from four constitutions by

checking the pulse. Kuan explained each constitution has different characteristics of pulse (Kuan, 1974). Chae et al. (2003) explained that Tae-Yang type refers to a creative and visionary person who is gifted in starting social relationships but not in sustaining them. So-Yang type is a sharp and clean-looking person who is extroverted and interested in the outside world. The Tae-Eum type is a conservative and cautious person who has a talent for sustaining social relationships. The So-Eum type is an inactive, prudent, narrow-minded, resolute, and self-directed person who is in his or her own world. The body shape of Tae-Eum type is larger than that of the So-Eum type and the body shapes of So-Eum and So-Yang types are similar (Chae et al., 2003). Bae described the relationship between food and herbs and four body types (Table 2). For example, it is recommended that Tae-Eum type eats ginkgo, hemp, deer horn, beef, and nuts. For So-Yang type, youngji mushroom (*Ganoderma Lucidum*), pork, fish, and root vegetable are recommended (Bae, 2002).

Meridian Theory

Meridian is defined as a network of energy pathways in the body (National Cancer Institute, 2007). It is believed that there are 12 main meridians and eight secondary meridians and that there are more than 2,000 acupuncture points on the human body that connect them (National Cancer Institute, 2007). On the other hand, some people believe that there are 14 meridians to various organs or viscera of the human body (Gach, 1990).

Qi is defined as a living force or vital energy which flows through the body along certain channels called meridian (National Institute of Arthritis and Musculoskeletal and Skin Disease, 2008). Qi affects a person's spiritual, emotional, mental, and physical condition. Qi has two forces, Yin and Yang. When a person's Yin and Yang are not in balance, qi can become blocked. Blocked qi causes pain, illness, or other health problems (National Cancer Institute, 2007). Stimulation at precise locations along these channels by practitioners can unblock the flow of qi, relieving pain and restoring health (National Institute of Arthritis and Musculoskeletal and Skin Disease, 2008). The human body has 14 imaginary meridians that conduct energy to specific anatomical regions (Gach, 1990). The fourteen meridians are as follows: conception vessel (CV), governing vessel (GV), heart (HT), pericardium (PC), lung (LU), spleen (SP), liver (LV), kidney (KD), small intestine (SI), triple heater (TH), large intestine (LI), stomach (ST), gall bladder (GB), and urinary bladder (UB) (Yinyanghouse, 2007). These imaginary meridians, which originate in the fingertips,

provide a direct pathway to the brain. In turn, the brain is able to communicate with the organ associated with a particular meridian. Each meridian is classified according to the specific organ to which it is associated. Acupoints are located on the skin that is especially sensitive to the conduction of bioelectrical impulses throughout the body (Gach, 1990). To stimulate acupoints, hand acupuncture, acupressure, cupping therapy, moxibustion, and venesection can be used by nurses. Moxibustion uses the heat generated by burning herbal preparations containing mugwort (Cardini & Weixin, 1998). Cupping therapy stimulates acupoints by negative pressure using small cups. There is wet cupping therapy and dry cupping therapy. Wet cupping therapy collects pus and blood, while dry cupping therapy uses only negative pressure to stimulate acupoints (Chirali, 1999). Venesection sucks out non-physiological (extravasated) blood using a lancet, alleviating pain induced by blood circulation dysfunction (Kim et al., 2005). For example, if a person has a sty, the points for venesection are under the big toes and the thumbs. Making a little bleeding unblocks qi and heals the sty right away.

Hand acupuncture was developed by Tae-Woo Yoo. He recognized that points on the hand corresponded to acupuncture points on the body (Celik, 2006). Small and thin needles are used which cause less pain than acupuncture needles. It is simple and lacks any side effects (Yoo, 2007).

Case Study

A thirty-four-year old man had stiffness and swelling of the fingers. He had several tests including antinuclear antibodies (ANA) to determine rheumatoid arthritis but the results were normal. He then visited an oriental clinic where the doctor diagnosed him as Tae-Yang constitution by checking his pulse, conducting Sasang diagnosis questionnaire, and observing his response to herbs (Sasang theory). The doctor diagnosed his symptoms as febrile arthritis caused by heat (Five element theory). The signs and symptoms are painful joints, severe with heat; swelling; local redness; limitation of movement; fever or thirst; slippery and rapid pulse; and greasy and yellow coating on the tongue. Acupuncture treatment points were ST (stomach) 43 and LI (large intestine) 4 to eliminate heat (Meridian theory). According to five element theory, Tae-Yang has a metal element. Eating too spicy food and excessive grief may affect health. Tae-Yang constitution has strong lung and weak liver. Therefore, the doctor recommended not eating meat because it strengthens fire element and it controls the metal element. The doctor recommended to eat green

vegetables and to drink green tea because green color strengthens the liver. The doctor also recommended drinking cold water and keeping the room temperature cool because he had big Yang (Yin Yang theory). He has not experienced swelling of the fingers since he stopped eating meat (Eu, S., personal communication, November 11, 2007).

Description of theories

Purpose

Four theories are analyzed to understand the human being and describe phenomena related to health, explain how to prevent and treat diseases, and predict the result of treatment.

Concepts & Definition

The important concepts are Yin-Yang, qi, meridian, and five elements. These concepts are defined comparatively. However, it may be difficult to understand them because they are described in philosophical language rather than scientific language.

Relational Statement

Qi has two forces, Yin and Yang. When a person's Yin and Yang are not in balance, qi can become blocked. Blocked qi causes pain, illness, or other health problems (National Cancer Institute, 2007). Yin and Yang are opposite forces that work together to form a whole (Kang, 1993). Organs in the human body are explained as having water (kidney/urinary bladder), wood (liver/gall bladder), fire (heart/small intestine), earth (spleen/stomach), or metal (lung/large intestine) elements. Water generates wood and wood generates fire. Fire generates earth and earth generates metal. Metal generates water (BIOM., 2007). Fire, water, earth, wood, and metal can be explained as having either Yin or Yang (Kang, 1993). Meridian is defined as a network of energy pathways in the body (National Cancer Institute, 2007). Qi moves through the meridian. The names of twelve meridians are distinguished by organs which have five elements and Yin and Yang. Other two meridians such as conception vessel (CV) and governing vessel (GV) are not related to specific organs

Structure of Traditional Korean Medicine

Sasang constitutional medicine theory (SCM), Five Element theory, and meridian theory are based on Yin-Yang and qi (figure 2). SCM theory focuses on how to use food and herbs by constitutional types. SCM theory explains that eating food or herbs which agree with one's constitution enhances qi. It also use acupuncture but the acupuncture points are below knees and elbows. Food and herb have five elements

(Bae, 2002). Meridian theory focuses on how to use needles, fingers, heat, and so on to stimulate acupuncture points. Stimulating meridian affects organs which have five elements. In summary, to balance yin and yang and to unblock qi, SCM uses four types of diet, meridian theory emphasizes stimulating 12 meridians, and five element theory gives information of the relation between organs and effects of treatments.

Assumption

The body and mind exist at either end of a line. Mental, emotional, and physical illness are closely related. In other words, if we treat the body, the emotions also will be treated, and vice versa (Bensky, 1997). Qi affects a person's spiritual, emotional, mental, and physical condition. Each individual was born with a primary Sasang constitutional type that does not change (Bae, 2002).

Critical Reflection of Theories

Clarity

The concepts of Yin-Yang and five elements are very abstract and subjective. It is difficult to diagnose people with the degree of Yin-Yang and five elements imbalance because it depends on doctors' experience and sensitivity. Meridian is numbered in two ways: some insist there are 14 meridians; others insist there are 12 primary meridians and eight extra meridians.

Simplicity

The four theories have many relationships among concepts. SCM theory, meridian theory, and five element theory have common concepts of Yin and Yang and qi. SCM theory categorizes people using Yin and Yang and five elements. For example, So-Eum has two types which are "water and Yin" and "water and Yang". Also meridian theory distinguishes organs using Yin and Yang and five elements. For example, lung is considered to have a metal element and Yin. These theories intend to describe human beings, explain how to treat and prevent diseases and predict the result of treatment. The four theories focus on controlling balance to maintain health.

Accessibility

The concept of Yin-Yang and five elements is identifiable through experience of reaction to treatments and by checking pulses. However, diagnosis by pulse requires professional training, much experience and sensitivity. Sasang constitution is identifiable by the Sasang diagnosis questionnaire, appearance, and herbal drug test (Yoo et al., 2007). After interview and questionnaire, a patient receives proper herb mix and takes it for two days. The patient observes the good response and side effects

from the herb. If the patient has more side effect than good response, the doctor thinks that the first diagnosed constitution could be wrong. Then the patient tries another herb mix (Bae, 2002).

Importance

Sasang constitutional medicine theory can be applied by nurses to teach patients how to choose food and herbs. However, it is not easy to diagnose the right constitution. The effect of Sasang constitutional diet on hypertension, hyperlipidemia, and Crohn's disease could be studied. Meridian theory can be applied to the practice of acupressure, hand acupuncture, moxibustion, venesection, and cupping therapy by nurses. The possibility of nursing research to examine the effect of these therapies is limitless. For example, venesection could be researched to examine the effect on acute infectious conjunctivitis, tinnitus, otitis media with effusion, and hypertension in stroke patients (Kim et al., 2005). The effect of hand acupuncture could examine musculoskeletal pain (sprains, tendonitis, contusions, arthritis), headache, back and neck pain, upper respiratory symptoms (nasal congestion, sore throat, ear pain), allergies, digestive problems (including postoperative vomiting) (Kim, Koo, Jeon, Park, & Seung, 2002), women's health problems, anxiety, and insomnia (Yoo, 2007). Moxibustion can be researched to determine the effect on the correction of breech presentation (Cardini & Weixin, 1998), voiding dysfunction, facial paralysis, hypertension, and peripheral circulation (Kim et al., 2005). Cupping therapy can be studied to examine the effect on musculoskeletal pain (Kim et al., 2005). These theories are in agreement with the holistic view of nursing because these theories view humans as a whole not as a collection of cells. Therefore, nurses could use this theory in education, research, and practice.

Discussion

Western medicine and Oriental medicine have very different ways of organizing information. The theories of Western medicine explain the human as a compilation of cells. However, the theories of Oriental medicine explain humans as holistic beings. The theories of Western medicine deal with physical and mental problems separately. However, theories of Oriental medicine believe that emotions affect the body directly and the body affects the emotions directly. Therefore, Western medicine tries to treat cells. However, Oriental medicine tries to work with energy that animates those cells.

Oriental medicine complements Western medicine. There are many side effects of symptomatic treatments in Western medicine. However, Oriental medicine tries to enhance the immune system to resist disease. The surgical part of oriental medicine has not developed well because people thought cutting bodies was disrespectful to parents and dead people. Oriental medicine uses acupuncture for anesthesia. Western medicine provides better acute and surgical care.

Oriental medicine broadens the choice of treatment. There are several reasons for people to choose Oriental medicine. Some people do not want to experience side effects from Western medications. Others like holistic care. Many Asian patients who can not access the health care system in USA seek Oriental medicine because of easy access.

Oriental medicine and Western medicine have their own strong points and weak points. They can be good partners for better patient care. If nursing schools teach both types of medicine, it will enhance holistic care.

Many patients are using Oriental medicine to manage their symptoms or prevent diseases along with Western medications. Therefore, nurses also need to know the effects of herbs and the interaction between herbs and medications. If we introduce Oriental medicine, we will have a lot of independent interventions for patients. Therefore, we need to take several basic courses about Oriental medicine.

Conclusion

Theories of traditional Korean medicine have many possible applications in nursing. Even though it has abstract and subjective concepts, these theories provide a holistic view regarding health. Nurses and nurse practitioners can practice independent interventions using acupuncture, moxibustion, and venesection. Also this theory can be applied to educate patients on managing symptoms with diet. Despite of a long history of traditional Korean medicine, there is a lack of research on theories and mechanism. Further study on theories and mechanism of traditional Korean medicine is needed. Therefore, nurse researchers, practitioners, and educators need to consider this theory as a new paradigm.

Table 2.1.

Five Element Theory

	Wood	Fire	Earth	Metal	Water
Taste	Sour	Bitter	Sweet	Spicy	Salty
Color	Green	Red	Yellow	White	Blue/Black
Environment	Wind	Heat	Damp	Dry	Cold
Yin organs	Liver	Heart	Spleen	Lung	Kidney
Yang organs	Gall bladder	Small intestine	Stomach	Large intestine	Urinary bladder
Emotions	Anger	Joy	Worry	Grief	Fear
Senses	Eyes	Tongue	Mouth	Nose	Ear
Sounds	Shouting	Laughing	Singing	Wailing	Groaning
Direction	East	South	Middle	West	North

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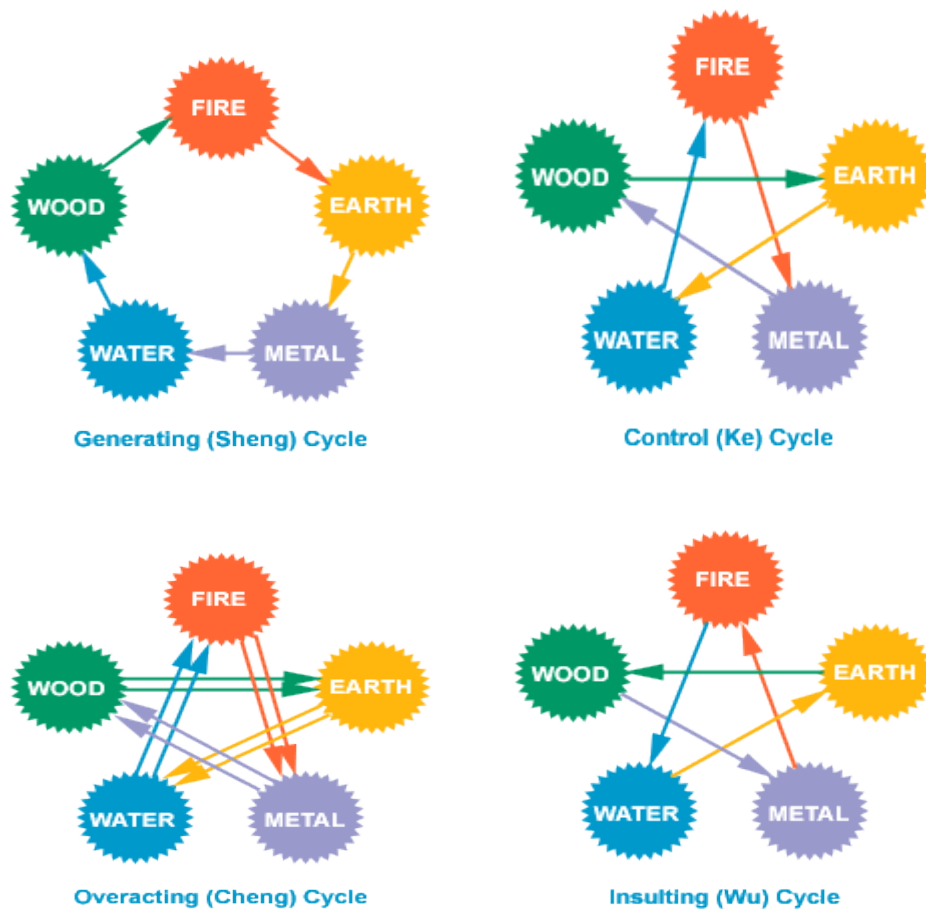
Table 2.2

Sasang Constitutional Theory

	Tae-Yang	So-Yang	Tae-Eum	So-Eum
Nature	Sorrow	Anger	Gladness	Enjoyment
Five element	Metal	Earth	Wood	Water
Developed organ	Lung	Spleen	Liver	Kidney
Character	Creative, positive, progressive, charismatic	Curious, easily get bored, active, sacrificing	Gentle, commercial, endurable, tentative	Negative, intelligent, organized, selfish
Body shape	Loud voice, sharp eyes, big ears, big head, developed upper body	High –tone voice, shiny eyes, thin lips, sharp and small nose	Low –tone voice, unclear eyes, big nose, small ears, thick hands and ankles, thick waist	Stable voice, round and clear eyes, thick upper lip, developed hip
Healthy sign	Urination	Bowel movement	Perspiration	Digestion

Note. Source: adopted from Bae (2002)

Figure 2.1
Five Element Theory

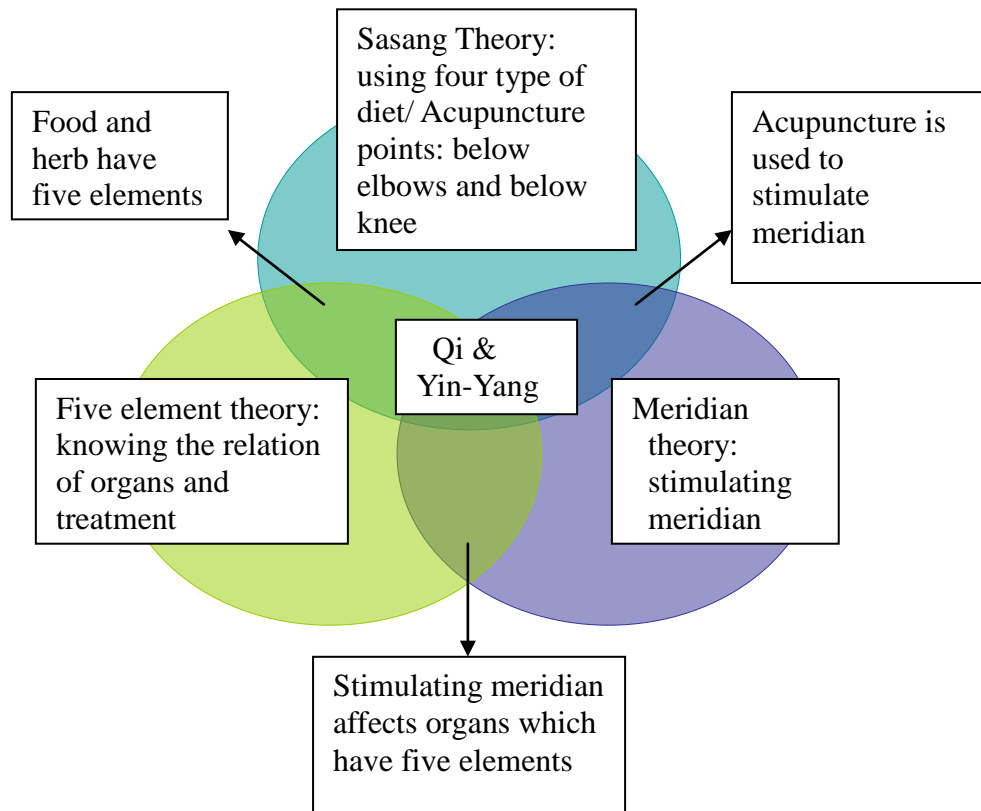


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Source: Yinyanghouse (2007)

Figure 2.2

Structure of Traditional Korean Medicine



CHAPTER THREE

A Review of Mechanisms and a Conceptual Model of Acupuncture and Moxibustion

Introduction

For over 5000 years, Oriental medicine has been used for treatment of diseases. Oriental medicine includes acupuncture, acupressure, moxibustion, and herbs which have been used in China, Korea, and Japan. In Eastern models, Meridian theory, Yin-yang theory, Five Element theory, and Sasang Constitutional Medicine theory offer explanations for how Oriental medicine works. In Western models, Roger's energy field theory (1988) or gate control theory could explain how Oriental medicine works. According to the gate control theory, acupuncture closes the gate to pain and reduces pain perception in the brain through stimulation of large nerve fibers (Khadilkar, et al., 2005). In other words, acupuncture needles stimulate peripheral nerves and block pain stimuli from passing to the brain (Hao, Zhu, Zhang, & Tian, 2005). Rogers (1988) proposes that human beings are energy fields. These energy fields of human beings are in a constant state of fluctuation, interacting with environmental energy fields, altering the pattern of each field. Rogers (1988) explains that a goal of nursing is to provide the most effective methods for improving the health of patients by controlling the environment, both internal and external, thereby helping patients reach their highest level of wellness. The idea that health can be improved by controlling the environment is a common theme in theories of Oriental medicine.

Five Element theory explains that environmental factors such as color, temperature, humidity, direction, or sound might influence health (Yinyanghouse, 2009). Sasang Constitutional Medicine theory explains that people have unique constitutions such as Tae-Eum, So-Eum, Tae-Yang, or So-Yang. Therefore changing environment according to the constitution is important to improve health (Bae, 2002). For example, if a patient has So-Eum constitution, blue color of walls, coldness (such as ice water or air conditioner), groaning sounds, or a north direction of a house should be avoided to maintain optimal health.

Recently, Western efforts to examine the mechanisms of acupuncture and moxibustion have begun. One purpose of this paper is to summarize proposed mechanisms of acupuncture and moxibustion. Probable mechanisms for acupuncture/moxibustion effects on pain, gastric activity, myocardial ischemia, irritable bowel syndrome, spinal cord injury, epilepsy, drug addiction, and stroke have

been revealed in human and rat models. The second purpose is to develop a conceptual model of acupuncture and moxibustion. The third purpose is to generate directions for future research. Acupuncture uses needles to stimulate acupuncture points. Acupuncture needles are metallic, solid, and hair-thin. Acupuncture causes no or minimal pain during needle insertion. Some people feel energized by treatment, while others feel relaxed. To be effective, treatment may be required over several weeks or more (National Center for Complementary and Alternative Medicine, 2008). Electroacupuncture uses needles with electronic stimulation (Guo et al, 2008a). Moxibustion uses heat to stimulate acupuncture points using mugwort. Moxibustion methods are varied. Garlic, aconite, scallions, fermented soybeans, salt, fresh ginger, chives, buckwheat, and croton seed are used in combination with moxibustion (Deadman, 2008). Moxibustion therapy is divided into direct burning and indirect burning. Direct burning places moxa on the skin. Direct burning has two types: scarring and non-scarring. Indirect burning puts salt, various plants leaves, ginger slices, or garlic slices under moxa or a therapist holds moxa close to the skin (Okada & Kawakita, 2009).

Methods

Search Strategy and Selection Criteria

Articles for review were selected using online literature search engines. Medline and Pubmed were searched for articles published from 1997 to 2009 using key words “acupuncture” or “moxibustion,” narrowed down by “experimental” and “mechanism.” Forty-seven studies were identified using these keywords. Experimental studies which examined the mechanism of acupuncture or moxibustion were included when they were written in English. Investigations which have only one study to examine a mechanism for a symptom were excluded. After application of the exclusion criteria, 42 studies remained. In the following sections, evidence about the mode of action of acupuncture and moxibustion is discussed.

Results

Pain

Acupuncture/moxibustion decreases pain by stimulating the pain receptors (nerve endings), causing the secretion of neurotransmitters, such as endorphin (Uryu, Okada, & Kawakita, 2007), serotonin (Qu & Zhou, 2007), enkephalin (Guo, Moazzami, Tjen-A-Looi, & Longhurst, 2008), epinephrine, or norepinephrine (Koo, Lim, Chung, Ju, & Chung, 2008) in the central nervous system and the plasma, and by

decreasing substance P (Lee, et al., 2009). Neurotransmitters increase pain threshold (McChance & Huether, 2002; Ulett, Han, & Han, 1998). Electroacupuncture at PC 5 and PC 6 increased c-Fos immunoreactivity, neurons double-labeled with c-Fos, and either enkephalin or 5-HT (serotonin) in all three midline medullary nuclei, especially in the nucleus raphe pallidus (n=6, all p< 0.05) in cats compared to cats with manual acupuncture (Guo, et al., 2008b). Electroacupuncture produces a synergism of the central nervous system with a direct impact on the uterus through increasing the release of β -endorphin and 5-hydroxytryptamine into the peripheral blood (Qu & Zhou, 2007). Indirect moxibustion every other day for an average of 2 minutes for 28 days reduced pain in 36 rats with osteoarthritis. Naloxone, an opioid antagonist, blocked the effect of moxibustion. This result suggests that the effect of moxibustion on pain works through endogenous opioid mechanisms (Uryu, et al., 2007).

Gastric Activity

Acupuncture/moxibustion increases gastric activity by increasing serotonin (Sugai, et al., 2004) and activating the dorsal vagal complex (J. J. Wang, et al., 2007). Acupuncture decreases gastric activity by increasing cholecystokinin (Kim, et al., 2008). Serotonin is a neurotransmitter involved with mood, anxiety, sleep induction, and intestinal motility. About 80 to 90 percent of serotonin exists in the enterochromaffin cells in the gut, and the remainder is made in serotonergic neurons in the central nervous system (CNS) (McChance & Huether, 2002; Sikander, Rana, & Prasad, 2009). Cholecystokinin (CCK) is a polypeptide hormone secreted by the gastrointestinal mucosa. CCK stimulates the gall bladder to eject bile and the pancreas to secrete alkaline fluid and CCK decreases gastric motility (McChance and Huether, 2002). The dorsal vagal complex, which is located in the brainstem (Charrier, et al., 2006), controls the upper digestive tract (Rhoades & Bell, 2009). Electroacupuncture with 100 Hz and 0.2-0.3 mA at ST 36 (stomach) for 30 minutes reduced 30-min and 60-min food intake in 48-hour fasted rats with vagotomy. Vagotomy is a surgical procedure which cuts the vagus nerve. Lorglumide, a CCK-1 receptor antagonist, blocked the effect of electroacupuncture. These results suggest that electroacupuncture at ST 36 increases cholecystokinin (CCK) in gastric mucosa, followed by decreasing gastric motility. As the result, food intake decreases (Kim et al., 2008). Electroacupuncture with 50 Hz and 20 V at ST 36 for 30 minutes increased gastric activity using electro-gastric graph in rats. Vagotomy reduced gastric activity. Electroacupuncture at ST 36 and ST 37 increased the frequency of electro-

physiological activity in the nucleus of solitary tract (NTS) and dorsal motor nucleus of the vagus nerve (DMV). These results suggest that the effect of acupuncture may partially depend upon integrated nerve pathways and related central neurons in the dorsal vagal complex (Wang, et al., 2007). Electroacupuncture at ST 36 (stomach) and SP 6 (spleen)—acupuncture points on the hind limb—was effective in increasing gastric emptying in rats. Moxibustion at ST 25, CV 10 (concept vessel), CV 12—acupuncture points on abdomen—for 8 minutes increased gastric emptying in rats with the immobilization-induced slow gastric motility. pCPA (para-chlorophenylalanine), a serotonin inhibitor, blocked the action of electroacupuncture and moxibustion on gastric emptying. This result suggests that moxibustion in the abdominal points and electroacupuncture in the hind limb require an intact serotonergic pathway (Sugai, et al., 2004).

Irritable Bowel Syndrome

There is evidence from animal studies that moxibustion/acupuncture decreases chronic visceral hypersensitivity by decreasing serotonin and hypothalamic corticotrophin-releasing hormone (Wu, et al., 2009; Zhou, et al., 2009). An abnormally enhanced perception of visceral stimulation is an important biological marker of irritable bowel syndrome (IBS). Herb-partition moxibustion at ST 25 (stomach) for 15 minutes once a day for 7 days increased the pain threshold of chronic visceral hypersensitivity in rats and recovered normal sensitivity by 5-hydroxytryptamine (HT) concentration decreased in the colon tissue. Chronic visceral hypersensitivity significantly raises 5-HT concentration, while suspended moxibustion reduced it (Zhou, et al., 2009). Electroacupuncture at ST 37 for 20 minutes once a day for 7 days decreased visceral sensitivity (measured by abdominal withdrawal reflex (AWR) score) and hypothalamic corticotropin-releasing hormone (CRH) levels in 30 rats with irritable bowel syndrome. Hypothalamic CRH, which releases during stress, was tested because IBS patients have been reported to be hypersensitive to routine stress (Wu, et al., 2009).

Drug Addiction

Acupuncture/moxibustion treats drug withdrawal by regulating dopamine (Yoshimoto, et al., 2001), serotonin (Yano, et al., 2004), and gamma-aminobutyric acid (GABA) (Yoon, et al., 2004). Electroacupuncture at ST 36 (stomach) for 10 minutes twice a week for 3 weeks reduced the alcohol-drinking behavior in restricted rats, and increased striatal dopamin levels. After fasting for 24 hours, only alcohol

was given for drinking. The alcohol-drinking behavior increased in rats with long restriction compared to those with short restriction (Yoshimoto, et al., 2001). Acupuncture at HT 7 (heart) for 1 minute decreased ethanol-induced dopamine in the nucleus accumbens in rats. However, SCH 50911 (GABA (B) antagonist) prevented the action of acupuncture on dopamine. These results suggest that acupuncture at HT 7 inhibits ethanol-induced dopamine release by modulating GABA (B) activity (Yoon, et al., 2004). Moxibustion at ST 36 (stomach) for 10 days increased the dopamine level in the midbrain substantia nigra/ventral tegmental area in rats without restraining the stress response. Acupuncture at the HT 7 (heart) for 1 minute significantly inhibited the increase of locomotor activity (the movements from place to place) as well as the tyrosine hydroxylase expression in the ventral tegmental area in cocaine-injected rats. This data suggests that the inhibitory effects of acupuncture on cocaine-induced expression were closely related to the decrease of dopamine biosynthesis and the postsynaptic neuronal activity. Acupuncture may be effective for inhibiting the behavioral effects of cocaine by possible modulation of the central dopaminergic system (Lee, Han, & Shim, 2009). Moxibustion at BL 23 significantly increased the serotonin level in the nucleus amygdala, while moxibustion at ST 36 decreased the serotonin level in the nucleus accumbens. The results suggest that electroacupuncture at BL 23 or ST 36 has an antistress effect, while moxibustion is likely to stimulate the functions of mesocortical and mesolimbic dopaminergic and serotonergic neurons (Yano, et al., 2004).

Myocardial Ischemia

Acupuncture recovers cardiac function by regulating nitric oxide synthase (NOS) expression in myocardium (Wang, Chen, Gao, Luo, & Liu, 2008); relieving arteriospasm, inhibiting extreme dilatation of blood capillaries, modulating imbalance of micro-vasomotion of the coronary artery, improving myocardial blood-supply, and promoting normalization of electrical activities of the ischemia myocardium (Cao, Liu, Chen, & Han, 1998); and decreasing β_1 -adrenergic receptors, $G_s\alpha$ protein, and cAMP (Gao, Fu, Jin, & Yu, 2007). Acupuncture at PC 6 (pericardium) for 30 minutes once a day for 3 days produced cardio-protective effects against ischemia and reperfusion. It may be mediated via β_1 -adrenergic receptors, $G_s\alpha$ protein, and cAMP (cyclic adenosine monophosphate) (Gao, et al., 2007). Acupuncture at PC 6, SP 4, PC6+SP 4 for 30 minutes promoted significantly the recovery of cardiac and gastric electrical activities after acute myocardial infarction (AMI), and up-regulated nitric oxide

synthase (NOS) expression in myocardium, gastric antrum, and duodenum tissues in 24 rats with acute myocardial infarction (Wang, et al., 2008).

Diabetes

Acupuncture decreases blood sugar by stimulating somatic afferent fiber and muscle contraction, increasing insulin binding in various tissues followed by increasing insulin responsiveness (Higashimura, Shimoju, Maruyama, & Kurosawa, 2009), and increasing beta endorphin levels (Chang, Lin, Chi, Liu, & Cheng, 1999). Electroacupuncture at CV 12 (conception vessel) acupuncture point caused hypoglycemia in diabetic mice and increased beta endorphin levels. The authors presumed that the increase of beta endorphin in plasma was caused by the increase of insulin in the plasma of diabetic mice (Chang, et al., 1999).

Epilepsy

Acupuncture treats epilepsy by decreasing GABA (Fu & Longhurst, 2009) and increasing the expression of GAD (67) mRNA in the DG granular cell layer (Guo, et al., 2008). Melatonin levels in pineal, hippocampus, and serum increased following acupuncture (Chao, Chen, & Cheng, 2001). GABA (gamma-Aminobutyric acid) is the major inhibitory neurotransmitter in the brain. GABA inhibits the postsynaptic neurons in the brain. Drugs that enhance GABA function have been used to treat epilepsy (McChance & Huether, 2002). Melatonin is an anti-stressor and a natural down-regulator of epileptiform activity (Chao, et al., 2001). Electroacupuncture at the PC 5-6 (pericardium) for 28 minutes reduced the release of GABA by 39% during electroacupuncture and by 44% 15 minutes after electroacupuncture. Thirty-five minutes after electroacupuncture, GABA concentrations went back to pre-EA levels. Blockade of cannabinoid type 1 receptors with AM251, a selective cannabinoid type 1 receptor antagonist, reversed the EA-modulated changes in GABA concentration. These results suggest that electroacupuncture changes the sympathoexcitatory reflex responses by decreasing the release of GABA, but not glutamate, in the ventrolateral periaqueductal gray, most likely through a presynaptic cannabinoid type 1 receptor mechanism (Fu & Longhurst, 2009).

Stroke

Acupuncture treats stroke by decreasing the number of apoptotic cells and expression of the proapoptotic Bax gene and increasing the expression antiapoptotic gene Bcl-2 (Wang, Liu, Yu, Jiang, & Han, 2009), regulating GABA (Gan, Cheng, Ng, & Ling, 2005), decreasing infarct size, and increasing the production of

endocannabinoid 2-arachidonylglycerol and N-arachidonylethanolamine-anandamide, which brings out protective effects against transient cerebral ischemia through a selective cannabinoid receptor type 1 receptors (Wang, et al., 2009). Acupuncture decreased brain edema and Brain B Barrier disruption caused by subsequent cerebral ischemia and decreased MMP-9 expression and activity which increases after stroke (Dong, et al., 2009). Electroacupuncture at GV 20 (governing vessel) and GV 26 for 30 minutes twice decreased the ischemic damaged areas in the cerebral cortex and hippocampus in rats with the rat model with middle cerebral artery occlusion ($p < 0.05$). Picrotoxin (PTX) injection, a GABA receptor's antagonist, followed by electroacupuncture, increased the infarct area and decreased survival cell percentage significantly when compared with those without PTX injection. These results suggest that electroacupuncture at GV 20 and GV 26 regulates expression of GABA that would have a neuroprotective effect (Gan, et al., 2005).

Immune System

Moxibustion enhances immunity in healthy respondents, but suppresses abnormal immune response in disease status. Moxibustion increases immunity by increasing CD3+ and CD4+ T-lymphocytes (Kung, Chen, & Hwang, 2006), increasing the levels of interleukin-2, interferon gamma, and the activity of natural killer cells of the spleen (Yu, et al., 1997), and suppressing natural killer (NK) cell cytotoxicity (Han, 2003). Moxibustion suppresses immunity by decreasing CD8+ T-lymphocytes (Kung, et al., 2006) and down-regulating expression of interleukin-1b (IL-1b) and IL-6 mRNA (Wu, et al., 1999). Moxibustion at ST 36 (stomach) and SP 6 (spleen) for 20 minutes per day for 7 days elevated CD3+ and CD4+ T-lymphocytes in normal subjects, whereas it decreased relative proportions of CD8+ T-lymphocytes in 12 patients with systemic lupus erythematosus (SLE) (Kung, et al., 2006). Moxibustion suppressed natural killer (NK) cell cytotoxicity (the quality of being toxic to cells) in both placebo-treated rats and sympathectomized rats. Moxibustion did not affect T cell proliferation. Moxibustion did not affect B cell proliferation in placebo-treated rats, but increased B cell proliferation in sympathectomized rats. Sympathectomy alone provoked an augmentation of NK cell cytotoxicity and a suppression of T cell proliferation (Han, et al., 2003). Partition-herb moxibustion regulated the expression of Bcl-2, Bax, fas and FasL proteins, inhibited the apoptosis of epithelial cells by Bcl-2/Bax, fas/FasL pathways (Wu, et al., 2004), and down-regulated expression of interleukin-1b (IL-1b), IL-6 mRNA in colonic mucosa in

ulcerative colitis rats (Wu, et al., 1999). Acupuncture and moxibustion raised the contents of PGE₂alpha (prostaglandine), PGF₂alpha, and cAMP, and reduced the content of cGMP in the tissue of gastric mucosa in model rats with chronic atrophic gastritis (Gao, Rao, Wang, Meng, & Wei, 2005). Electroacupuncture at Zusanli (St 36) acupuncture point for 60 min per day over 3 days increased the levels of interleucin-2, interferon gamma, and the activity of natural killer cells of the spleen (Yu, et al., 1997).

Characteristics of Acupuncture Points

Acupuncture points have a significantly decreased number and density of subcutaneous nerve structures compared to skin biopsies from non-acupuncture points (Wick, Wick, & Wick, 2007). A study revealed that the electrical current at BL 56 (bladder) and PC 6 (pericardium) were significantly higher than those of non-acupuncture points. Skin norepinephrine (NE) concentration and ³H-NE release at BL 56, PC 6, and GV 6 (governing vessel) were significantly higher than those in non-acupuncture points and non-meridian controls (Chen, Ibe, & Ma, 2006).

Factors Associated with Acupuncture

The types of afferent nerve fibers stimulated by acupuncture depend upon the manipulation methods used as well as individual differences in sensitization. Manual acupuncture (MA) stimulates all types (Ab, Ad and C) of afferent fibers, while electro-acupuncture stimulates Ab- (group II) and part of Ad type afferents (group III). Individual differences in sensitivity to acupuncture analgesia are connected with inherited genetic factors (Chae, Park, Hahm, Yi, & Lee, 2006) and the density of Cholecystokinin octapeptide (CCK) receptor (Kim, et al., 2007) rather than psychological factors (Chae, et al., 2006). Different frequency of electroacupuncture stimulates different opioid receptor subtypes (Wang, Zhang, Wang, Cao, & Han, 2005). A study reported that different frequencies of electroacupuncture (EA) increased the number of neurons in catecholaminergic neurons. These authors suggest that different frequencies of EA raise the cellular activity of central catecholamine (epinephrine and norepinephrine) synthesizing neurons. This provides evidence that the catecholamine system plays an important role in EA-induced analgesia (Kwon, et al., 2000). Electroacupuncture at PC 7 (pericardium) with intensity of 15 mA increased dopamine release in the corpus striatum in the rats. Electroacupuncture stimulation at 6Hz increased dopamine levels after 80 minutes of stimulation. At electroacupuncture stimulation frequency of 15 Hz, dopamine levels rose after 60

minutes of stimulation and continued elevated for more than 120 minutes (Shen & Lai, 2007).

Pathway of Acupuncture and Moxibustion

Spinal pathways of acupuncture impulses from acupuncture points go up mainly through the ventrolateral funiculus (Zhao, 2008). Electroacupuncture at tibialis anterior muscle for 10 minutes increased responsiveness to insulin in rats with streptozotocin-induced diabetes. The effect of electroacupuncture on the responsiveness to insulin was blocked by division of both sciatic and femoral nerves ipsilateral to the side of the electroacupuncture. These results suggest that the effect of electroacupuncture occurs via a mechanism that involves the somatic afferent nerves (Higashimura et al., 2009). Somatic afferent nerves transmit impulses from peripheral organ systems to the central nervous system (McChance and Huether, 2002). Local inflammatory responses such as flare (vasodilatation) and wheal (extravasation) induced by acupuncture and moxibustion stimulations might be the results of the release of neuropeptides due to the antidromic excitation of the polymodal receptors (PMR) as an axon reflex. Axons are located in the anterior horn on the spinal cord. The acupuncture trigger points are located in the same area of PMR. The tenderness of acupuncture points comes from the sensitized PMRs. The morphological characteristics of acupuncture points are also similar with those of the PMRs (Kawakita, et al., 2006). The needle stimulation should give rise to a specific sensation (called 'de qi' in Chinese) which is experienced as numbness, heaviness, and radiating paraesthesia, a sensation close to deep muscle pain, which is a sign of the activation of thin myelinated A-delta nerve fibers (Andersson & Lundeberg, 1995).

Conceptual Model

Pathway of Stimulation

There are several hypotheses regarding pathways of acupuncture or moxibustion. When acupuncture (needle) or moxibustion (heat) stimulate the skin, somatic afferent nerves/myelinated nerve fibers/polymodal receptors are activated. The polymodal receptors release neuropeptides as well as activate an axon reflex in the spinal cord. The neuropeptides move to tissue and organs to repair functioning. Polymodal receptors have effects on central neurons as well as peripheral nerve fibers (Rhoades & Bell, 2009). The signal moves via the spinal cord to the brain. Signals from the brain move via efferent nerves to body systems (Figure 1).

Factors for Inducing Different Mechanisms

Different factors activate different mechanisms. For acupuncture and moxibustion, acupuncture points, duration and intervals between stimulation, and individual differences (genetic/ Sasang constitution, disease status/ status of Yin-Yang and Five Elements, or positive/negative perception toward stimulation) can be factors. For acupuncture, types of acupuncture (laser, electro, manual), the frequency and intensity of electroacupuncture, depth of needling, length and diameter of needles, and manipulation methods of manual acupuncture (lifting, thrusting, twisting, and twirling) can be factors. For moxibustion, kinds of moxibustion (indirect or direct), the quality of mugwort, distance from skin in case of indirect moxibustion, and used material below indirect moxibustion can be factors (Figure 2).

Positive and Negative Feedback System

Mechanisms of acupuncture/moxibustion can be described as a positive and negative feedback system. Theories of Oriental medicine explain that acupuncture or moxibustion help to keep bodies balanced. In Yin-Yang theory, Yin can be described in terms of coldness, whereas Yang can be described in terms of hotness. If a body has Yin deficiency, treatments add Yang to balance it. If the function of the liver is too strong and the function of the stomach is too weak, treatments can be given to suppress the functioning of the liver and enhance the functioning of the stomach. The review of mechanisms showed that acupuncture or moxibustion might increase or decrease serotonin by different acupuncture points. Moxibustion might enhance or suppress the immune system by subjects' status regardless of the use of the same acupuncture points (Figure 1).

Discussion

There are several literature reviews on mechanisms of acupuncture on smoking cessation (Cabýoglu, Ergene, & Tan, 2007), pain (Lin & Chen, 2008; S. M. Wang, Kain, & White, 2008; Zhao, 2008), and wound healing (Andersson & Lundeberg, 1995). Zhao (2008) explained that acupuncture increased analgesic effects by enhancing the degranulation of mast cells, activating afferent nerve fibers, and enhancing depolarization in presynaptic primary C-afferent terminals leading inhibition of release of transmitters, Lin and Chen (2008) summarized that lower frequency electroacupuncture (EA) increases beta-endorphin, enkephalin and endomorphin, which in turn stimulates the mu- and delta-opioid receptors, while higher frequency EA stimulates dynorphin which activates the kappa-opioid receptor.

Wang et al. (2008) explained that acupuncture releases neurotransmitters and endogenous opioid-like substances, and activates c-fos within the central nervous system. Andersson and Lundeberg (1995) explained acupuncture decreased pain by increasing beta-endorphin and increased healing of wounds by releasing vasoactive intestinal polypeptide, increasing blood flow, influencing the proliferative and functional capacity of fibroblasts, leading to increased collagen synthesis and increased receptor levels of transforming growth factor-B. Cabyoglu et al. (2007) explained that nicotine increases serotonin and dopamine in brain tissue and plasma. Acupuncture helps smoking cessation by increasing serotonin. Previous reviews mainly focused on partial mechanisms of acupuncture on analgesic effects. This paper tried to cover broad mechanisms of acupuncture and moxibustion. Further research is needed to explain whole mechanisms of acupuncture/moxibustion for broad diseases.

Even though there are several papers on theories of traditional Chinese medicine, there are few papers on the conceptual model for mechanisms of acupuncture or moxibustion. Pomeranz and Stux (1989) suggested a concept for mechanisms of acupunctures on pain. Acupuncture stimulates nerves or fibers in muscles which send impulses to the spinal cord. At the spinal cord, acupuncture decreases pain by releasing enkephalin and dynorphin. Acupuncture stimulates midbrain structures which result in the release of the monoamines (norepinephrine and serotonin) in the spinal cord. These neurotransmitters reduce pain by decreasing transmission of signals through the spinothalamic tract. Stimulation in the pituitary-hypothalamic complex rouses systemic release of beta-endorphins into the blood stream from the pituitary gland. Even though previous conceptual models helped us to understand mechanisms of acupuncture /moxibustion partially, it was not enough to understand the whole picture. Further studies are needed.

There are controversial results of acupuncture. For example, acupuncture at ST 36 had opposite results on gastric emptying. Acupuncture at ST 36 increased gastric emptying in rats with slow gastric motility (Wang, et al., 2007), while it decreased gastric emptying in rats with vagotomy (Kim, et al., 2008). Therefore, further study is needed to examine the effects of acupuncture at ST 36 (stomach) on gastric emptying in rats with/without vagotomy. In Western medicine, the medications for constipation or diarrhea are different. However, in Oriental medicine, the same acupuncture points can be used for opposite symptoms. For example, further studies are needed to examine the effect of acupuncture on constipation or diarrhea using ST

(stomach) 25, 27, or SP (spleen) 14. These acupuncture points are known to be used for either constipation or diarrhea. This “normalizing” effect of acupuncture is in contrast to the western pharmacologic model of treatment, in which “system” regulation is posited much less often. Mechanisms of acupuncture/moxibustion can be revealed using neuropeptides. For example, further study is needed to examine the effect of acupuncture or moxibustion at ST 36 (stomach) on gastric emptying using serotonin and cholecystokinin.

Conclusion

The mechanisms of acupuncture/moxibustion can be explained by neurotransmitter, hormones, brain activity using PET, and changes of cells, nerves, and neurons using skin biopsies. The conceptual model explains that different factors activate different mechanisms when acupuncture/moxibustion is conducted. Mechanisms of acupuncture/moxibustion can be described as a positive and negative feedback system. Further studies are needed to examine the utility of this conceptual model.

Figure 3.1

Pathway of Stimulation in a Positive and Negative Feedback System

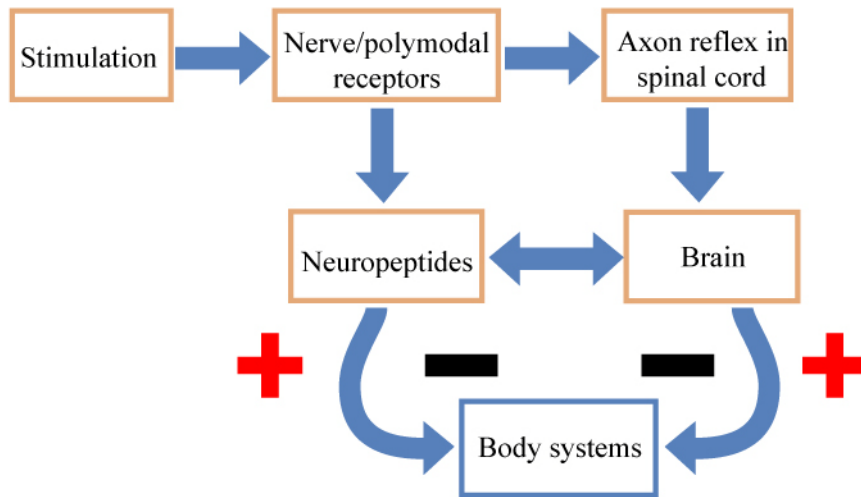
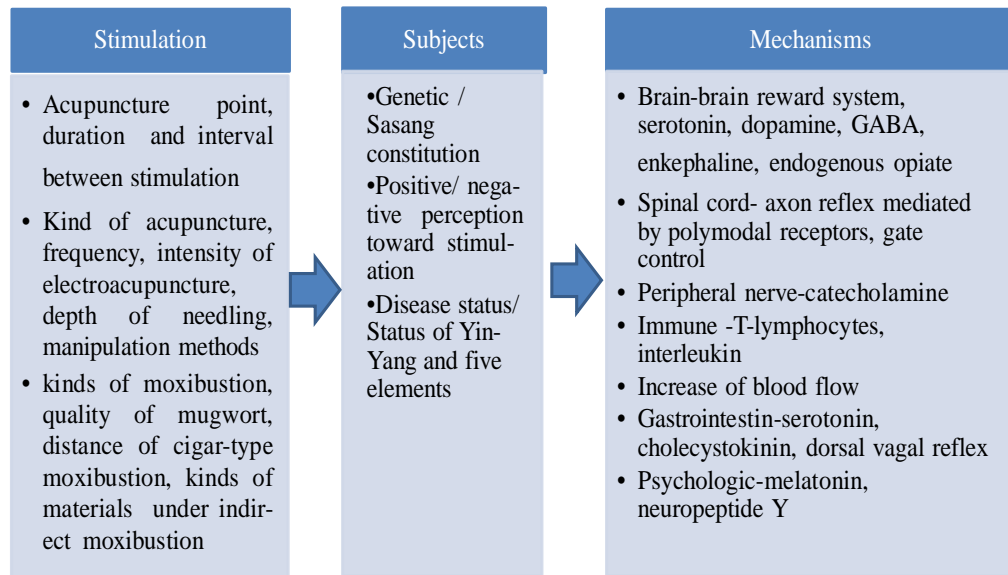


Figure 3.2

A Conceptual Model of Oriental Medicine



CHAPTER FOUR

The Efficacy of Acupressure for Symptom Management: A Literature Review

Introduction

Symptoms are the subjective sensations that accompany disease or injury. Symptoms include pain, nausea, fatigue, and dyspnea. These experiences are ubiquitous; all individuals encounter multiple symptoms during their lifetime. Symptoms may be acute or chronic, isolated or found in clusters, and they are the primary reason individuals seek health care (Leonard & Kourlas, 2008; Shapiro & Teasell, 2004). Effective management of symptoms is needed to improve individual quality of life and reduce health care costs. For example, chronic pain occurs in 50 million Americans each year and has been found to influence functional status, to reduce quality of life and to cost an estimated \$150 million each year (American Pain Society, 2006). Thus, interventions to effectively manage symptoms like pain are needed. Acupressure may be an effective intervention for a wide variety of symptoms. This intervention is noninvasive, relatively inexpensive, and has been demonstrated to be without adverse effects (Jones, Isom, Kemper, & McLean, 2008).

Acupressure uses same theory and points as acupuncture. Acupressure uses fingers, hands, elbows, a foot, or acupressure bands (Sea bands) or acustimulation bands instead of using needles. The acupressure band is an elastic band with a protruding plastic button. The acustimulation band (Relief band) is an electronic device worn on the inside of the wrist; this band can be adjusted to alter the intensity of the stimulation. Meridian theory explains that acupressure stimulates meridians, a network of energy pathways in the body, to increase the flow of qi (bioenergy), which subsequently alters the symptom experience (National Cancer Institute, 2007). An example of a meridian is shown in Figure 1.

Harris (1997) performed a literature review for the effect of acupressure on nausea. Research testing the efficacy of acupressure has increased rapidly during the last decade; there are several reviews about the effect of acupressure on nausea. However, there has not been a published integrative review reporting the efficacy of acupressure for various symptoms reduction. Thus, the purpose of this paper was to review the findings of randomized controlled trials that tested the effect of acupressure for symptom reduction.

Methods

CINAHL, Medline, and Pubmed were searched for articles published from 2000 to 2010 using key words acupressure, randomized, human, and/or clinical trial. Hand searching was conducted from references of articles. Randomized controlled trials which used acupressure as the sole intervention and studies that had at least five trials for management of a particular symptom were included when they were written in English. Investigations with a sample size of less than 30 individuals were excluded due to a lack of statistical power. Auricular, hand acupressure, reflexology, and shiatsu were excluded because they have different naming system or different technique than body acupressure.

The quality of studies included in this review was evaluated using the method of Jadad and colleagues (1996). In this method, five items that include the use of randomization, description of the randomization method, the use of double blinding, the description of appropriate double blinding (patients and assessors), and the description of withdrawal or attrition from the sample are evaluated. Each component is rated on a scale from 0 to 1 and all 5 ratings are summed to provide a total score. The total score can range from 0 to 5, with the higher score indicating the lowest risk of bias and the highest quality. The face validity of this method was evaluated by six research experts. Nearly three fourths (71%) of studies judged as excellent by these experts received a total score greater than 2 points out of 5 using this method. Inter-rater reliability was reported to be 0.66 (Jadad et al., 1996). For this review, we considered a total score of 2.5 to have adequate quality. Those studies that scored below 2.5 were considered to have low quality and results with questionable validity.

Results

Sixty one from CINAHL, 60 from Medline, 103 from Pubmed were searched on March 6, 2010. No article was found by hand searching. After application of the inclusion and exclusion criteria, 48 studies remained (Figure 2). Studies included in this review were categorized by the symptoms managed, nausea and vomiting, pain, dyspnea and fatigue/insomnia. As described earlier, each experimental study was evaluated for quality. The quality ratings and other characteristics of these studies are summarized in Table 1. Those studies that included placebo acupressure defined this as acupressure at non-acupuncture points, the use of felt bands that did not apply pressure or acupressure using inappropriate meridians for management of the symptom.

Methods

Design

All studies used randomized controlled trials (RCT) design. In 48 RCTs, the randomization was unclear or inadequate in 15 articles. 30 studies used double blinding and four studies did not describe the method of double blinding. Thirty five articles reported the dropout and reasons.

Outcome measures

To measure the effect of acupressure on nausea and vomiting, two principal outcome measure were used: visual analogue scale (VAS) for nausea and vomiting, incidence and severity of nausea and vomiting, and Rhodes Index of nausea, vomiting, and retching (INVR). To measure the effect of acupressure on pain, VAS for pain and Short-form Mc Gill Pain Questionnaire were used. To measure the effect of acupressure on dyspnea, Saint George respiratory questionnaire, 6-minute walking distance, VAS for dyspnea, and Pulmonary Functional Status and Dyspnea Questionnaire were used. To measure the effect of acupressure on fatigue and sleep, Pittsburgh statistical quality index, Piper Fatigue Scale, Stanford Sleeping Scale, and VAS for fatigue were used.

Description of Studies

Acupressure for nausea and vomiting

Nausea and vomiting associated with pregnancy

Seven randomized controlled trials examined the effect of acupressure at PC 6 in the prevention or management of nausea and vomiting (Habek, Barbir, Habek, Janculiak, & Bobic-Vukovic, 2004; Heazell, Thorneycroft, Walton, & Etherington, 2006; Jamigorn & Phupong, 2007; Norheim, Pedersen, Fonnebo, & Berge, 2001; Shin, Song, & Seo, 2007; Steele, French, Gatherer-Boyles, Newman, & Leclaire, 2001; Werntoft & Dykes, 2001). Investigators used nausea self report and objective measurement of emesis, total dose of anti-emetic medications and hospital length of stay as indicators of efficacy. Habek and colleagues (2004) reported that acupressure ($p < .01$) and acupuncture ($p < .0001$) for 30 minutes daily for 7 days improved nausea and vomiting compared to the placebo acupressure and placebo acupuncture in 36 patients with hyperemesis gravidarum. In women with gestational age 8-12 weeks ($n = 97$), Norheim and colleagues (2001) compared 4 days of acupressure using Sea bands with a control group who wore wrist bands with a felt patch for 4 days. They found that acupressure significantly reduced the duration of nausea and vomiting

early in pregnancy ($p < 0.05$), but did not reduce the intensity of nausea when compared with the placebo group. In a study by Steele and colleagues (2001), 4 days of acupressure using Sea bands significantly reduced the frequency and severity of nausea and vomiting during the first trimester of pregnancy when compared with a placebo group (Sea band with no acupressure buttons) ($p < 0.0005$). Werntoft and Dykes (2001) found that acupressure using Sea bands daily for 2 weeks (removed only when showering) significantly reduced nausea in healthy pregnant women compared with control and placebo (Sea bands at non-meridian) groups. Because prolonged nausea and vomiting produces ketonuria, Shin and colleagues (2007) used ketonuria as an additional outcome variable. These investigators found that a four-day, daily, 10-minute acupressure treatment significantly reduced nausea, vomiting, and ketonuria in women with hyperemesis gravidarum when compared to placebo (acupressure at inappropriate location) and control groups. Jemigorn and Phupong (2007) reported that acupressure using Sea band for 24 hours for 5 days improved nausea and vomiting compared to the pre acupressure status ($p < .001$). Acupressure was as effective as vitamin B6 in 60 pregnant women. In contrast, Heazell and colleagues (2006) found that the use of acupressure bands (Sea bands) for an 8 hour period did not affect the length of hospital stay, amount of anti-emetic medication required, and the volume of fluid required in 80 patients who experienced nausea and vomiting in early pregnancy when compared with a placebo group (Sea band placed in non-meridian location).

Nausea and vomiting associated with chemotherapy and radiation

Five randomized controlled trials examined the effect of acupressure at PC 6 on nausea and vomiting in cancer patients who were undergoing chemotherapy or radiation (Dibble, Chapman, Mack, & Shih, 2000; Molassiotis, Helin, Dabbour, & Hummerston, 2007; Roscoe et al., 2009; Roscoe et al., 2005; Roscoe et al., 2003). Roscoe and colleagues (2003) found that acupressure using Sea bands or Relief bands continuously for 5 days significantly reduced nausea and vomiting on the first day of chemotherapy. However, there was no significant difference on the second to fifth day of chemotherapy. Roscoe and colleagues (2005) found that acupressure using Relief bands was not effective in breast cancer patients when compared to both a sham comparison group and a control group that received standard care. These investigators allowed patients to use Relief bands as desired rather than per protocol and did not report exact time of acupressure treatment for each patient. Roscoe and

colleagues (2009) found that Sea bands were effective in reducing nausea and vomiting associated with radiation therapy. Molassiotis and colleagues (2007) also found that acupressure using Sea bands continuously for 5 days significantly reduced nausea, vomiting, and retching in patients with breast cancer receiving chemotherapy when compared to a control group (standard care) ($p < 0.05$). In another study of patients with breast cancer receiving chemotherapy, Dibble and colleagues (2000) found that daily 9-minute acupressure treatment started prior to chemotherapy administration on the day of treatment initiation and continuing for 21 days did not reduce acute nausea and vomiting on the day of chemotherapy, but did decrease nausea and vomiting from day 2 to day 11 when compared to the control and placebo groups (acupressure in inappropriate location).

Nausea and vomiting associated with surgical intervention

Thirteen studies examined the effect of acupressure at PC 6/HT 7 on nausea and vomiting in post-operative patients (Agarwal et al., 2002; Agarwal, Pathak, & Gaur, 2000; Alkaissi, Evertsson, Johnsson, Ofenbartl, & Kalman, 2002; Harmon, Ryan, Kelly, & Bowen, 2000; Ho, Tsai, Chan, & Tsai, 2006; Klaiman et al., 2008; Klein et al., 2004; Ming, Kuo, Lin, & Lin, 2002; Sadighha & Nurai, 2008; Samad, Afshan, & Kamal, 2003; Schultz, Andrews, Goran, Mathew, & Sturdevant, 2003; Turgut et al., 2007; White et al., 2002). Alkaissi (2002) reported that acupressure using Sea band for 24 hours improved nausea and vomiting compared to the control group in 420 patients with gynecological surgery ($p < .05$). White (2002) reported that acupressure using acustimulation band for 3 days improve nausea and vomiting compared to the placebo group in 120 patients with plastic surgery ($p < .05$). In patients following functional endoscopic sinus surgery, Ming and colleagues (2002) found that one 20 minute acupressure or Sea bands for 24 hours were both effective in reducing nausea and vomiting when compared to a control group ($p < 0.001$). Of the two acupressure strategies used with the sinus surgery patients, acupressure using fingers was more effective than Sea bands ($p < 0.001$). Agarwal and colleagues (2000; 2002) reported that acupressure using Sea Band for 6 hours was as effective as Zofran in improving nausea and vomiting in 150 patients with cholecystectomy ($p < .05$) but did not improve those symptoms in 200 patients with urological endoscopic surgery. Harmon and colleagues (2000) reported that acupressure for 6 hours improved nausea and vomiting compared to the placebo group in 94 women with cesarean section ($p < .01$). Turgut and colleagues (2007) reported that acupressure for 24 hours improve

nausea and vomiting in 100 patients with gynecologic surgery ($p < .05$). In contrast, Klaiman and colleagues (2008) reported that magnetic patches at PC 6 did not improve nausea and vomiting after surgery in 58 patients. This study did not report the exact time for acupressure. Sadighha (2008) reported that acupressure wristband for one day improved nausea and vomiting compared to the control and antiemetic groups ($p < .05$). Ho and colleagues (2006) reported that acupressure during cesarean section did not improve nausea and vomiting compared to the control group. Klein and colleagues (2004) reported that acupressure using Sea band for 24 hours did not improve nausea and vomiting compared to the placebo group in 152 patients with cardiac surgery. Samad and colleagues (2003) reported that acupressure using Sea band for 6 hours did not improve nausea and vomiting compared to the placebo group in 50 patients with cholecystectomy. Schultz (2003) reported that acupressure for 24 hours for 3 days did not improve nausea and vomiting in 103 patients with gynecologic surgery.

Nausea and vomiting associated with acute myocardial infarction (AMI)

Dent and colleagues (2003) reported that acupressure for last 20 hours among 24 hours using Sea bands at PC 6 reduced the incidence and severity of nausea and vomiting. It took 4 hours for acupressure to work for nausea. The authors suggested that there was a concentration of many emetic stimuli during first few hours of AMI.

Nausea and vomiting associated with motion sickness

Alkaissi and colleagues (2005) studied women with a history of motion sickness and reported that acupressure using Sea bands at PC 6 was not effective in reducing nausea related to motion sickness compared to placebo and control groups. The intervention group received acupressure using Sea bands, but the time of application and the length of treatment were not described. The placebo group wore Sea bands in an inappropriate location, also for an unknown period of time, and the control group received no therapy. Rotation chairs with 60°/second speed were used to induce motion sickness. When participants reported moderate nausea, rotation chairs were stopped. Nausea was measured immediately and 30 minutes later using a seven-point Likert scale and motion sickness was not improved by acupressure in this experiment.

Acupressure for Pain

Dysmenorrhea

Three studies examined the effect of acupressure on menstrual pain (Chen & Chen, 2004; Pouresmail & Ibrahimzadeh, 2002; Taylor, Miaskowski, & Kohn, 2002).

Chen and Chen (2004) studied adolescents with menstrual pain and found that 20 minutes of acupressure at SP 6 on the first day of menstruation was effective in reducing dysmenorrhea compared to a control group that received a rest period in the school health center ($p < 0.05$). Dysmenorrhea was found to be associated with a lower abdominal skin temperature (Kim, Kim, & Lee, 2001). Thus abdominal skin temperature was measured in a similar study. Taylor and colleagues (2002) used specialized panties that administered acupressure to multiple points (CV2, 4, SP12, 13, ST30, KD11, 13, UB 23,25,27,28, and GV4) continuously. These panties were worn for the first three menstrual days and were found to be effective in reducing dysmenorrhea and the number of doses of pain medication daily compared to a control group who received usual care ($p < 0.05$). Pouresmail and Ibrahimzadeh (2002) reported that acupressure at LI4, SP6, 15, ST25, and LR3 for 2 minutes improved dysmenorrheal in 216 high school students compared to the placebo group ($p < .05$). However, this study did not describe the frequency and duration of acupressure.

Labor pain

Two randomized controlled trials tested the efficacy of acupressure for reduction of labor pain (Chung, Hung, Kuo, & Huang, 2003; Lee, Chang, & Kang, 2004). Chung and colleagues (2003) found that acupressure at LI 4 and UB 67 for 20 minutes during the first stage of labor was effective in reducing pain when compared to a placebo group who received effleurage, a light stroking at both upper outer arms, and a control group who received usual care ($p < 0.05$). In a similar study, Lee and colleagues (2004) found that acupressure at SP 6 for 30 minutes was effective in reducing pain ($p < 0.05$) and decreasing the labor time required for cervical dilation from 3cm to delivery ($p = 0.006$) when compared to a placebo group that received only touch at SP 6.

Pain related to trauma

Lang and colleagues (2007) found that 6 minutes of acupressure administered once at GV20 and LI4 during ambulance transport to the hospital reduced pain and anxiety compared to a placebo group who received acupressure at an inappropriate location in 70 patients with radial fracture ($p < 0.001$). Kober and colleagues (2002) reported that acupressure at LI4, PC 6, 9, BL60, and GV 2 for 3 minutes improved pain and anxiety compared to the control group in 60 patients with minor trauma ($p < .01$).

Muscular pain

Three randomized controlled trials examined the effect of acupressure on muscular pain (Hsieh et al., 2006; Hsieh, Kuo, Yen, & Chen, 2004; Shin & Lee, 2007). Hsieh and colleagues (2004) found that acupressure treatment six times over a one month period was significantly more effective in reducing chronic low back pain compared to a comparison group who were treated with physical therapy ($p < 0.0001$). The effect of the acupressure treatments persisted for 6 months ($p < 0.0001$) and pain scores remained significantly lower than the physical therapy group ($p = 0.0004$). In a subsequent study, Hsieh and colleagues (2006) used the same protocol and found that acupressure significantly reduced chronic low back pain when compared to a placebo group ($p < 0.0001$). Unfortunately, these two reports provided inadequate details about the acupressure which precludes replication of the study. Shin and Lee (2007) compared the effects of acupressure and the combination of acupressure with aromatherapy on shoulder pain in patients with hemiplegia post stroke ($n = 30$). Acupressure was administered twice daily for 20 minutes each treatment for a 2 week period at LI 15, SI 9, TE 14, GB 21, SI 11, and SI 12, while the comparison group received acupressure treatments accompanied by aromatherapy. These investigators found that both acupressure and acupressure with aromatherapy effectively reduced pain and increased motor power ($p < 0.001$). However, acupressure combined with aromatherapy was more effective than acupressure alone in the management of shoulder pain after stroke ($p < 0.001$).

Pain related to surgery

Sakurai, Suleman, Morioka, Akca, and Sessler (2003) reported that acupressure using minute spheres at PC6, ST36, SP4, and SP 6 did not improve pain compared the control group in 53 patients with abdominal surgery. The authors did not report the exact time of acupressure.

Acupressure for dyspnea

Dyspnea is the sensation of difficulty breathing or shortness of breath, which may be acute or chronic. Dyspnea is often accompanied by other symptoms like anxiety, depression and signs like elevations in respiratory rate and reduced functional ability (Wu, Lin, Wu, & Lin, 2007; Wu, Wu, Lin, & Lin, 2004). The authors of four investigations reported that acupressure was effective in reducing dyspnea (Maa et al., 2003; S. Maa et al., 2007; Tsay, Wang, Lin, & Chung, 2005; Wu et al., 2007; Wu et al., 2004). Dyspnea is the most common and most debilitating symptom found in chronic lung disease. Thus, studies primarily included patients with some form of chronic

lung disease. Wu and colleagues (2004) found that four weeks of a daily 16 minute acupressure treatment at GV 14, CV 22, UB 13, 23, and LU 10 was effective in improving pulmonary function, oxygen saturation and six-minute walk distance, dyspnea and state-anxiety when compared to a placebo group who received acupressure at an inappropriate location in patients (n = 44) with chronic obstructive pulmonary disease (COPD). In a subsequent study, Wu and colleagues (2007) found that acupressure improved depression, oxygen saturation, blood pressure, heart rate, respiratory rate, and dyspnea in patients with COPD (n = 44) when compared to a placebo group who received acupressure in inappropriate sites ($p < 0.05$). In another study of patients with COPD (n = 52), Tsay and colleagues (2005) found that 12 minutes of daily acupressure for 10 days at LI 4, PC 6, and HT 7 improved dyspnea, anxiety, blood pressure, heart rate, and respiratory rate when compared to a placebo group who received handholding and massage ($p < 0.05$). Two studies by Maa and colleague (2003:2007) found that 2.5-10 minute of daily acupressure for an eight week period at LU 1, 5, 10, and ST 36, 40 significantly improved respiratory health-related quality of life in patients with bronchiectasis (n=35) and asthma (n=41) when compared to a control group who received standard care ($p = 0.01$). Maa and colleagues (2003) reported that acupuncture was more effective than acupressure in improving dyspnea.

Acupressure for insomnia & fatigue

Five experimental studies were performed to determine the effect of acupressure on the reduction of fatigue and improvement of sleep in adults (Harris et al., 2005; Molassiotis, Sylt, & Diggins, 2007; Nordio & Romanelli, 2008; Tsay, 2004; Tsay & Chen, 2003). The symptom of fatigue is often associated with poorer sleep quality, so the effect of acupressure on fatigue and sleep was investigated both separately and simultaneously in studies. Nordio and Romanelli (2008) reported that acupressure band at HT 7 for 10 hours, daily for 20 days improved sleep and normal melatonin rhythm compared to the control group in 33 patients ($p < .05$ and $p = .01$ respectively). Harris and colleagues (2005) investigated the effect of 2 sequences of acupressure treatment (cross-over design) to support relaxation or stimulation administered daily for 3 days. These investigators found that acupressure at LI 4, ST 36 KD 1, and UB 10 decreased fatigue and improved alertness compared to the period of relaxation acupressure in 39 healthy university students. Molassiotis and colleagues (2007) reported that acupressure for 3 minutes daily for 2 weeks improved fatigue

compared to the control group ($p < .05$). The authors reported that acupuncture was more effective than acupressure in 47 cancer patients. Tsay and Chen (2003) found that the application of 9 minutes of acupressure at HT 7 and KD 11, three times a week for 4 weeks, improved the sleep quality in patients ($n = 98$) with end-stage renal disease (ESRD) when compared to standard care ($p < 0.05$). However, there was no statistical difference between acupressure treatment and placebo (acupressure at non-acupressure points) groups. Because fatigue and poor sleep is often accompanied by depressive symptoms, Tsay (2004) reported that the application of 12-minutes of acupressure at SP 6, GB 34, ST 36, and KD 1 three times a week for four weeks reduced fatigue and depression, and improved sleep quality in patients with ESRD ($n = 106$) when compared to a control group ($p < 0.01$).

Adverse effects

Most studies reported that there were no adverse effects. However, Alkaissi (2002) reported that Sea Bands had adverse effects such as being uncomfortable, causing a red indentation, itching ($n = 15$), headache and dizziness ($n = 1$), or the wrists hurt and the swelling or deep marks or blistering at the site of the button ($n = 45$) in 410 patients. Harris and colleagues (2005) reported that acupressure had adverse effects such as muscle cramps ($n = 5$), muscle aches ($n = 5$), headaches ($n = 6$), and fatigue ($n = 7$) in 39 college students.

Quality of the Studies

Twenty seven trials examined the effect of acupressure for the management of nausea and vomiting. Nineteen of these provided support for the efficacy of acupressure to manage nausea. Six out of seven studies supported that acupressure improved nausea and vomiting during pregnancy. The quality score averaged 3.5 out of 5. Ten out of eleven trials on the effect of acupressure on reduction of pain supported the efficacy of acupressure in the management of pain. The quality score averaged 3.7 out of 5. Five trials examined the efficacy of acupressure for reduction of dyspnea, primarily in patients with COPD. All trials supported the efficacy of acupressure for the management of dyspnea. The quality score averaged 2.6 out of 5. Five trials examined the efficacy of acupressure for the management of fatigue and improvement of sleep. All trials provided research support for the efficacy of acupressure on fatigue and sleep. The quality score averaged 2.6 out of 5. Thus, based on the quality scores for these studies, there is adequate quality data that supports the

efficacy of acupressure in the management of nausea and vomiting during pregnancy, pain, fatigue, and dyspnea.

Strengths of these studies included the use of randomization, the use of an appropriate placebo (Werntoft & Dykes, 2001), the use of one acupressure point, large sample sizes, the use of a physiological measure (ketonuria) (Shin, et al., 2007), well described experimental protocols (Lang, Hager, & Funovits, 2007), the use of both subjective and objective measures such as oxygen saturation and 6-minute walk distance and the use of an appropriate placebo (Wu et al., 2007; Wu et al., 2004). Overall, study weaknesses included a lack of double blinding, the use of multipoint acupressure points, a lack of biological markers as variables, inadequate information about attrition rate and reasons for attrition, use of an inappropriate placebo, the use of a posttest-only design (Steele et al., 2001), inadequate description subject characteristics (Lang et al., 2007), no description of validity and/or reliability of measures (Lang et al., 2007), the lack of reporting about fidelity to the study protocol (Roscoe et al., 2003), the lack of control for the use of anti-emetics, and a lack of procedure detail.

Discussion

Forty-eight studies examined the efficacy of acupressure for the management of nausea and vomiting, pain, dyspnea and fatigue and insomnia. A majority of these investigators (71%) concluded that acupressure was effective for management of one of these symptoms in adults. Adequate quality support was described for the efficacy of acupressure for the management of nausea and vomiting during pregnancy, acute and chronic pain, fatigue, and dyspnea, but not for fatigue and insomnia.

Symptom management strategies include pharmacological therapy, nutritional therapy (Barford & D'Olimpio, 2008), exercise (Kromer, Tautenhahn, de Bie, Staal, & Bastiaenen, 2009), cognitive behavioral therapy, relaxation, complementary and alternative therapies (Hassett & Gevirtz, 2009), meditation (Mansky & Wallerstedt, 2006), music therapy, and guided imagery (Carlson & Bultz, 2008). Most studies reported that acupressure did not have adverse effects (Lee & Fan, 2009). However, acupressure might have side effects such as headache or dizziness (Harris, et al, 2005). There are currently few studies that compare the efficacy of acupressure with other symptoms management strategies. Thus, there is a dearth of evidence to support the use of acupressure over other management strategies or as an adjunct to other strategies.

When considering the quality of the evidence reviewed that supported the use of acupressure as a symptom management strategy, we found that studies testing acupressure use for nausea and vomiting during pregnancy, acute and chronic pain and dyspnea provided adequate quality support for the efficacy of acupressure. The studies of the efficacy of acupressure to manage fatigue and sleep did not provide sufficient quality evidence to establish a clear conclusion this strategy is effective. As these are clinical trials testing the efficacy of an intervention, the design and conduct of these studies should follow the international Consolidated Standards of Reporting Trials (CONSORT) statement (Moher, Schulz & Altman, 2001). This statement provides specific guidelines for optimal reporting of clinical trials and when followed assures that the consumer of research is able to understand the purpose and conduct of the study and can evaluate the quality of the study. This ensures that the consumer can effectively assess the validity of the results and determine whether the studied intervention should be added to the repertoire of symptom management strategies. The CONSORT statement clearly provides a blueprint for appropriate reporting that should be expected of all investigators who conduct a clinical trial. For example, CONSORT statement requires the description of randomization (sequence generation, allocation concealment, and implementation), blinding (masking), and the success of blinding, participant flow, adverse events, and effect size calculation with confidence level.

The ability to generalize the findings from these studies is also a point of interest to the consumer of research. Half of the studies in this review included only Asian participants; while the remainder primarily studied Caucasian participants. To ensure the ability to generalize the results of this research, ethnic diversity of subjects and its effect on outcomes should be included as a part of the study design. Factor-Litvak, and colleagues (2001) found there were no significant differences between Caucasian, African American and Hispanic women in their use of complementary and alternative therapies including acupressure. In contrast, Harrigan and colleagues (2006) found that in a multi-ethnic study in Hawaii, Caucasians were significantly more likely to use complementary and alternative therapies when compared with other ethnic groups and African Americans and Filipinos were least likely to use these strategies. Thus, identification of ethnic differences in use and acceptability of acupressure as a symptom management strategy is needed.

The daily dose of acupressure in this review varied from 2.5 minutes from 24 hours. The total intervention time of acupressure varied from 20 minutes form 56 days. The numbers of acupressure points varied from one to twelve. There was no study which compared dose of acupressure. Further studies are needed to compare different daily doses, total intervention time, and the number of acupressure points.

It is vital that investigators include appropriate measures of outcome for acupressure. Nearly one fourth of the reviewed studies included both subjective measures of symptoms and objective markers of symptom improvement. These included physiological measures like urinalysis for ketonuria and skin temperature measurement and clinical indicators like total daily dose of medication for symptom management. Although symptoms are the individual's experience, and as such, self report is the gold standard measure (Dodd et al., 2001); the addition of these types of objective indicators provides additional evidence for efficacy and utility.

Acupressure may be administered using several techniques. Only two of the studies reviewed compared different methods of administration of acupressure (Ming et al., 2002; Roscoe et al., 2003). Roscoe and colleagues (2003) reported Relief band had better effect on nausea than Sea band in men, while Ming and colleagues (2002) reported that acupressure and Sea bands were equally effective to manage nausea. Other studies used techniques as varied as traditional finger pressure to specialized panties that applied pressure to multiple acupressure sites. Thus, different administration strategies, in addition to variation in the meridians treated, makes comparisons across studies impossible. Consistency in techniques and acupressure sites under study would facilitate comparison of results and provide more rigorous examination of the efficacy of acupressure for symptom management.

Patient and health care provider attitude toward acupressure may be a factor related to efficacy and use. Roscoe and colleagues (2003) found that patients who expected acupressure to be effective demonstrated more positive effects than those who did not expect acupressure to be effective. However, Rosenberg, and colleagues (2008) found that although more than half of their chronic pain patients used some form of complementary or alternative therapy, in addition to their traditional treatment, when given the choice between traditional treatment and alternative therapy, the traditional treatment strategy was preferred. Other factors like the degree of individual perceived control and level of depression might influence the use of acupressure.

The effective use of both traditional and complementary and alternative therapies is an attractive strategy for symptom management. Unfortunately, there are considerable knowledge deficits about these therapies, in spite of a generally positive attitude toward their inclusion in a plan of care (Hoellein, Lineberry, & Kifer, 2008; Wahner-Roedler, Vincent, Elkin, Loehrer, Cha, & Bauer, 2006). Because of this, curriculum development and continuing education focused on the inclusion of alternative and complementary strategies is clearly needed.

Limitations

The limitations of this review include the exclusion of acupressure studies with sample size of less than 30. These excluded studies that might have been well designed, but the low degree of statistical power likely would not have altered the conclusions. There is always the possibility that some appropriate studies were missed with our search strategy. However, multiple key words were used and reference lists were hand searched to ensure that all studies that met criteria were included. The strategy for quality evaluation might not have been appropriate. However, the quality criteria did evaluate the appropriate use and reporting of important design decisions about these clinical trials.

Conclusion

Acupressure is commonly used in some cultures and countries to manage symptoms. This technique is noninvasive and may prove to be a useful adjunct in the care of a wide variety of individuals with symptoms. Research evidence provides support for the efficacy of acupressure in the management of nausea and vomiting during pregnancy, acute and chronic pain from a variety of causes, fatigue, and dyspnea. Well designed, randomized controlled studies are needed to illuminate the utility and efficacy of acupressure to manage a variety of symptoms.

Table 4.1

Effects of Acupressure on Various Symptoms

Author	Sample	n	Point	Method	Time per day	Day	Measures	Quality Score
Nausea and vomiting								
Norheim (2001)	Pregnancy	97	PC6	Sea band	24 h	4 d	Visual Analogue Scale (VAS), nausea intensity, duration, nature of symptom	4
Werntoft (2001)	Pregnancy	60	PC6	Wrist band	24h	14d	VAS for nausea	4
Steele (2001)	Pregnancy	110	PC6	Sea band	24h	4 d	Frequency, severity of nausea and vomiting	3
Habek (2004)	Pregnancy	36	PC6	Acupressure	30min	7d	Incidence of nausea, vomiting, antiemetic	3
Heazell (2006)	Pregnancy	80	PC6	Sea band	8 h	3 d	Length of stay, amount of medication and fluid for nausea and vomiting	3
Shin (2007)	Pregnancy	66	PC6	Acupressure	10 min	4 d	Rhodes Index of nausea, vomiting, and retching, ketonuria	4
Jamigorn (2007)	Pregnancy	60	PC6	Sea band	24h	5d	Rhodes Index of nausea, vomiting	3
Roscoe (2003)	Chemotherapy	739	PC6	Relief band Sea band	24h	5 d	Severity, frequency of nausea & vomiting, expected efficacy of the wrist bands	2
Roscoe (2005)	Chemotherapy	96	PC6	Relief band		5d	Likert scale for nausea	1
Molassiotis (2007)	Chemotherapy	36	PC6	Sea band	24h	5 d	Rhodes index of nausea, vomiting, and retching	3
Dibble (2007)	Chemotherapy	160	PC6	Acupressure	9 min	21 d	Rhodes Index of Nausea, NRS, state-trait anxiety inventory	4
Roscoe	Radiation	88	PC6	Sea band	24h	5d	Likert scale for severity of nausea, number of vomiting	3

Table 4.1 (Continued)

Author	Sample	n	Point	Method	Time per day	Day	Measures	Quality Score
(2009)								
Harmon (2000)	Surgery	94	PC6	Sea band	6h	once	Incidence or vomiting , VAS for nausea, antiemetic	4
Agarwal (2000)	Surgery	200	PC6	Sea band	6h	once	Incidence of nausea, vomiting	5
Alkaissi (2002)	Surgery	410	PC6	Sea band	24h	1d	Seven point scale for nausea, vomiting, pain	5
Ming (2002)	Surgery	150	PC6, HT7	Acupressure Wrist band	20 min 24h	once 1 d	Rhodes Index of Nausea, Vomiting, and Retching, state-trait anxiety inventory	4
White (2002)	Surgery	120		Relief band	24h	3d	Incidence of nausea, vomiting, VAS for nausea	4
Agarwal (2002)	Surgery	150	PC6	Sea band	6h	once	Incidence of nausea, vomiting	4
Schultz (2003)	Surgery	103	PC6	Sea band	24h	3d	Four point scale for nausea, incidence of vomiting, retching	4
Samad (2003)	Surgery	50	PC6	Sea band	6h	once	Incidence of nausea, vomiting, antiemetic	4
Klein (2004)	Surgery	152	PC6	Sea band	24h	1d	Incidence of nausea, vomiting, antiemetic	4
Ho (2006)	Surgery	110	PC6	Sea band	104min	once	Incidence of nausea and vomiting	3
Turgut (2007)	Surgery	100	PC6	Sea band	24h	1d	Likert scale for nausea and vomiting	3
Klaiman (2008)	Surgery	58	PC6	Magnet patch		1d	Likert scale for nausea and vomiting	3
Sadighha (2008)	Surgery	156	PC6	Wrist band	24h	1d	Likert scale for nausea and vomiting	4

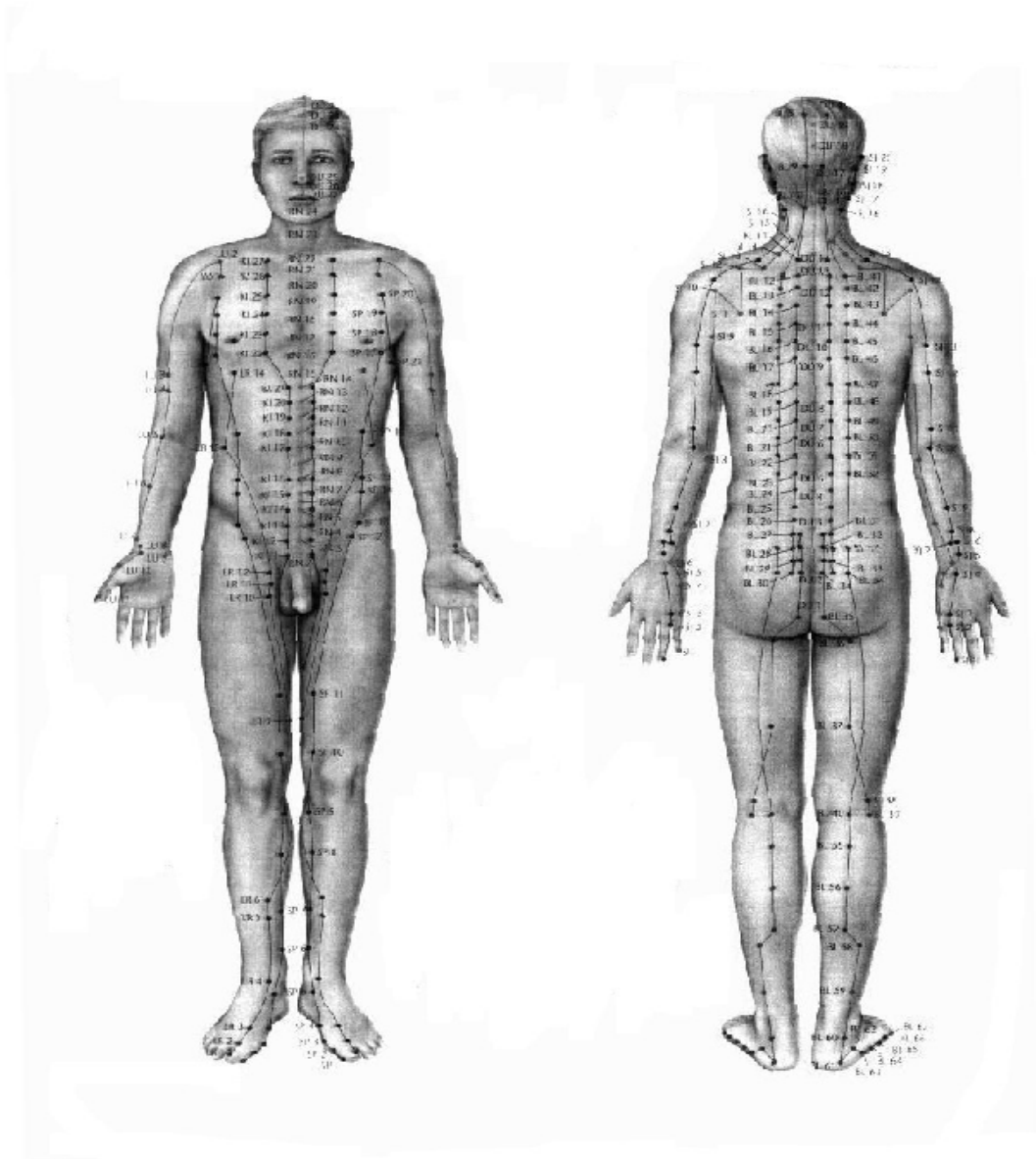
Table 4.1 (Continued)

Author	Sample	n	Point	Method	Time per day	Day	Measures	Quality Score
Dent (2003)	Acute MI	301	PC6	Wrist band	24 h	1 d	Incidence and severity of nausea and vomiting, doses of anti-emetic medication	3
Alkaissi (2005)	Motion sickness	60	PC6	Sea band			Likert-type scale for nausea	4
Pain								
Taylor (2002)	Dysmenorrhea	58	Multi point	Acupressure pad	24 h	3 d	Descriptive numeric rating scale of pain intensity, Dysmenorrhea symptom intensity & distress inventory	3
Pouresmail (2002)	Dysmenorrhea	216	Multi points	Acupressure	2 min		VAS for pain, multidimensional scoring system for the severity of dysmenorrhea	1
Chen (2004)	Dysmenorrhea	69	SP6	Acupressure	20 min	2d	VAS for pain and anxiety, Menstrual distress questionnaire Short-form Mc Gill pain questionnaire,	2
Chung (2003)	Labor	127	LI4,U B67	Acupressure	20 min	Once	VAS for pain, external fetal monitor, hours of first stage of labor	3
Lee (2004)	Labor	75	SP6	Acupressure	30 min	Once	VAS for labor pain, duration of labor to delivery	4
Hsieh (2004)	Back pain	146		Acupressure	15 min	120d	Short-form pain questionnaire	5
Hsieh (2006)	Back pain	129		Acupressure		30d	Roland and Morris disability questionnaire, Oswestry disability questionnaire, quality of life	5
Shin (2007)	Shoulder pain	30	Multi point	Acupressure	40 min	14d	VAS for pain, motor power	3
Lang (2007)	Radial fracture	70	GV20, LI4	Acupressure	6 min	Once	VAS for pain and anxiety	5
Sakurai (2003)	Surgery	53	Multi point	Sphere			VAS for pain, opioid consumption	5
Kober	Trauma	60	Multi	Acupressure	3 min	once	VAS for pain, anxiety	5

Table 4.1 (Continued)

Author	Sample	n	Point	Method	Time per day	Day	Measures	Quality Score
(2002)			point					
Dyspnea								
Maa (2003)	Asthma	41	Multi point	Acupressure	2.5-10min	56d	VAS for dyspnea, Borg scale, St. George's respiratory questionnaire, bronchitis emphysema symptom checklist	2
Wu (2004)	COPD	44	Multi point	Acupressure	16 min	28d	Pulmonary functional status, dyspnea questionnaire-modified, 6-minute walking distance	1
Tsay (2005)	COPD	52	LI4, PC6, HT7	Acupressure	12 min	10 d	Respiratory rate, heart rate, VAS for anxiety and dyspnea	3
Maa (2007)	Bronchiectasis	35	Multi point	Acupressure	2.5-10min	56d	Daily sputum amount, 6-minute walking distance, VAS for dyspnea, Saint George respiratory questionnaire, sputum self assessment	3
Wu (2007)	COPD	44	Multi	Acupressure	16 min	28d	Geriatric depression scale, VAS for dyspnea	4
Fatigue and Insomnia								
Tsay (2003)	ERSD	98	HT7, KD11	Acupressure	9 min	12d	Pittsburgh sleep quality index, sleep log	3
Tsay (2004)	ESRD	106	Multi point	Acupressure	12 min	12d	Piper Fatigue Scale, VAS fatigue, Pittsburgh sleep quality index	1
Harris (2005)	Students	39	Multi point	Acupressure	15 min	3 d	Stanford Sleeping Scale	2
Molassiotis (2007)	Chemotherapy	47	LI4, SP6, ST36	Acupressure	3 min	12d	Multidimensional Fatigue Inventory	3
Nordio (2008)	Insomnia	40	HT 7	Sea band	10h	20d	Pittsburgh sleep quality index, Urinary melatonin	3

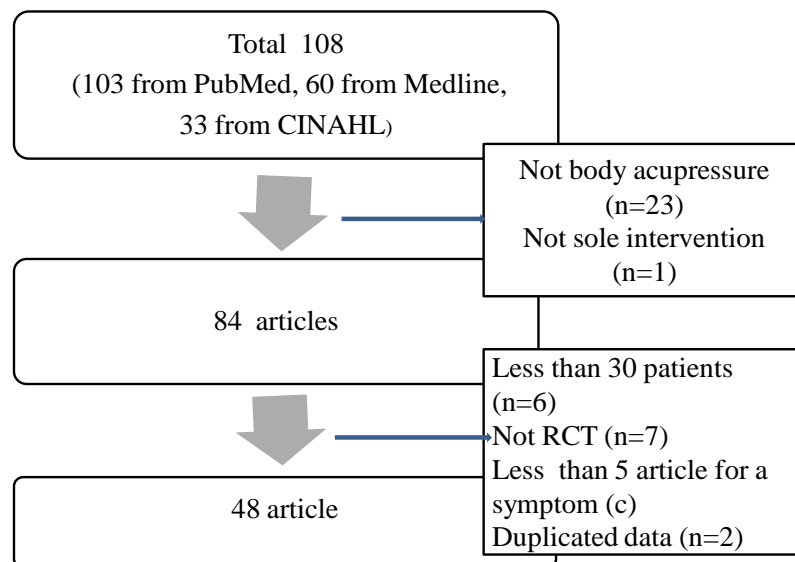
Figure 4.1
Meridians



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Figure 4.2

Sample Selection Flow Chart



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CHAPTER FIVE

Psychometric Properties of the Patient Health Questionnaire-9 in Heart Failure Patients with Constipation

Introduction

The purpose of this study was to examine the reliability and validity of the Patient Health Questionnaire-9 (PHQ-9) in heart failure patients with constipation compared to those with gastrointestinal disease. Depression often coexists with chronic illnesses such as heart disease, cancer, and diabetes (Den Oudsten, Van Heck, Van der Steeg, Roukema, & De Vries, 2009; Knol, Geerlings, Grobbee, Egberts, & Heerdink, 2009; National Institute of Mental Health, 2009; Pozuelo et al., 2009). Approximately 9.5% of the adult population in the U.S. suffers from depression. In 2005, nearly 10 % of all hospital admissions were associated with depression; 2.9 million hospital admissions resulted in a cost of \$21.8 billion (Agency for Healthcare Research and Quality, 2007). When people have depression with chronic illness, they tend to have more severe symptoms of both depression and medical illness, more difficulty adjusting to their medical condition, and more medical costs than those who do not have co-existing depression (O'Connor et al., 2008). Depression increases mortality in those with heart failure (O'Connor et al., 2008). Treating the depression can improve the outcome of treating the co-occurring illness (Cassano & Fava, 2002; Katon & Ciechanowski, 2002).

Depression and anxiety are often correlated with chronic illness such as gastrointestinal disease (Addolorato et al., 2008; Fullwood & Drossman, 1995; van Kerkhoven et al., 2005) or heart failure (Cully, Johnson, Moffett, Khan, & Deswal, 2009). Heart failure patients often have gastrointestinal symptoms caused by congestion of the gut and side effects of medications which can lead to nausea, diarrhea, and constipation (McMillan, 2002). Addolorato et al. (2008) reported that the prevalence of high state anxiety in patients with gastrointestinal disease was 84.1%, 67% had trait anxiety, and 27% were depressed. Depression was correlated with irritable bowel syndrome and coeliac disease, and small intestinal bacterial overgrowth in 1,641 patients (Addolorato et al., 2008). Higher scores on the Center for Epidemiologic Studies--Depression Scale (CES-D) were also associated with impaired bowel function. Depression is associated with constipation (Everhart et al., 1989). Chronic constipation in patients without organic causes (i.e., normal transit time) was associated with somatization, depression, and anxiety (Wald, Hinds, &

Caruana, 1989) as well as hypochondriasis and disease affirmation (Chattat et al., 1997). Among heart failure patients, 14.7% were diagnosed as depression within the 12 months after their initial heart failure (HF) diagnosis (Cully et al., 2009).

Depression is associated with several psychosocial factors including poor social support (Boyes, Girgis, Zucca, & Lecathelinais, 2009; Scherer et al., 2007), anxiety (Arnold, Crofford, Martin, Young, & Sharma, 2007; McLaughlin, Khandker, Kruzikas, & Tummala, 2006), and hostility (Heponiemi et al., 2006). Therefore, screening for depression among patients with gastrointestinal illnesses is important to reduce treatment costs. The reliability and validity of the Patient Health Questionnaire-9 (PHQ-9) has not been tested in heart failure patients with gastrointestinal disease or constipation. The purpose of this study was to examine the psychometric properties of the Patient Health Questionnaire-9 in heart failure patients with gastrointestinal disease and those with constipation.

Literature Review

Among the 300 instruments measuring depression, only a few measures such as the Hospital Anxiety and Depression Scale (HADS) and the CES-D have been used to assess depression in patients with chronic constipation (Cheng, Chan, Hui, & Lam, 2003; Everhart et al., 1989). The Zung Self-rating Depression Scale, the Symptom Checklist-90R, and the Beck Depression Inventory (BDI) have been used in patients with gastrointestinal disease (Addolorato et al., 2008; Kovacs & Kovacs, 2007; Park, Jarrett, Cain, & Heitkemper, 2008). The literature on the measurement of depression shows that very few studies have assessed the psychometric properties of the depression scales when administered to patients with gastrointestinal disease including constipation and irritable bowel syndrome.

The PHQ-9 has been tested in samples with diverse demographic characteristics (i.e., gender, ethnicity, and age group). Different cut-offs were used in various populations. Even though Spitzer, Kroenke, and Williams (1999) suggested 10 as a cutoff point, the PHQ-9 had a lower cut-off point in elderly patients (Lamers et al., 2008). Huang, Chung, Kroenke, Delucchi, and Spitzer (2006) reported the results of factor analysis using data from 5053 subjects of four different ethnic groups. The variance explained by a single factor ranged from 39% to 49% across different ethnic groups. Internal consistency reliability (Cronbach's alpha) of the PHQ-9 was .80 in African Americans, .79 in Chinese Americans, .80 in Latinos, and .86 in non-Hispanic whites. These findings also support the idea that the DSM-IV criteria

for major depression are universal to persons of all cultures (Huang, Chung, Kroenke, Delucchi, & Spitzer, 2006). The PHQ-9 was accurate in detecting clinically depressed individuals (area under the curve = .96, where 1 is considered perfect) regardless of age, gender, or ethnicity (Williams et al., 2005).

The reliability and validity of the PHQ-9 were tested in people with ischemic heart disease (Esler, Johnston, & Thomas, 2007), diabetes mellitus and chronic obstructive pulmonary disease (Lamers et al., 2008), HIV/AIDS (Monahan et al., 2009), coronary artery disease (Stafford, Berk, & Jackson, 2007), cancer (Omor, Fann, Weymuller, Macharia, & Yueh, 2006), traumatic brain injury (Fann et al., 2005), and spinal cord injury (Bombardier, Richards, Krause, Tulskey, & Tate, 2004) (see Table 5.1). In 347 Kenyan adults with HIV/AIDS, convergent validity with a general health rating was excellent. Total loading ranged from 0.52-0.66. Coefficient alpha was .78, weighted Kappa was .53 ($p < .0001$), the test-retest reliability coefficient was .59, and sensitivity and specificity were 91% and 77%, respectively (Monahan et al., 2009). The validity was tested in 3000 patients who used primary care clinics (Spitzer, Kroenke, & Williams, 1999). The patients had hypertension (25%), arthritis (11%), diabetes (8%), and pulmonary disease (7%). Criterion-related validity was supported by assessment of mental health professionals and the correlation with the Primary Care Evaluation of Mental Disorders (PRIME-MD) and the finding of a correlation of .84 with the PHQ-9 (p was not given). Convergent validity with the Short-Form General Health Survey (SF-20) was supported ($r = .73$, $p < .05$) for mental health (Spitzer, Kroenke, & Williams, 1999).

The purpose of this study was to examine the psychometric properties of the PHQ-9 in heart failure patients with gastrointestinal disease and constipation. The specific aims of the study were to: (1) compare the prevalence of depression in patients with chronic constipation and the prevalence of depression in those with gastrointestinal disease in heart disease populations; (2) examine internal consistency reliability of the PHQ-9 using Cronbach's alpha, item-total correlations, and inter-item correlations; (3) evaluate construct and concurrent validity of the measure. The following hypotheses were tested: the PHQ-9 will be strongly associated with the BDI-II; depression measured by the PHQ-9 will be strongly associated with anxiety and hostility; patients with greater perceived social support will have lower depression scores as measured by the PHQ-9. Patients with constipation will have a higher prevalence of depression compared to cardiac patients without constipation.

Patients with gastrointestinal disease will have a higher prevalence of depression compared to cardiac patients without gastrointestinal disease.

Methods

Design and Sample

Cross-sectional data were used for the secondary analysis of data from four longitudinal studies of 382 patients with heart disease. Inclusion criteria were: (1) a primary diagnosis of heart failure (2) able to read and speak English; and (3) age 18 years and older. Exclusion criteria were: (1) cognitive impairment; (2) myocardial infarction within 3 months; (3) cerebral vascular accident within 3 months; (4) coexisting terminal disease such as cancer. Patients were recruited from the outpatient clinics of one academic medical center and two community hospitals in a Midwestern city in the United States.

Instrumentation

Patients Health Questionnaire-9 (PHQ-9)

The PHQ-9 consists of nine questions designed to correspond to the nine diagnostic criteria for major depressive disorder covered in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). Items are rated from 0 to 3 according to increased frequency of experiencing difficulties in each area covered. Responses to the PHQ-9 are rated using a 4-point Likert scale: 0 = "Not at all," 1 = "Several days," 2 = "More than half the days", and 3 = "Nearly every day." Scores range from 0 to 27. The score can then be interpreted as indicating either no depression, minimal, mild, moderate, moderately severe, or severe depression (Spitzer et al., 1999). Cronbach's alpha was .90 and convergent validity with the HADS was .72 in 193 patients with coronary artery disease (Stafford et al., 2007). For major depression, a cut-off point of 10 or 11 was recommended for the PHQ-9 for adults (Cameron, Crawford, Lawton, & Reid, 2008; Kroenke, Spitzer, & Williams, 2001). A cut point of five for depressive disorders was suggested for geriatric populations and patients with coronary artery disease (Han et al., 2008; Stafford et al., 2007). Optimal cut-off scores of > 6 for any depressive disorder and > 7 for major depressive disorders were suggested in chronically ill elderly patients (Lamers et al., 2008). Cutoff of five for minor depressive disorder and 10 for major depressive disorder were suggested in Nigerian university students (Adewuya, Ola, & Afolabi, 2006). Validation data were published for the original English and for other language

versions (e.g., Spanish, German, Korean, Thai, French, and Arabian) (Mapi Research Trust, 2009).

Beck Depression Inventory-II

The BDI-II measures depression including symptoms of severe depression, which would require hospitalization. It has 21 items in which scores range from 0 to 63; the higher score, the more severe the depression. Response options are from 0 (No symptom) to 3 (severe symptoms). For example, people can choose from 0 (I do not feel sad) to 3 (I am so sad or unhappy that I can't stand it). Concurrent validity of the BDI-II was .69 with the Cardiac Depression Scale in 81 patients with heart disease (Di Benedetto, Lindner, Hare, & Kent, 2006). A cutoff point of 10 was used for cardiac patients (Sorensen, Friis-Hasche, Haghfelt, & Bech, 2005; Ziegelstein, Fauerbach, Stevens, Romanelli, & Richter, 2000). The BDI-II was positively correlated with CES-D ($r = .69, p < .001$). Cronbach's alpha was .86 in older adults (Segal, Coolidge, Cahill, & O'Riley, 2008).

Brief Symptom Inventory

The BSI is a shortened version of the Hopkins Symptom Checklist (Derogatis, 1993). The BSI measures psychological symptoms in the past seven days. The BSI has a 5-point scale, from 0 (not at all) to 4 (extremely). The raw score ranges from 0 to 4. Raw scores should be converted to T-scores by age and gender. A T-score of ≥ 63 can be defined as 'caseness'. Originally the BSI has 53 items, but this study used the shortened BSI. It consists of 17 items with three subscales of anxiety, depression, and hostility (Derogatis, 1993). The BSI depression ($r = .60, p < .01$) and anxiety ($r = .51, p < .01$) were positively associated with the DSM-IV criteria in 22 patients with heart disease (Bromberg, Beasley, D'Angelo, Landzberg, & DeMaso, 2003).

Multidimensional Scale of Perceived Social Support (PSSS)

The Multidimensional Scale of Perceived Social Support (PSSS) consists of 12 items to assess perceptions about support from family, friends, and a significant other (Zimet, Powell, Farley, Werkman, & Berkoff, 1990). Scores range from 12 to 84 with a 7-point Likert-type scale. Response options are from 1 (very strongly disagree) to 7 (very strongly agree). High scores show high levels of perceived support. Cronbach's alpha was .94 in patients with chronic heart failure. The PSSS was positively correlated with Crisis Social Support, ranged from .40 to .61 ($p < .001$) (Pedersen, Spinder, Erdman, & Denollet, 2009).

Procedure

IRB approval and informed consent were obtained in the original study. This secondary analysis received an exemption approval. The data were collected from 2004 to 2006. Three hundred and eighty two patients completed PHQ-9, BDI-II, BSI and 68 patients completed PSSS. Data were analyzed using SPSS 12.0. Missing values of instruments were substituted with average scores of other responses. Internal consistency of the PHQ-9 was examined using Cronbach's alpha, inter-item correlation coefficients, and item-total correlations. A Cronbach's alpha coefficient greater than .70 was considered acceptable support for internal consistency of the PHQ-9. Item-total correlations and inter-item correlations were performed to inspect the homogeneity of the PHQ-9. Coefficients greater than .30 were acceptable for item-total correlations. Inter-item correlation coefficients between .30 and .70 were considered acceptable. A coefficient less than .30 means that the item is not important for the instrument, whereas coefficients greater than .70 indicate redundancy. Concurrent validity of the PHQ-9 was tested with the BDI-II. Construct validity of the PHQ-9 was tested with Multidimensional Scale of Perceived Social Support and the Brief Symptom Inventory. Principal component analysis was conducted to examine the scale dimensionality. The scree plot was used to determine the number of factors to retain and rotate using Varimax rotation.

Results

Characteristics of the sample

The mean age of the total sample was 61 years (SD = 11.9). Participants were mostly male (68%), married (60%), and white (85%) (Table 5.2). The percentage of female was higher in those with GI disease compared to those without GI disease ($\chi^2 = 4.1, p < .05$). The mean age was greater for patients with GI disease compared to those without GI disease ($t = 2.5, p = .013$). The mean age was greater for patients with constipation compared to those without constipation ($t = 2.4, p = .017$). The percentage of employed persons was lower in patients with constipation compared to patients without constipation ($\chi^2 = 13.3, p = .047$). Ethnicity, marital status, education, weight, and height were not significantly different between two groups (GI disease versus no GI disease; constipation versus no constipation).

Prevalence of depression

According to a cut off of ≥ 5 in PHQ-9, 50% of the total sample reported depressive symptoms, whereas 57% of those with GI disease and 65% of those with

constipation reported depression. The means of PHQ-9 were 6.2 (\pm 5.9) for those with heart failure, 6.9 (\pm 6.0) for those with GI disease, for those without GI disease, 8.23 (\pm 7.3) for those with constipation and for those without constipation. There was no significant difference in mean of PHQ-9 scores across the two groups using two sample t-test: GI subsample versus no GI subsample ($t = 1.6, p = 0.11$); constipation subsample versus no constipation subsample ($t = 1.83, p = 0.07$). Patients with gastrointestinal disease had a higher prevalence of depression compared to patients without gastrointestinal disease using two sample t- test ($\text{PHQ-9} \geq 5$; 57% versus 50%; $t = 18.6, p < .0001$). Patients with constipation had a higher prevalence of depression compared to heart failure patients without constipation ($\text{PHQ-9} \geq 5$; 65% versus 50%; $t=19.4, p =.0004$) (Table 5.3).

Reliability

Cronbach's alphas for the PHQ-9 were .87 for the total sample, .87 for those with GI disease and .89 for those with constipation. All item-total correlations were greater than .30 among three groups. All inter-item correlations were greater than .30 and below .70 except two questions. The inter-item correlation coefficient for item nine was less than .30 in those with GI disease, whereas the correlation for item 1 was less than .30 in those with constipation.

Concurrent Validity

The PHQ-9 was strongly associated with the BDI-II across the three groups. The correlation between the PHQ-9 and the BDI-II was .81 in those with constipation ($p < .01$). The PHQ-9 and BSI were strongly associated ($r = .42-.77, p < 0.01$). The correlations between the PHQ-9 and the BSI were .77 with anxiety, .68 with depression, and .51 with hostility subscale in patients with constipation (Table 5.4).

Construct Validity

The PHQ-9 was inversely related to the PSSS in those with heart failure ($r = -.29, p = 0.01$). This result supported the hypothesis that patients who have more perceived social support will have lower depression scores in heart failure patients. However, the correlation between the PHQ-9 and the PSSS was not significant in those with constipation.

Principal Component Analysis

The results of principal component analysis and examination of scree plot indicated one dominant dimension with a large decrease between the first and second eigenvalues and small decreases thereafter in patients with constipation. Factor

loadings are shown in Table 5.5. The percentage of total item variance explained by one factor was 51%.

Discussion

The prevalence of depressive disorders (PHQ-9 \geq 5) in those with GI disease in this study (57%) was higher than other studies. This study found that 18% of 378 patients had anxiety and 14% of 378 patients had depression and anxiety together. A study reported that 27% of patients with gastrointestinal disorders had depression and 84% had state anxiety. Compared to our study, more were female (58%), lesser were married (50%), more were employed (41%), and younger age (43.9), and more had *Helicobacter pylori* (38.5%) and small intestine bacterial overgrowth (33.8%) (Addolorato et al., 2008). The prevalence of severe depression (PHQ-9 \geq 15) in patients with gastrointestinal symptoms was four times greater than that of patients without gastrointestinal symptoms (19.1% vs. 3.9%; $p < .001$) (Mussell et al., 2008). The prevalence of depression in those with GI disease was much higher compared to the prevalence (6.7%) in the general population in USA (National Institute of Mental Health, 2010). The mean of the PHQ-9 and the BSI anxiety in those with GI disease was higher than patients without GI problems in this study ($p < .05$ and $p < .01$, respectively). The coexisting chronic disease such as cardiac and gastrointestinal disease might contribute to higher prevalence in this study. Among 189 patients who had depressive disorder as identified by the PHQ-9, only 75 patients (40%) were taking antidepressants.

The reliability of the PHQ-9 (Cronbach's alpha = .89) was similar with other studies. Other studies had reliability coefficients ranging from .71 in patients with head and neck cancer (Omoro et al., 2006) to .90 in patients with coronary artery disease (Stafford et al., 2007). The concurrent validity coefficient of the PHQ-9 in this study (.81) was similar to other studies. Other studies used the BDI, the CES-D, the HADS, and other measures of depression to examine concurrent validity of the PHQ-9. The range of concurrent validity coefficients of those studies was from .54 (Lee, Schulberg, Raue, & Kroenke, 2007) to .90 (Fann et al., 2005). The construct validity coefficient of this study was compared with Multidimensional Scale of Perceived Social Support ($r = -.31$, $p < .01$) and Brief Symptom Inventory ($r =$ from $-.24$ to $-.34$, $p < .01$) in heart failure patients. Other studies used a general health rating, the Short Form-36 (SF-36), and quality of life measure to examine construct validity. The result

of factor analysis of PHQ-9 in this study was the same as other studies which reported that the PHQ-9 is unidimensional (Cameron et al., 2008; Monahan et al., 2009).

Conclusion

This study has several limitations. The original studies were not designed to evaluate the psychometric properties of the PHQ-9 in those with GI disease and constipation. The data were selected from patients who were taking medications for these conditions. We could not assess gold standard diagnoses using a structured interview. We could not test sensitivity and specificity of the PHQ-9. We could not evaluate test-retest reliability. We did not examine the exact diagnosis of gastrointestinal disease. This study found a high prevalence of depression among patients with gastrointestinal disease or constipation. Therefore, screening depression among the GI population may be important to reduce the cost of treatment. Addolorato and his colleagues (2008) suggested that the approach to patients affected by gastrointestinal disease should be managed by a team including gastroenterologists, psychologists and/or psychiatrists, or alternatively they should be managed by a gastroenterologist having expertise in the treatment of psychological disorders. The sample size of constipation population (n=26) was very small in this study. Further study is needed to examine the psychometric properties of the PHQ-9 with a large sample of patients with constipation. In conclusion, this study provided support for the reliability and validity of the PHQ-9 in patients with failure for a measurement of depression. The PHQ-9 is an effective screening tool for depression because it is short, easy to complete, and easy to score.

Table 5.1

Reliability and Validity of PHQ-9

Author	Sample	N	Reliability	Result	Validity	Result	Limitation
Monahan (2008)	Adults with HIV/AIDS in Kenya Age 36 Female 73%	347	Cronbach's alpha Test-retest intraclass correlation weighted kappa	0.78 0.59 0.59 0.53	Convergent with general health rating Factor analysis Content-Narrative data Sensitivity/Specificity	p=0.001 0.52-0.66 Good 91%/77%	Did not report Pearson's r for convergent validity
Han (2008)	Korean	1060	Cronbach's alpha Test-retest	0.88 0.6	convergent with GDS with CES-D	0.74 0.66	Did not report the time between test and retest.
Lotrakul (2008)	Thai/Age 45 Female 73.7%	924	Cronbach's alpha	0.79	convergent with HAM-D Sensitivity/Specificity	0.56 0.53/0.98	Test-retest reliability was not assessed
Cameron (2008)	Englishmen Age 37.7 Male 26%	1063	Cronbach's alpha Item total correlation	0.83-0.92 0.42-0.78	Convergent with HADS-D Discriminant with HADS-A Total loading	0.68 0.48 0.54-0.77	Did not include gold standard such as HAM-D or structure clinical interview
Esler (2008)	Australian/Ischemic heart disease	34	Cronbach's alpha	0.8	Criterion with MINI Sensitivity/Specificity	73.6% 80%/71.4%	Small sample size
Lamers (2008)	DM and COPD Age 71.4	713	Cohen's kappa Test-retest Internal consistency	0.69-0.71 0.91	Criterion with MINI Sensitivity/specificity Construct with SF-36, SGRQ, DSC-R	95.6%/81.0%. -0.56/0.39/0.47	Interview by nurses

Table 5.1 (continued)

Author	Sample	N	Reliability	Result	Validity	Result	Limitation
Stafford (2007)	CAD Age 64.14 Male 75.5%	193	Cronbach's alpha	0.90	Criterion with MINI Sensitivity/specificity Convergent with HADS	81.5% / 80.6% 0.72	Effects of repetition or order of depression measures cannot be excluded
Carballera (2007)	Internal medicine French Age 49.5	292			DSM-IV diagnostic criteria Sensitivity/specificity HDRS >8 Sensitivity/specificity	0.75 65%/76% 0.92 59%/80%	Lower sensitivity due to severe symptoms? Did not examine reliability
Lee (2007)	Depression	405	Cronbach's alpha	0.80	Concurrent with HSCL-20	0.54	Did not use gold standard
Huang (2006)	non-Hispanic white African American Chinese American Latino	2520 598 941 974	Cronbach's alpha	0.86 0.80 0.79 0.80			Did not test convergent and construct validity

Table 5.2

Characteristics of the Sample

Variables	Categories	Total (N=382)	GI (n=115)	Constipation (n=26)	GI vs. No GI t/ χ^2	Constipation vs. No constipation t/ χ^2
Gender	Male	258	69	15	4.1*	1.3
	Female	122 (32%)	45 (39%)	11 (42%)		
Age		60.8 (\pm 11.9)	63.1(\pm 11.8)	66.2 (\pm 11.5)	-2.5*	2.4*
Education Years		13.3(\pm 3.6)	12.8 (\pm 3)	12 (\pm 3.4)	1.8	1.9
Height		68.3(\pm 4.4)	68.6 (\pm 4.1)	67.2 (\pm 3.8)	1.9	1.3
Weight		211.1(\pm 54)	203.9 (\pm 50.6)	201.8 (\pm 54)	1.7	.9
Marital Status	Single	3	12	2	3.2	2.2
	Married	229 (60%)	65 (57%)	15 (58%)		
	Divorced/ separated	61	17	4		
	Widowed	45	16	5		
	Co-habitate	10	5	0		
Ethnicity	Black or African	51	9	4	8.1	.4
	White	326 (85%)	105 (91%)	22 (85%)		
	Others	4	1	0		
Employment Status	Employed	78 (28%)	14 (12%)	2 (8%)	9.3	13.3*
	Unemployed	301	100	24		
Anti-depressant Use		97 (25%)	46 (40%)	11 (42%)	17.9***	4.2*

*p< .05 *** p< .001

Table 5.3

Prevalence of Depression, Anxiety, and Hostility in Patients with Heart Failure

Measure	Total sample ^a n (%)	GI subsample ^b n (%)	Constipation subsample ^c n (%)	GI vs. no GI t	Constipation vs. no Constipation t
PHQ-9 \geq 5	189 (50%)	66 (57%)	17 (65%)	18.6***	19.4***
BDI \geq 10	189 (50%)	68 (59%)	18 (69%)	23.9***	24.5***
BSI_Depression \geq 63	121 (32%)	41(36%)	10 (39%)	14.5***	11***
BSI_Anxiety \geq 63	68 (18%)	19 (17%)	4 (38%)	4.2***	31.3***
BSI_Hostility \geq 63	44 (12%)	8 (7%)	0 (0%)	10.3***	12.2***

^a Sample size varies from 377 to 382, ^b Sample size varies from 114 to 116, ^c Sample size varies from 24 to 26

*** p < .001

Table 5.4

Correlations among PHQ-9, BDI-II, PSSS, and BSI in Heart Failure Patients (Total/GI/ Constipation)

Scale/ subscale	BDI-II	BSI_A	BSI_D	BSI_H	PSSS
PHQ-9	(.79/.78/.81)**	(.58/.54/.77)**	(.66/.59/.68)**	(.48/.42/.51)**	-.31**/-.25*/-.30
BDI-II		(.58/.60/.75)**	(.66/.65/.69)**	(.48/.47/.52)**	.31**/-.30**/-.13
BSI_A			(.73/.75/.80)**	(.66/.49/.69)**	-.24**/-.10/-.48*
BSI_D				(.66/.58/.45)**	.34**/.29**/-.71**
BSI_H					-.26**/-.21/-.20

Note. BSI_A (Brief Symptom Inventory_Anxiety), BSI_D (Depression), and BSI_H (Hostility)

**<0.01 *<0.05

Table 5.5

Principle Component Analysis of the PHQ-9 in Patients with Heart Failure (N=382)

Item no.	Item conception	Total sample (n=382)
6	Low self esteem	.81
2	Depressed	.80
7	Trouble concentrating	.76
1	Anhedonia	.73
5	Appetite problems	.71
4	Low energy	.68
3	Sleep problems	.67
8	Psychomotor problems	.66
9	Suicide ideation	.56
Eigen values		4.56
% of variance explained		50.631

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CHAPTER SIX
A Qualitative Study of
Quality of Life and the Experience of Complementary and Alternative Medicine
in Korean Women with Constipation

Introduction

Constipation is the passage of small amounts of hard, dry bowel movements, usually fewer than three times a week. People who are constipated may find it difficult and painful to have a bowel movement. Other symptoms of constipation include feeling bloated, uncomfortable and sluggish (National Institute of Diabetes and Digestive and Kidney diseases, 2007). In a survey which explored the duration and frequency of constipation, including 13,879 participants from four continents, 12% of people worldwide reported suffering from self-defined constipation (Wald et al., 2006). Women experience constipation three times more than men (Godfrey & Rose, 2007).

There are many quantitative studies on constipation. However, there are few qualitative studies on constipation. Studies have shown that constipation has a negative effect on an individual's quality of life and increases the risk of colon cancer (Watanabe et al., 2004). Quality of life is a multidimensional construct: emotional or psychological well being, physical functioning, social functioning, and symptoms of the disease and treatment (Eypasch et al., 1995). The direct impact of constipation on patients' quality of life has been assessed in a number of studies, using a variety of validated quality-of-life assessment scales (Irvine, Ferrazzi, Pare, Thompson, & Rance, 2002). However, the experience of living with constipation has scarcely been described. Complementary and alternative medicine (CAM) has been used for many health problems. However, there are only a few qualitative studies on the experience of using CAM. Therefore, the aim of this study was to describe how Korean women experienced constipation and how constipation affected quality of life and the experience of using CAM for constipation.

Theoretical Framework

Qualitative descriptive research method was used to describe this topic. Qualitative descriptive research focuses on understanding the subjective experience. Purposive sampling is used most commonly in qualitative research inquiry (Speziale & Carpenter, 2007). Data is collected from the individuals who have experienced the

phenomenon. Often data is collected by in-depth interviews and multiple interviews with participants (Creswell, 1998).

Data analysis steps are: a) dictating the interview; b) highlighting significant statements that provide an understanding of how the participants experienced the phenomenon; c) developing clusters of meaning from these significant statements into themes; and d) presenting the essence of the phenomenon. These significant statements and themes are then used to write a description of what the participants experienced (textural description). They are also used to write a description of the context or setting that influenced how the participants experienced the phenomenon, called imaginative variation or structural description (Creswell, 2007). A researcher must consider issues of privacy. When preparing a final manuscript, the researcher must determine how to present the data so that it is accurate yet does not reveal the participants' identities (Speziale & Carpenter, 2007). The review of the literature generally follows data analysis. The rationale for postponing the literature review is related to the goal of achieving a pure description of the phenomenon under investigation (Speziale & Carpenter, 2007).

Methods

Design and Setting

This is a qualitative descriptive study. Data were collected by in-depth, semi-structured, individual interviews at the patients' houses or public places.

Participants

Ten participants were recruited from Korean churches and Korean student associations in the USA. Demographically, the participants had a mean age of 42.7 years (range 32-63 years) and were 100% female (Table 1).

Inclusion criteria were: 1) having constipation, 2) Korean women 3) living in USA, and 4) experience using CAM. Exclusion criteria were; 1) cognitive deficits such as considerable memory loss, confusion/dementia, and intellectual disability, 2) significantly impaired hearing, and 3) seriously ill in an acute treatment phase, or receiving palliative care.

Procedure

This study was approved by the Institutional Review Board (IRB) at a southeastern University. Participants were recruited by individual contacts or announcement at meetings. The purpose and procedure of this study were explained by the researcher and the participants signed consent forms. A time was arranged with

the participant for interview. Participants were interviewed once or twice in their home or any quiet place at a mutually convenient time. The mean duration of the interview was 45 minutes. A list of topics on inquiries guided the interview process but participants were also encouraged to talk generally on the topic. The interview was recorded by audio-tape. Interviews were taken in Korean and translated into English. The interview was guided by four topics: tell me about your constipation; tell me about how your constipation has affected the quality of your life; tell me about your strategy to relieve constipation; and tell me your experience of using complementary and alternative medicine for constipation (See appendix 1).

Data Analysis

Each interview was fully transcribed and read several times to gain an overall impression of the participants' experiences. Next, significant statements were extracted from the transcriptions and, using an interpretative approach, a meaning was formulated for the given extract. The statements were clustered to support the development of a theme, which captured the essence of the experience described. To obtain a sense of wholeness, a descriptive statement was written for each theme.

A Priori codes for this study were: the reason for constipation, the duration of constipation, characteristics of constipation, the effect of constipation on quality of life, strategies for resolving constipation, the effect of CAM, and the side effects or demerits of CAM. Other codes were added during analysis: examination process (i.e. colonoscopy) to reveal the reason for constipation, the result of the examination, the situation of improvement, the situation of aggravation, the reason for no effect of CAM, and effects of laxatives, enemas, and suppositories. The codes of the duration of constipation and the characteristics of constipation were used to explain characteristics of the participants' constipation. The first theme was subjective definition of constipation. The second theme "effort to find the reasons for constipation" consists of codes of the reasons for constipation, situations of aggravation and improvement, examination process, and the results of examination. The third theme "efforts to find solutions for constipation" consists of codes of strategies for constipation, the effect of CAM, the side effects of CAM or reasons for stopping, and side effects of laxatives, enemas, and suppositories. These codes were clustered into subthemes which consist of frequent use of enemas, laxatives, and suppositories; expectation and disappointment for CAM; and finding individually effective solutions for constipation. The fourth theme "the negative impact on quality"

consists of codes of mood, sleep, fashion, skin problem, finance, appetite, and relationship. These codes were clustered into the subthemes of mental discomfort, changed appetite, and difficult relationships with people. The codes for data analysis are described in the table 2.

Credibility and Trustworthiness of Qualitative Analysis

Creswell (1998) defined validation in qualitative research as attempting to assess the “accuracy” of the findings, as best described by the researcher and the participants. To ensure the trustworthiness of data analysis, the researcher returns to each participant and asks if the exhaustive description reflects the participant’s experiences. When the findings are recognized to be true by the participants, the trustworthiness of data is further established (Speziale & Carpenter, 2007).

Coding checks

Interview transcripts were analyzed and coded by the author. Following initial coding, one co-researcher reviewed randomly selected sections of transcripts and coded them using a coding book. Then two coded transcripts were compared to check their accuracy. There was strong agreement between the co-researchers’ analyses.

Member checking

Nine participants reviewed the analysis and gave feedback. They supported and agreed with the analysis. One participant was lost to contact.

Results

Four main themes were identified. Pseudo names were used to describe the story. Each theme is narrated and an exemplar is given for each theme. Characteristics of constipation were described using frequency, amount of stool, shape, hardness, gas, abdominal pain, moisture of stool, pushing, abdominal bloating, long stay at restroom, nausea/vomiting, chilling, dizziness, abdominal distention, and dyspnea.

Subjective definition of constipation

Ten out of ten defined constipation subjectively regardless of the frequency of constipation.

“I think constipation is a feeling of having stool in my bowel even after bowel movement. When I want to have a bowel movement but I cannot. It is constipation”.

“If I do not have a bowel movement every day, it is constipation”

Efforts to find the reason for constipation

Ten participants tried to find physical, emotional, and situational reasons for constipation. Participant mentioned several possible reasons for constipation: trauma, sensitive characteristic, irregular diet, side effect of a medication, not drinking enough liquids, a lack of exercise, irritable bowel syndrome, abuse of laxatives, problems with intestinal function, Crohn's disease, busy schedule, a lack of sleep, dirty rest room, and stress.

“I lived in the countryside when I was young. The restroom was far away. I had fallen down into an old style restroom (which had to bail night soil out of the restroom). I avoid going to the toilet because I was afraid of falling in again.”

“I made an appointment for a colonoscopy when I was a college student. I drank a special fluid and took a medication. However, I did not have a bowel movement. I just felt a strange feeling in my abdomen. When I went to a clinic, a nurse said that I needed to make an appointment again because my bowels were not empty. I asked the nurse whether she had other methods to empty the bowels. She got irritated and asked me to buy laxatives. I drank the fluid again and took 10 laxatives. I almost vomited that night. Finally, I could empty my bowels and had my colonoscopy. However, my intestines were normal.”

Six out of ten participants had colonoscopies. The decision to have a colonoscopy was related to the severity and duration of constipation. When participants had severe constipation for a long time, they decided to have the examination. Furthermore, Lee did a marker test, an abdominal x-ray, an abdominal ultrasound, and a sigmoidoscopic exam. Three participants described the difficulty of having the exams because they had slow responses to laxatives or enemas which were given to empty the colon. Four participants did not know the exact cause of their constipation after the examinations. Lee heard from several doctors that the cause of constipation might be related to Crohn's disease, irritable bowel syndrome, slow bowel movement, and/or a narrow intestine. Five participants described themselves as having a very sensitive personality. When they were stressed or traveled, their constipation became worse. Kang said that her previous trauma might have affected her constipation. Five participants thought that lack of sleep, stress, and a busy schedule might cause constipation. Two participants stated that medications for their allergy or ear infection aggravated their constipation.

This finding supports difficulties in diagnosing causes of constipation (Farrell, Holmes, Coldicutt, & Peak, 2003). This finding also supports the belief that

constipation is frequently multi-factorial and can result from systemic or neurological disorders or medications (Lembo & Camilleri, 2003).

Efforts to find solutions for constipation

It was a long journey for them to find effective methods for constipation. Eight out of ten participants tried to use Western medicine first because they had severe and chronic constipation. Two participants who had constipation for 6 months and 3 years did not take Western medications because one pursued a natural way and another tried herbal therapy first because she could get it easily from her brother.

Frequent use of laxatives, enemas, and suppositories

“When I took Milk of Magnesia, about this much at the first, I could have a bowel movement right away. Gradually, I could not have a bowel movement even though I took the same amount of Milk of Magnesia. By spring 2004, I rarely did not feel urge for bowel movements. Therefore, I took Milk of Magnesia often because I worried. However, after having bowel movements I had severe diarrhea.”

“Without enemas or suppositories, I cannot have bowel movements. I use them at least two or three times a week.”

Two participants used laxatives or suppositories regularly. Two participants were using laxatives once in a while. Another four participants stopped using laxatives because of severe abdominal pain. Lee found that Milk of Magnesia was effective for her constipation, while Metamucil and other laxatives caused side effects such as feeling bloated and abdominal pain. Kang found that suppositories and enemas were effective for her constipation. She did not develop a tolerance for enemas and suppositories. However, Lee experienced an increased tolerance of laxatives when she used them for a long term. Ko had a negative attitude toward Western medications because of side effects. She had vocal cord paralysis and she believed taking Dulcolax (laxative) every day for more than 30 years might have caused it.

Expectation and disappointment for CAM

Ten participants had used CAM. A variety of CAM which participants had tried for relieving constipation was summarized in the table 3.

“I tried things of various sorts. Even though many people experienced good effects for constipation, I could not experience any effect when I tried to use this and that. I guess this was because my symptom is chronic and severe.”

“My friend taught me how to massage my abdomen. To the right 60 times, to the left 60 times, circular 60 times; I worked hard but it was not effective.”

When they heard something was good for constipation, they always tried it. However, all participants often experienced disappointment when they could not get the same effect as other people experienced. Ten participants had the experience of using cupping therapy, massage, herbs, acupressure, acupuncture or an oriental diet. No participants used CAM continually because of the inconvenience, cost, time, or side effects. Seven out of ten participants had the experience of using herbal therapy. Three participants said that herbal therapy was effective for constipation, but constipation came back after stopping herbal therapy. They reported that the cost of herbal therapy was expensive. One participant did not have urges for a bowel movement for 30 years. After taking herb therapy for two years, she could feel urges for bowel movement again. Lee experienced cold chills from acupuncture. Kang tried to get acupuncture but it was painful. Kang also tried to use cupping therapy several times but could not do this continually because she did not have the equipment. Also, Lee bought cupping therapy equipment but it was not effective for her constipation even though she tried several times. Six participants tried massaging their abdomen and one participant tried massaging around the anus. Three participants did not have any effect; while three said that it had some effect. Choi tried to use soybean paste fomentation. She stopped using this method because the smell was not good and it took two hours to get a response even though it had some effect. All participants tried many things but did not use them consistently in most cases.

Finding individually effective solutions for constipation

Nine out of ten participants found somewhat suitable therapies through trial and error. Another participant was on the way to finding good therapies for herself.

“Somebody said that aloe was good. Eating aloe caused severe abdominal pain and diarrhea. I could not eat. Too much pain and diarrhea. My husband suggested grinding aloe with vegetables. I mixed celery and carrot with aloe. How good it was. My bloated abdomen was much better. Therefore I ate aloe juice in the morning and night.”

“In fall 2007, my friend gave me Tibet mushroom yogurt. Yogurt reduced my bloating. But it might develop tolerance; I have felt bloated for 2-3 weeks. I drink one cup a day. Much better so far.”

While eight participants tried yogurt, only five participants experienced improvement from the yogurt. Six participants ate homemade yogurt and four felt that homemade yogurt had better effects on constipation than market yogurt. Kang tried to make Tibet mushroom yogurt when she was a college student. At that time, she could

not make it consistently because she was busy. Her mother brought new yogurt from Korea which she did not know the name of. Kang said that making this yogurt was very convenient compared to other homemade yogurt and it had a better effect compared to market yogurt. She found that massage was effective for constipation. One participant said that aloe with vegetable juice worked for her. When she tried to eat raw peeled aloe for the first time, she had severe abdominal pain and diarrhea. Then her husband suggested that she make aloe juice. She found that aloe juice with vegetables helped to make her bloated abdomen subside. However, she developed tolerance to aloe after six months and then had to eat raw peeled aloe without vegetables to have the same effect.

This finding supports that seeking a solution to constipation is fraught with difficulty (Annells & Koch, 2002). While participants used laxatives, enemas, and suppositories once in a while, they sought various methods to solve constipation. The findings of this study also support that CAM use can be understood as a critical component of self-care management in general, and not as a rejection of conventional medicine or an unrealistic search for a cure (Thorne, Paterson, Russell, & Schultz, 2002).

Negative impacts on quality of life

Ten participants described the negative impact of constipation on quality of life. Negative impacts on quality of life are: mental discomfort, changed appetite, difficult relationship with people, tight-fitting clothes due to abdominal bloating, unhealthy looking skin tone, and skin troubles.

Mental discomfort

All participants were distressed because they felt their bodies did not work well.

“I am uncomfortable when I feel bloated. When I think that my circulation does not work well, it makes me very uncomfortable. I feel my body is heavy. Because body and mind do not work separately, I am depressed.”

“Due to not having bowel movement, my mind is uncomfortable and unstable. Having bowel movement in the morning make me happy for the day.... I am uncomfortable and not stable because I do not know when I will have bowel movement.”

Kim said that she was uncomfortable when she went outside because of her worry about the defecation urge. Lee could not wear fitted clothing because it made her uncomfortable because of her bloated abdomen. She was distressed because she

needed to buy her clothing one size larger and people thought she was obese. Choi said that she was uncomfortable because she felt her circulation of body did not work well when she was constipated.

Changed appetite

Seven out of ten participants described the change in their appetite.

“For feel bloated, eating is not fun. Food is not delicious in my mouth. Eating pleasure is big but I am not hungry... I do not want to eat much.”

“When I think my circulation is not good, my mind is very uncomfortable. Rather than not eating, it makes me eat more. It is similar like eating disorder”

Five participants said that constipation reduced their appetite. However, two participants described that they ate too much once in a while. Kang said that constipation increased her appetite because she wanted to push stool using a lot of food.

Difficult relationship with people

Five out of ten participants described a difficult relationship with their families and other people.

“I want to sit down at the toilet and massage on my abdomen. However, I have a lot of things to do such as washing my babies, changing their clothes, and putting them to sleep. I do not have time to care for me. It made me upset. I get angry with my children. Then I regret it. It is caught in a vicious circle.”

“I am nervous because I am constipated and do not have regular bowel movements. Therefore I am short-tempered even though I realize that I could treat people nicely. I thought that I should not show temper but I am irritable every moment.”

Kang said that even though she wants to meet people, she worried that her mental discomfort might affect others. She said that she was angry when she could not go to the toilet when she wanted to. She was always busy taking care of two children; therefore, she had difficulty making enough time to relieve herself. This situation made her upset. She easily got angry with her children. She described it as a vicious circle. Ju had a lot of stress from constipation. Not having bowel movements regularly made her nervous. She considered herself as being irritable and showing her temper toward people even though she did not want to.

This finding supports the evidence that constipation is one of the factors that has a negative impact on quality of life (Norton, 2006). This finding also supports the idea that constipation puts patients in a bad mood, which affected both their families

and contact with their friends. Conflict could occur because of their irritability. In order to avoid conflicts, feelings of discomfort, and the fear and uncertainty that something would happen in a public place, they chose not to meet others (Friedrichsen & Erichsen, 2004).

Conclusion

The findings of this study show how constipation affects quality of life in Korean women. This study also described their journey to find good strategies for treating constipation. All participants tried to find the reason for their constipation. The causes of constipation varied: lack of exercise, lack of fluid, busy schedules, stress, and sensitive characteristics. All participants tried many methods for constipation including cupping therapy, acupuncture, massage, or herb therapy. Finally they found effective methods for constipation through trial and error. This study concludes that constipation might influence a person physically, mentally, and socially. All participants said that they were uncomfortable and unstable because of a bloated abdomen and feeling heavy. They also fears about having the urge for a bowel movement when they go out. Five participants had some conflict with their family because of their irritability. Seven participants described their change in appetite as either decreasing or increasing because of constipation and stress. Future research using different ethnic groups, males, and older people is needed to describe how constipation affects quality of life and how participants experience CAM in other groups of people.

Table 6.1

Characteristics of Participants

Name	Age	Job	Constipation Period	Bowel Movement	Constipation Characteristic	Present strategy
Kim	32	No	6 months	Two times per week	Feeling bloated, abdominal pain, take more time, short and thin shape stool	Vegetable, exercise
Lee	63	No	12 years	Every day	Feeling bloated, abdominal pain, round shape stool, no defecation urge	Aloe, yogurt, milk of magnesia, mineral oil, milk, plum juice
Kang	34	No	28 years	2-3 times per week	Feeling bloated, pushing, gas, nausea, vomiting	Apple, yogurt, enema, suppository
Song	33	Yes	13 years	Every day	Feeling bloated, abdominal distension	Orange, massage
Ju	62	Yes	40years	Every day	Hard stool	Apple, mixed rice
Park	61	No	30 years	Every other day	Pushing, hard stool	Mixed rice, medication (Jenical), pills of a tangle
Han	64	Yes	3 years	3 times per week	Abdominal distension	Walnut, grapefruit, exercise, oatmeal, soymilk, sweet potato
Ko	60	No	50 years	3 times per week	Feeling bloated, abdominal pain, no defecation urge	Mixed rice, physical activity,
Cho	62	No	40years	Everyday	Pushing	Yogurt
Koo	60	Yes	35 years	1 time per week	Gas, hard stool, pushing	Alcohol, flax seed

Table 6.2

Four Themes and Codes for Data Analysis

Subjective definition of constipation	Cannot have bowel movement when I want, feeling of not defecating completely, irregular bowel movement Characteristics Frequency, small amount, shape, hardness, gas, abdominal pain, dryness, pushing, feeling bloated, long stay at restroom, nausea/vomiting, chilling, dizziness, abdominal swelling, dyspnea
Efforts to find the reason for constipation	Reason for constipation Trauma, stress, sensitive characteristic, dirty rest room, diet, a lack of liquids, exercise, or sleep , changes in life or routine (pregnancy, older age, and travel), medication, abuse of laxatives, problems with intestinal function (irritable bowel syndrome, Crohn’s disease), busy schedule Examination process: Abdominal x-ray, colonoscopy, sigmoidoscopic exam, marker test, ultrasound Result of examination: normal, slow intestine mobility, narrow intestine, swelling of intestine Situation of aggravation: medication overuse, eating junk food, eating food unfit for my body, stress, reduced activity Situation of improvement: helper, enough sleep, physical work, quitting medication, hemorrhoid surgery
Efforts to find solutions for constipation	Frequent use of enemas, laxatives, and suppositories Effect & side effects: feeling bloated, tolerance, diarrhea, abdominal pain, nausea/vomiting, sweat Expectation and disappointment for CAM Effect & side effects: chilling, pain, abdominal pain, tolerance, hot, gas, diarrhea Reasons for stopping: fear of addiction, cost ,time, bad smell, bad taste, need equipment, bothersome Reasons for no effect Finding individually effective solutions for constipation: strategies for constipation
Negative impact on quality of life	Mental discomfort, changed appetite, difficult relationships with people, negative impact on sleep, finance, fashion skin problem, choice of food

Table 6.3

Experience of Complementary and Alternative Medicine

Strategy	n	Method	Effective?	Disadvantage
Herb therapy	7	Drank herb mix for one-two months every day	Yes: 4 No:2	Cost
Acupuncture	3	Received acupuncture one-two times per week for one month	Do not know	Pain, chilling
Yogurt Homemade	6	Ate yogurt 1-2 cups every day for one month to one year.	Yes:4 No:1/ Not sure:2	Tolerance, taste
Market	8	Ate 1 bottle every day for one month-one year	Yes: 3 No:5	Cost
Cupping therapy	2	Performed cupping therapy on abdomen or back several times	Do not know	Equipment needed
Massage	6	Massaged abdomen/around anus for 5-10 minutes	Yes:3 No:3	
Soy bean paste fomentation	1	Applied a pad with soy bean paste for two hours	Yes	Smell, time
Soy bean paste soup	6	Ate soy bean paste soup often	Yes: 2/ No:4	Smell
Aloe	3	Drank vegetable juice with aloe Ate raw aloe with salt Drank aloe juice with milk	Yes:1 No:2	Abdominal pain, diarrhea, tolerance
Mineral oil	2	Drank 20cc mineral oil as needed	Yes	
Prayer	2	Prayed for healing constipation/ touching anus at a prayer house with a healer	Yes	
Pills or tea of a tangle	5	Ate 20-30 pills of a tangle every day for one month Drank tea of a tangle every day for one month	Yes:2 No:3	
Senna tea	2	Drank senna tea two times a day for 3 weeks Drank senna tea one time and quit	Yes	Abdominal pain, diarrhea
Moxibustion	1	Performed moxibustion several times	No	Hot
Acupressure or press Pellets	2	Performed press pellets on hands several times Received acupressure on back every other day for one month	Do not know No	
Sweet potato	3	Ate raw/cooked sweet potatoes	Yes:1 No:2	Gas
Apple	6	Ate half or one apple a day	Yes :3/ No: 3	
Orange	3	Ate one orange as needed	Yes	
Cabbage	1	Ate cooked cabbage often	Yes	Gas
Mixed rice	4	Ate mixed rice such as sweet rice,	Yes	

Table 6.3 continued

Strategy	n	Method	Effective?	Disadvantage
		bean, black rice, brown rice, barley		
Walnut	1	Ate 5-6 walnuts a day	Yes	
Grape Fruit	2	Ate grape fruit every day	Yes	Bothersome
Oatmeal	1	Ate oatmeal with hot water and soy milk	Yes	
Vegetable juice	2	Drank vegetable juice with carrot, celery, cabbage, cucumber, kale	No	Tolerance
Ground Flax seed	1	Ate 1 teaspoon with water	Yes	
Alcohol	1	Drank as needed	Yes	Addiction
Fruit juice	4	Apple+ kiwi /Apple /Plum+ milk	Yes :2/ No:2	

CHAPTER SEVEN

The Effect of Acupressure on Constipation, Quality of Life, and Depressive Symptoms in Cancer Patients with Constipation: A Pilot Study

Introduction

Patients with cancer often suffer from constipation. The prevalence of constipation in patients with cancer ranges from 42.7% to 87% (Sykes, 1998; Wirz & Klaschik, 2005). A study of 206 patients with cancer reported that 74.3% took laxatives (Wirz & Klaschik, 2005). Americans spend \$ 725 million on laxatives each year (National Institute of Diabetes and Digestive and Kidney diseases, 2007). Long term use of laxatives may have side effects such as bloating, allergic reaction, abdominal pain, metabolic disturbances, and hepatotoxicity (Xing & Soffer, 2001). Constipation decreases quality of life and is related to depressive symptoms (Bengtsson & Ohlsson, 2005; Thomas, Cooney, & Slatkin, 2008). Acupressure is the application of pressure or localized massage to specific sites on the body to manage symptoms such as pain or nausea (National Cancer Institute, 2010). Acupressure can be an alternative and cost effective therapy for constipation which has fewer side effects than laxatives.

The primary aim of this pilot study was to determine if acupressure can decrease constipation in cancer patients with constipation. The secondary aim of this study was to examine the relationships of duration and severity of constipation with quality of life and depressive symptoms in cancer patients with constipation.

H1: Compared to patients in the placebo group, patients who use left Abdominal Bind (SP14) acupressure for 7 days will report: (a) a lower mean score on Constipation Assessment Scale (CAS); (b) more frequent bowel movements for 7 days; and/or (c) less use of laxatives, suppositories, or enema compared to the placebo group.

H2: The severity of constipation and duration of constipation will be positively associated with depressive symptoms and negatively associated with quality of life in cancer patients with constipation.

Literature Review

Constipation is the passage of small amounts of hard, dry bowel movements, usually fewer than three times a week (National Institute of Diabetes and Digestive and Kidney diseases, 2007). Constipation is the most common gastrointestinal complaint in the United States, resulting in about 2 million annual visits to the doctor

(National Institute of Diabetes and Digestive and Kidney diseases, 2007). Common causes of constipation are a lack of fluid and exercise, low fiber in the diet, medications, irritable bowel syndrome, changes in life or routine such as pregnancy, old age, travel, the abuse of laxatives, ignoring the urge to have a bowel movement, specific diseases such as multiple sclerosis and lupus, problems with the colon and rectum, and problems with intestinal function (National Institute of Diabetes and Digestive and Kidney diseases, 2007). Side effects of medications, the growth of tumors, or decreased mobility might cause constipation in patients with cancer. Opioids often cause constipation (Panchal, Muller-Schwefe, & Wurzelmann, 2007). Ninety-seven percent of patients with cancer in palliative care take opioids (Wirz & Klaschik, 2005).

Acupressure is based on the Meridian theory that a life force called Qi (pronounced chee) flows through the body along certain channels (meridians), which if blocked can cause illness. Stimulation at precise locations along these channels by practitioners can unblock the flow of Qi, relieving pain and restoring health (National Institute of Arthritis and Musculoskeletal and Skin Disease, 2005). When acupressure points are pressed, they release muscular tension and promote the circulation of blood and the body's life force to aid healing (Gach, 1990). Several studies have been conducted to examine the effect of acupressure on nausea, vomiting, pain, dyspnea, and fatigue. Acupressure at PC6 (pericardium) reduced nausea during pregnancy, after surgery, and in cancer chemotherapy (Harris, 1997).

Depressive symptoms are defined as a mood state of sadness, depressed mood, "the blues," or other related feelings and behaviors that do not meet the diagnostic criteria for a DSM-IV-TR mood disorder (Rosenthal, 2008). Women with chronic constipation had lower psychological well-being, including greater anxiety and depressed mood compared to the women without constipation (Bengtsson & Ohlsson, 2005). Twenty-five percent of 1,993 survivors with disease-free breast cancer reported moderate to severe depression. Constipation was a risk factor of depression (Kim et al., 2008). Women with chronic constipation had lower psychological well-being, including greater anxiety and depressed mood compared to the women without constipation (Bengtsson & Ohlsson, 2005).

Quality of life can be defined as "individual perceptions of their position in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" (WHO, 2010). Constipated women

reported poorer health related quality of life than constipated men in 2,870 participants over seven countries (Wald, et al., 2007). Constipation related to opioid analgesics can have a serious negative impact on quality of life (Thomas, Cooney, & Slatkin, 2008).

Conceptual Framework

This pilot study is based on a biopsychosocial model (Engel, 1997). Engel (1997) explains that illness is a result of interacting mechanisms at the cellular, organismic, interpersonal, and environmental levels. Halligan and Aylward (2006) explain that the biopsychosocial model involves the treatment of disease processes. For example, type two diabetes and cancer require the health care team to deal with biological, psychological, and social influences upon a patient's functioning. The biopsychosocial model explains that the workings of the body can affect the mind, and the workings of the mind can affect the body (Halligan & Aylward, 2006). Psychological factors such as stress increased vulnerability to illness (McEwen, 1998). Fatigue in patients with spondyloarthritis was related to worse functional capacity, greater perceived stress, more depressed mood, and less physical activity (Da Costa, Zummer, & Fitzcharles, 2009).

For this dissertation, the biopsychosocial model for constipation was used. Constipation is related to age, gender, depressive symptoms, and serotonin (Bosshard, Dreher, Schnegg, & Bula, 2004; Jovanovic, et al., 2008; Ohayon, 2009; Spiller, 2008). Wu and colleagues (2007) found that acupuncture improved depression and dyspnea in patients with chronic obstructive pulmonary disease (n = 44) when compared to a placebo group (p < 0.05). Therefore, acupuncture may have a biopsychosocial effect which may include constipation relief via increasing serotonin as well as positive impact on quality of life and depressive symptoms.

Methods

Design

A pilot study using a double-blind, randomized clinical trial design was conducted from February 1, 2010 through March 5, 2010 with eight cancer patients who were constipated.

Sample

Subjects were recruited from UK Markey Cancer Center chemotherapy outpatient department. In order to be included in the study, subjects were required to: (1) have constipation; (2) have the physical and mental ability to learn and perform

acupressure; (3) be older than age 18; (4) have cancer; and (5) read and write English. Participant eligibility was assessed by their nurses' recommendation, date of birth, and patients' reports. Patients were excluded if they: (1) had acute illnesses such as fever or active infectious disease; (2) were pregnant; or (3) had an abdominal cancer in the left lower quadrant (LLQ), were undergoing radiation therapy at LLQ, or had surgery in abdominal area (LLQ) within the past 3 months.

Measures

The Constipation Assessment Scale (CAS) (McMillan & Williams, 1989) was used to assess the incidence and severity of constipation both pre- and post-intervention. The CAS scale has eight items which assess abdominal distention or bloating, change in amount of gas passed rectally, frequency of bowel movements, oozing of liquid stool, rectal fullness or pressure, rectal pain with bowel movement, small volume of stool, and the ability to pass stool during the past three days. The subject is asked to rate whether this descriptor is 'no problem (0),' 'some problem (1),' or a 'severe problem' (2). Scores range from 0 to 16; the higher the score, the more severe the constipation. In a sample of 32 cancer patients, Cronbach's alpha was .70 and the test-retest reliability coefficient was .98 (McMillan & Williams, 1989). Cronbach's alpha was .82 and test-retest reliability coefficients ranged from .84 to .92 and content validity index was .75 in a sample of 46 women (Broussard, 1998).

Patient Assessment of Constipation Quality of Life (PAC-QOL) (Marquis, De La Loge, Dubois, McDermott, & Chassany, 2005) was used to assess quality of life. This instrument has 28 items with four subscales (worries and concerns, physical discomfort, psychosocial discomfort, and satisfaction). PAC-QOL has a 5-point scale ranging from not at all (1) to extremely (5). Total scores range from 28 to 140; the higher the score, the worse the quality of life (Marquis et al., 2005). The PAC-QOL subscales had good internal consistency (Cronbach's alpha = .81-.91) and were significantly associated with abdominal pain and constipation severity in 260 patients with constipation (Marquis et al., 2005).

The Patient Health Questionnaire (PHQ)-9 consists of nine questions designed to correspond to the nine diagnostic criteria for major depressive disorder covered in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV). Items are rated from 0 to 3 according to increased frequency of experiencing difficulties in each area covered. Responses to the PHQ-9 are rated using a four-category Likert scale: 0 = not at all, 1 = several days, 2 = more than half the days, and 3 = nearly every day.

Scores are summed and can range from 0 to 27. A score higher than 9 indicates a moderate level of depressive symptoms. Internal consistency reliability was .90 and convergent validity with Hospital Anxiety and Depression Scale was .72 in 193 patients with coronary artery disease (Stafford, Berk, & Jackson, 2007). Cut-off point of “5” for depressive disorders was suggested for geriatric population and patients with coronary artery disease (Han et al., 2008; Stafford et al., 2007).

Demographic data on age, gender, height, weight, current medications, cancer-related factors, constipation-related factors such as occurrence of constipation, frequency of bowel movement, experience of laxatives or suppositories, diet, and exercise were collected at baseline.

Procedure

Prior to beginning the study, approval from the UK Markey Cancer Center IRB and the UK Medical IRB was obtained. Nurses from the UK Markey Cancer Center outpatient department asked patients if they would like to participate in this research during intake. Flyers were put in the nursing station and waiting areas. When patients indicated interest in participating, the researcher entered the room, explained the study, and obtained informed consent. Participants were randomized to either the experimental or placebo group by a random number table and were blind to group assignment. Patients picked a number from a container. Sealed envelopes with matching random numbers were given to the patients. Sealed envelopes had information on acupuncture or placebo acupuncture. The sequence was concealed until interventions were assigned. Patients completed the PAC-QOL, PHQ-9, and CAS and placed the questionnaires in an envelope provided by the investigator who was blind to baseline scores until post-intervention measures were obtained. Demographic data were collected via interview at baseline. The experimental and placebo groups were taught how to use self-acupuncture including intensity of pressure, duration of treatment, and locations of acupuncture points. The information included pictures and a thorough explanation of the procedure. Subjects were asked to do a return demonstration of the acupuncture procedure. The experimental group was instructed to perform 5-minute acupuncture at SP 14 every day for 7 days. The placebo group was instructed to perform 5-minute acupuncture daily at PC 6 for 7 days. Left SP 14 is located at 1.3 cun below and 4 cun left lateral to the umbilicus (Figure 1). PC 6 is located 2 cun (three fingers) above the wrist crease between the tendons of palmaris longus and flexor carpi radialis (Figure 2). Cun is a measurement relative to a

patient's body. One cun is equal to the length of the second knuckle of the middle finger or the width of the thumb (Farlex, 2008). The exact location varies by individual because of their different abdominal obesity. Therefore, patients were taught to find the tender point around the suggested location. The researcher called both experimental group and placebo group on the 3rd or 4th day and the 7th day after intervention instruction. The daily treatments were recorded by the researcher on a study flow sheet during the phone calls. On the 8th day, a research assistant who was blind to assignment called both the experimental and placebo groups to complete the CAS again by phone interview. Intervention fidelity was monitored by a researcher using flow sheets. The data were included only when acupuncture was performed at least 5 days for a week. Both the experimental and placebo group received usual clinic care and continued their standard treatment for constipation. The placebo and experimental subjects received \$10 for participation. Chart review was done to obtain data on cancer-related factors, co-morbidities, and medications.

Sample Size Calculation

For Person's correlation, 10 patients were required based on the correlation value with .7. For two sample t test (two sided), five patients per group were required based on 80% power, 5% alpha, and 2.3 effect size (Statistic calculators version 2.0, 2010).

Data Analysis

Descriptive statistics was used to summarize demographic characteristics, constipation-related factors, diet, and exercise. ANOVA was not used to prove hypothesis 1 due to a small sample size. Pearson's correlation and two sample t-test were used to examine the relationships of severity of constipation and duration of constipation with quality of life and depressive symptoms of persons with cancer.

Results

Participants

The basic characteristics of patients were a mean age 62.5 (± 7.58) years, 100% female, and 62% unemployed status (Table 1). Their mean number of months since cancer diagnosis was 13.1 (± 19.9) months; the majority had stage three cancer and all were presently receiving chemotherapy. The characteristics of constipation were: mean onset of constipation were 10.3 weeks (± 16.11) not including one outlier-- a patient who had experienced constipation for 20 years; 86% used laxatives, stool softeners, or enemas and averaged 5.5 (± 3.8) bowel movements per week.

The Effect of Acupressure on Constipation

Eighteen patients were evaluated for participation. Four patients were excluded because of not having cancer (2), a prisoner (1), and having a cancer at left lower quadrant (1). Three patients refused to participate. Four out of 11 patients were excluded from data analysis because they did not perform acupressure according to the experimental protocol (reasons: they were busy, sick, preferred taking laxatives rather than doing acupressure) (Figure 3).

There were no adverse events from the use of the acupressure treatment or the placebo acupressure reported by participants. Patients in the acupressure group performed acupressure for 4 minutes daily for one week, while patients in placebo group used acupressure for 5.1 minutes daily for one week. Three out of five patients in the experimental group reported improvement of constipation in terms of either the frequency of bowel movements or CAS scores (Table 1). Two out of three patients in the placebo group reported that acupressure did not help constipation even though they had improvement of constipation in the frequency of bowel movements and laxatives use (Table 2). One hundred percent of total patients thought that they were assigned to the experimental group.

The Relationships among Constipation, Quality of Life, and Depressive Symptoms

Eleven patients completed questionnaires (Table 3). There was a negative correlation between severity of constipation and quality of life in cancer patients with constipation ($r = -.94$, $p < .001$). Cancer patients with less than a four-month history of constipation had higher quality of life and fewer depressive symptoms compared to patients with more than a four-month history of constipation. Cancer patients with less severe constipation (less than 6 on the CAS) had higher quality of life than patients with more severe constipation (more than 7 on the CAS) ($p = .002$). There was no difference in mean level of depressive symptoms by severity of constipation (Table 4). Hypothesis 2 was proved except the relationship of the severity of constipation with depressive symptoms.

Case Description for Experimental Participants

Factors related to constipation such as diet, exercise, medications, and fluid intake are described. The body mass index (BMI) is described because abdominal fat might affect the acupressure performance (Table 1). The amount of pain medications and the kind

of chemotherapy is described because the side effect of those medications could be constipation. The performance of acupressure is described.

Patient #1

Ms. Jones, a 59 year-old female, had multiple myeloma for 60 months with co-morbidity of hypertension and hyperlipidemia. She had constipation for 2 weeks since she started the new chemotherapy (Cafilzomib). She did not take any laxatives, suppositories, stool softeners, or enemas for constipation. She drank prune juice for constipation, more than 5 cups of fluid, and ate 1 cup of fruits and vegetables for the 24 hours, and had not exercised for the past week. She had taken six Aleve tablets for the past week. She wanted to learn acupressure because she did not like taking medication for constipation. She performed acupressure for 5 minutes, a total of five times for one week. Bowel movements increased from two to five times per week. She did not take any medication for constipation for the past week. Her score on the Constipation Assessment Scale did not improve. She reported that performing acupressure was easy and it worked. She rated the effect of acupressure on constipation as 4 out of 5 (very helpful). She did not have any side effects.

Patient #2

Mrs. Smith, a 67-year-old female had head and neck cancer for 17 months with co-morbidity of diabetes and anxiety. She was taking chemotherapy (Metotrexate). Her vocal cord was removed, therefore she could not speak. She had a feeding tube in the left upper quadrant. She had been constipated for 20 years. She tried laxatives, suppositories, stool softeners, and enemas for the past week. She drank 250 cc of fluid for the last 24 hours and did not exercise for the past week. She took Oxycodone 5mg 4 times daily. She wrote that if her constipation resolved, she would feel much better. The researcher showed the exact acupressure point using a measuring tape and attached a sticker at the acupressure point. The researcher explained that one should find a tender point around the sticker. The research assistant was supposed to call her but the patient could not talk. When the researcher met her again at the clinic, she reported that the acupressure did not work for her. The researcher asked the patient to demonstrate the acupressure. She explained that she pushed the sticker instead of finding a tender point. She pushed the point with her 1.5cm-long fake nails. The researcher asked her whether she could detach the fake nails during acupressure. She explained that she performed acupressure sometimes with her long nails because she had to go to a nail shop to detach the nails. The

researcher observed that she could not perform acupressure effectively because of long nails.

Patient #3

This 68-year-old female, Ms. Brown, had ovarian cancer for four months with co-morbidity of hypertension and hyperlipidemia. She had been constipated for 4 months since she started chemotherapy (Gembitadine). She took Miralax 17mg once a day and Activa yogurt 6-8oz once a day. She drank 1500 ml of fluid and ate 375 ml of fruit and vegetable juice for the past 24 hours. She had not exercised for the past week. She took three pain medications, but did not remember the names of the medications. She felt her constipation was controlled well by laxatives. She wanted to learn acupressure to know an alternative option. She performed acupressure for 3 minutes a day for one week. Her bowel movements decreased from 14 to 5. The use of laxatives and Constipation Assessment Scale did not change. She rated 4 out of 5 that acupressure was helpful on constipation. She did not report any side effects.

Patient #4

Ms. Kraul, 66 year-old female had been diagnosed with stage I breast cancer 3 months earlier. She had been constipated for three weeks. She took three laxatives daily. She increased to four laxatives daily before learning acupressure. She drank 2500 cc of fluid, ate 900 ml of fruits and vegetables for the last 24 hours, and had not exercised for the past week. She doubted that acupressure could help her constipation. "It would be difficult that acupressure works for my constipation because chemotherapy caused it. This is different constipation than others." She performed acupressure 5 minutes a day for one week. The number of bowel movements did not improve. She reported that acupressure was helpful most days but did not solve the problem. She reported that she had the urge of bowel movement within 4-5 minutes after acupressure. However, overall acupressure did not change her bowel movements, Constipation Assessment Scale, and the use of laxatives and stool softeners.

Patient #5

Ms. Honey, 44-year old female had stage IV lung cancer for 3 months with metastasis in her neck and chest. Her voice was hoarse and low. She had been constipated for 4 years. She took Dulcolax stool softeners as needed. She took Vicodin (pain medication) four tablets daily for pain. She drank 250 cc of fluid, and ate 60 cc of vegetables during the last 24 hours, had not exercised during the past week. She performed acupressure for 3.4 minutes a day for one week. She got a cold

and sore throat during the research period. Constipation improved in CAS, but did not change the frequency of bowel movement and stool softener use. She reported that acupressure was helpful (4 out of 5).

Case Description for Placebo Participants

Patient #1

Ms. Gold, 62 year-old female had stage III non-Hodgkin lymphoma for 3 months with a co-morbidity of hypertension. She took chemotherapy (Doxorubin, Cyclophosphamide, and Vincristin). She had been constipated for 2 weeks and was taking Miralax and Dulcolax for constipation as needed. She drank 1000 cc of fluid , and ate 1250 cc of vegetables and fruits during the last 24 hours, and had exercised for 210 minutes for the past week. She did not take any pain medication. She performed acupressure for 5 minutes a day for one week. Her bowel movements increased and the use of laxatives decreased. However, Constipation Assessment Scale worsened. She reported “acupressure was fascinating. It worked except one day.”

Patient #2

Ms. Lee, 66 year-old female had stage IV pancreatic cancer for one month. She took chemotherapy (Gemcitabine). She had been constipated for one week. She took Milk of Magnesia for constipation. She drank 1250cc of fluid and ate 750 cc of fruits and vegetables during the last 24 hours. She had walked for 90 minutes for the past week. She took Lortab daily for pain. She performed acupressure for 6.7 minutes a day for one week. Her bowel movement increased and the use of laxatives decreased. She had diarrhea twice in one week. However, Constipation Assessment Scale worsened. She reported that acupressure did not help her constipation. She did not have side effects from acupressure. When the researcher offered to teach her the correct points for constipation, she refused because her constipation was controlled well by medications.

Patient #3

Ms. Jane, 68 year-old female had multiple myeloma for 15 months. Her chemotherapy was Zoledronic acid. She had constipation for one week and took stool softeners as needed. She drank 1250 cc of fluid and ate 250 cc of vegetables and fruits during the last 24 hours. She performed acupressure for 5 minutes daily, a total of five times for one week. She stopped acupressure because she had diarrhea four times. She reported that acupressure did not help her constipation even though she had more bowel movements, decreased CAS score, and decreased laxative use.

Discussion

In this pilot study, acupressure improved constipation in three of five cases. The reason for no improvement in constipation for two patients could be incorrect performance of acupressure (wrong acupressure point or weak pressure), inadequate time for acupressure, abdominal obesity, a long history of constipation, patients' diseases, using one point, or patient's negative attitude toward acupressure. The need to change the experimental protocol, measure of the effect of acupressure, and inclusion criteria was found through this pilot study.

In this pilot study, the Constipation Assessment Scale (CAS) scores did not improve in most cases. The CAS scores in the researcher's preliminary study significantly decreased in the experimental group compared to the control group (Jung et al., 2000). The reason could be the CAS might have low validity and reliability in cancer patients. The validity and reliability of the CAS were tested in pregnant women (Broussard, 1998) and cardiac patients (McMillan, Dunbar, & Zhang, 2008). McMillan and Williams (1989) reported the reliability of CAS in 32 cancer patients. However, validity of the CAS was not tested in cancer patients. A different measure such as Patient Assessment of Constipation Symptoms (PAC-SYM) is considered for a future study. The validity and reliability of the PAC-SYM was tested in 216 patients with constipation (Frank, Kleinman, Farup, Taylor, & Miner, 1999) and 677 patients with opioid-induced constipation (Slappendel, Simpson, Dybois, & Keininger). The second reason could be due to the short intervention time and using only one acupressure point. A preliminary study found that acupressure at Origin Pass (CV 4) and Abdominal Bind (SP 14) for 5.7 minutes, three times a day, for 7 days improved the severity of constipation using CAS compared to the control group in 45 nurses (Jung, et al., 2000). Acupressure using two points is recommended for a future study. In the preliminary study (Jung et al, 2000), nurses were supposed to perform acupressure for 10 minutes a day. The actual time for acupressure was 5.7 minutes per day. In this study, patients were educated to perform acupressure for at least 5 minutes a day. However, the average acupressure performance was 4.4 minutes. Therefore, to increase acupressure performance, it would be better to educate patients to perform acupressure for 10 minutes. In previous studies, patients or researchers performed acupressure from 6 minutes to 40 minutes per day using their fingers. There have been no studies to examine the correlation between the time of acupressure performance

and the degree of effect. Further studies are needed to examine the correlation between the time of acupressure performance and the degree of effect.

Changing the inclusion criteria is needed for a future study: more than a score of 1 on the Constipation Assessment Scale (CAS); agreement not to increase laxatives before starting acupressure; and cancer-related (chemotherapy-induced or opioid-induced) constipation. If patients start acupressure at the base line score of 0, the measure of the effect of acupressure on constipation would be difficult. It was difficult to control the use of laxatives in this pilot study. The ideal method is that patients continue their medication for constipation or take as needed. One patient increased laxatives before trying acupressure. Therefore it was difficult to examine the effect of acupressure. In a future study, it would be better to include patients who agree not to increase their daily laxative during the research period. If patients have a long history of constipation, they would not get benefit from short term acupressure. Therefore it would be better to include patients who experience constipation since they were diagnosed with cancer.

An effective method for teaching acupressure was found in this pilot study. For the first patient, the researcher used a measuring tape to mark the acupressure point on the abdomen. However, patients did not have a measuring tape at home. Using the width of the thumb to find the acupressure point was easier for patients. It would be better to ask patients who have long nails to cut them before doing acupressure. The position for performing acupressure might be changed to get a better effect. In this study, patients performed acupressure in the sitting position. However, participants had difficulty finding a tender point or pushing the acupressure point effectively because of abdominal fat. Gach (1990) suggested lying down with bended knees for applying acupressure on the abdomen. A lying down position with bended knees might be easier for a future study (Figure 4). Patients who were old or at the end stage of cancer had difficulty pushing the acupressure point firmly by themselves. Educating their care givers on how to do acupressure would be better to have effective pressure.

In this pilot study, the most difficult part was recruitment. Most patients with constipation were taking laxatives and stool softeners. Patients with well controlled constipation might not feel that they need to learn acupressure. Acupressure was not as familiar to them as acupuncture. Some patients were confused between acupuncture and acupressure. Some patients were afraid of participating in this study

because they thought that they might be injected with needles. Further education to the public about acupressure is needed to increase recruitment. The manager wanted only nurses to ask patients if patients wanted to participate in this study. Originally, the researcher was to educate nurses about the study at the staff meeting. However, the staff meeting was cancelled. Therefore the researcher taught nurses one on one. In a future study, the researcher will teach nurses at a staff meeting and spend more time educating nurses about acupressure. It was difficult for nurses to spend time with patients to explain the research. Giving pocket-size cards to nurses briefly explaining the study is encouraged so that nurses can give the cards to patients without spending more time to explain the research. The cards will ask “Do you have constipation? Would you like to learn acupressure, a kind of massage to reduce constipation?” To recruit patients easily, multicenter based research is required. Using only one center would not provide enough patients with uncontrolled constipation

Interestingly, patients had different definitions for constipation. Even though the placebo group had more bowel movements, a lower CAS score, and less laxative use, two out of three patients reported that acupressure did not help their constipation. Having diarrhea might lead them to think acupressure did not help. Further interviews are needed on what patients consider an improvement in constipation. Frequency of bowel movements per week might not be an appropriate indicator of constipation. Patients had 5.5 bowel movements per week, but they considered themselves suffering from constipation. The placebo group had more bowel movements including diarrhea after acupressure, but they considered that constipation did not improve. In a future study, the researcher should either not include frequency of bowel movements to examine the effect of acupressure, or only count normal bowel movements and exclude diarrhea or very small volume of stool.

The reason for the decrease in frequency of bowel movements in a patient can be explained by the function of the acupressure point SP 14. SP14 regulates bowel movement and is used for diarrhea and constipation (Acupuncture.com, 2010). In addition, patient attitudes toward acupressure may influence the result of acupressure. Roscoe et al. (2003) found that patients who expected acupressure would work for pain demonstrated more positive effects than those who did not expect acupressure to be effective.

The degree of depressive symptoms might influence the performance of acupressure because they had lower energy to do acupressure. The reason for the

improvement in constipation in the placebo group (acupressure at PC6) can be explained by serotonin or patients' expectation of efficacy. Chang, Liu, and Liu (2009) reported that far-infrared rays using a patch-like sticker at PC6, SP6, and HT7 for 15 minutes twice a week for four weeks increased serotonin (5HT) and malondialdehyde (MDA) compared to the control group in 70 depressed patients with insomnia ($p < .01$ and $p < .001$ respectively). Serotonin initiates peristalsis (Tack & Muller-Lissner, 2009). Several studies reported that placebo acupressure was as effective as the real acupressure (Alkaissi, Stalnert, & Kalman, 1999; Roscoe, et al., 2003). When patients expected the acupressure would work for them, they might experience improvement of their symptoms.

The mechanism of how constipation is related to depression can be explained by serotonin which is a neurotransmitter involved with mood, anxiety, sleep induction, and intestinal movements. About 80% to 90% of serotonin exists in the gut and the remainder is made in the central nervous system (CNS) (Sikander, Rana, & Prasad, 2009). Low serotonin is related to both depression and constipation (Spiller, 2008; Young & Leyton, 2002). Too much or too little serotonin is associated with constipation. Increased mucosal serotonin in the rectum contributes to constipation due to receptor desensitization (Costedio, et al., 2009). Acupressure might have an effect on constipation as well as depressive symptoms. In this study, the intervention period was too short to examine the effect of acupressure on depressive symptoms and quality of life. Kang, Sok, and Kang (2009) reported that acupressure for 10 minutes daily for 2 weeks improved depression compared to the control group in 56 stroke patients ($p=.0001$). Further study is needed to examine the effect of acupressure on depressive symptoms and quality of life in cancer patients with constipation.

There have been no studies to examine the effect of acupressure on constipation that were published in English. However there are several studies in Korean. The results of this study are similar to previous studies. Acupressure at CV 4, CV 8, CV 12, ST (Stomach) 25, and GV (Governor vessel) 1 for 10 minutes for 2 weeks reduced constipation evidenced by increasing frequency of bowel movements and decreasing scores for Constipation Assessment Scale (CAS) compared to the control group in 35 patients with strokes (both $p < .001$) (Lee, 2006). Acupressure at LI4 (Large intestine), LI11, and TE (Triple energizer) 6 for 10 minutes a day for 2 weeks improved constipation evidenced by a decrease in the severity of constipation and increase in frequency of bowel movements per week compared to the control

group in 42 elderly inpatients (both $p < .001$) (Kim, 2009). However, these studies did not randomize patients which may cause bias in interpretation of the results of studies. Therefore further studies are needed to examine the effect of acupressure on constipation using a randomized controlled trial design.

There are several studies that examined the effect of various methods to improve constipation. Physical therapy was effective in reducing constipation and increasing quality of life in 22 patients with puborectalis dyssynergia (Lewicky-Gaupp, Morgan, Chey, Muellerleile, & Fenner, 2008). However, this study did not describe the experimental protocol for physical therapy. Massage for 15 minutes per day, 5 days per week for 8 weeks decreased the severity of constipation and increased bowel movements but did not decrease laxative use compared to the control group in 60 patients with constipation ($p < .05$) (Lamas, Lindholm, Stenlund, Engstrom, & Jacobsson, 2009). Further studies are needed to compare the effect of acupressure and other treatment options such as medications, physical therapy, massage, or diet.

This dissertation reported that constipation decreases quality of life. Previous studies reported similar results. Quality of life was improved when constipation was improved in 1630 adults (Dubois, Gilet, Viala-Danten, & Tack, 2010). Older people with constipation reported poorer quality of life than older people without constipation (Norton, 2006). Two-hundred forty subjects with constipation reported social impairment, distress, and restriction ($p < .0001$) (Wang, et al., 2009).

This dissertation reported that depressive symptoms were not related to the severity of constipation, but related to the duration of constipation. Rao and colleagues (2007) found that a stool frequency of less than three bowel movements per week was not significantly correlated with any of the psychological and quality of life subscores in both patient groups, except for obsessive-compulsiveness in the slow transit constipation group as well as somatization and psychoticism compared to the healthy control group ($p < .05$). Physical therapy for constipation decreased depressive symptoms significantly measured by PHQ scores ($p = 0.008$), but this improvement was not statistically correlated with the change in either the total PAC-SYM (the severity of constipation) or the total PAC-QOL (quality of life related to constipation) (Lewicky-Gaupp et al., 2008).

Limitations

This study is a pilot study. A small sample size of 7 is a limitation. Using only subjective measurements is another limitation. The amount of opioids, chemotherapy,

laxatives, enemas, activity, and diet can affect constipation. Fidelity could be a potential problem because the interventions were done by patients. Patients may not perform the procedure correctly or on the recommended schedule.

Conclusion

Acupressure at SP 14 for 5 minutes, daily for 1 week was effective in improving constipation in three out of five cancer patients with constipation. Further study is needed to examine the effect of acupressure using a revised experimental protocol. The revised protocol will use two acupressure points at CV4 and SP14 for 10 minutes with a lying down position. Inclusion criteria should be that the CAS score should be more than one and patients should agree not to increase daily laxatives before learning acupressure. This pilot study found that severity of constipation had negative correlation with quality of life in cancer patients with constipation. Cancer patients with less than a four-month history of constipation had fewer depressive symptoms compared to patients with more than a four-month history of constipation. Acupressure could be a safe and cost-effective alternative therapy in cancer patients with constipation.

Table 7.1

Effects of Acupressure at SP 14 on Constipation in the Experimental Group

Gender	Age	Constipation Duration (week)	BMI	Pain medication (# for one week)	Acupressure Performance (Minute/day)	PAC-QOL	PHQ-9	Bowel Movement		Constipation Assessment Scale (CAS)		Total # of laxatives		Acupressure Helpful? Self-report (1-5)
								Pre	post	Pre	post	pre	post	
Female	59	2	35.9	0	3.6	43	2	2	5	5	6	0	0	4
Female	67	360	25.8	28	5	92	5	1	1	13	13	7	13	1
Female	68	16	23.9	3	3	37	2	14	5	0	0	7	7	4
Female	66	3	23.2	0	5	28	4	7	6	0	5	21	30	3
Female	44	48	20.1	48	3.4	60	17	6	5	12	8	1	2	4

Note. Total numbers of laxatives include laxatives, suppositories, enemas, and stool softeners

Table 7.2

Effects of Acupressure at PC 6 on Constipation in the Placebo Group

Gender	Age	Constipation Duration (week)	Pain medication (# for 1 week)	Nausea (0-10)	Acupressure (Minutes)	PAC-QOL	PHQ-9	Bowel Movement		CAS		Total # of laxatives		Acupressure Helpful? Self-report (1-5)
								Pre	post	pre	post	pre	post	
Female	62	2	0	0	6.7	49	1	5	7	2	6	3	0	5
Female	66	1	7	1	5	30	3	6	9 (2 diarrhea)	0	3	1	0	1
Female	68	1	21	0	4.3	53	2	3	8 (4 diarrhea)	7	2	2	0	3

Note. Total numbers of laxatives include laxatives, suppositories, enemas, and stool softeners

Table 7.3

Relation between Constipation, Depressive Symptoms, and Quality of Life

#		Constipation Duration (week)	BM	CAS	PHQ-9	PAC- QOL
58	1	1	6	0	3	30
53	2	1	3	7	2	53
1	3	1	No BM for 6 days and diarrhea 4	5	1	65
50	4	2	5	2	1	49
45	5	2	2	5	2	43
17	6	3	7	0	0	28
56	7	5	5	4	0	54
49	8	16	14	0	2	37
64	9	48	1	7	6	96
62	10	48	6	12	17	60
59	11	360	1	10	5	92

Note: BM (bowel movement)

Table 7.4

Relation between the Duration and Severity of Constipation, Depressive Symptoms, and Quality of Life

		n	PHQ-9	T	PAC-QOL	t
Constipation period	<4 months	8	3.3	3.2 (p=.01)	55.9	2.8 (p < .05)
	≥4 months	3	13.7		98.3	
CAS	0-6	7	1.7	1.7	42	4.8 p = .002
	7-16	4	7.5		75.3	

Figure 7.1
Acupressure at SP 14

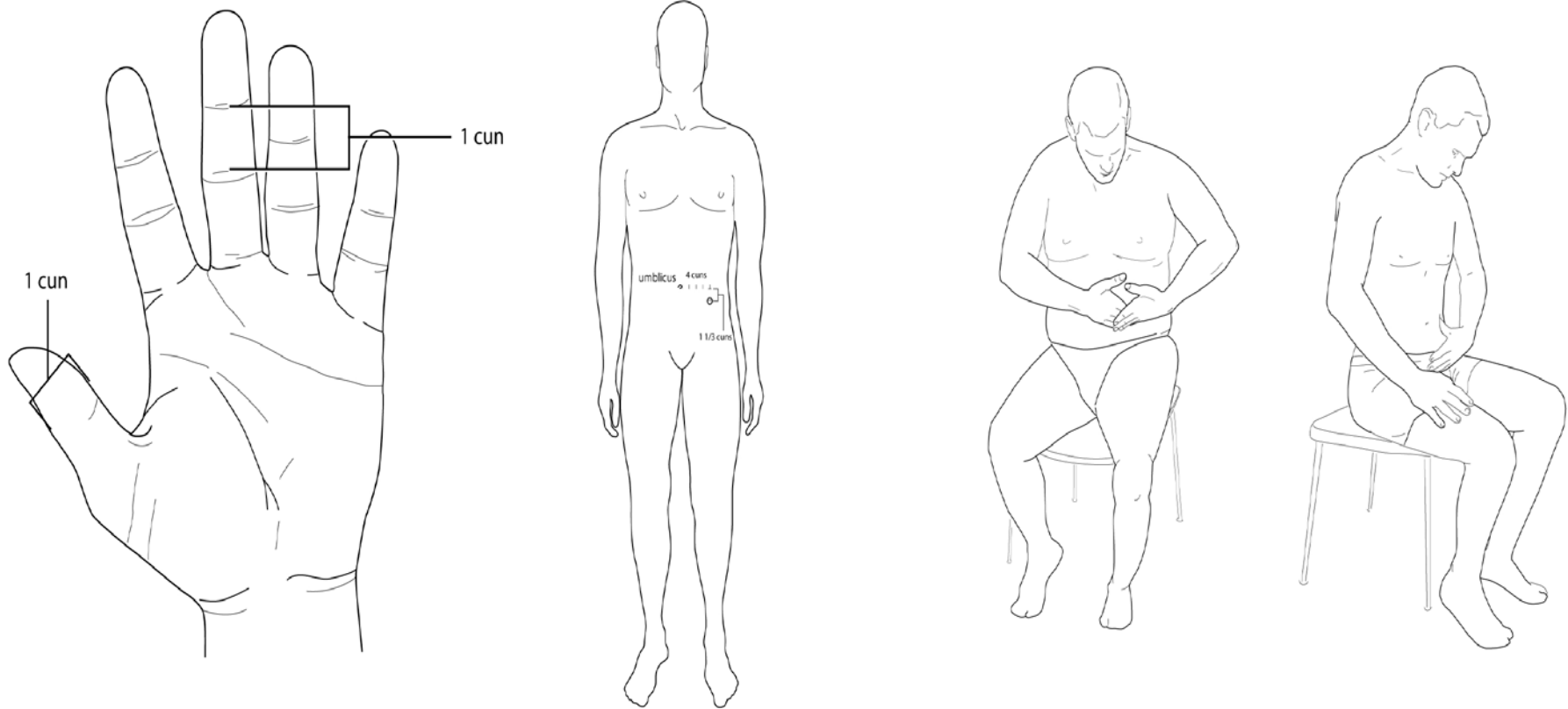


Figure 7.2
Acupressure at PC 6

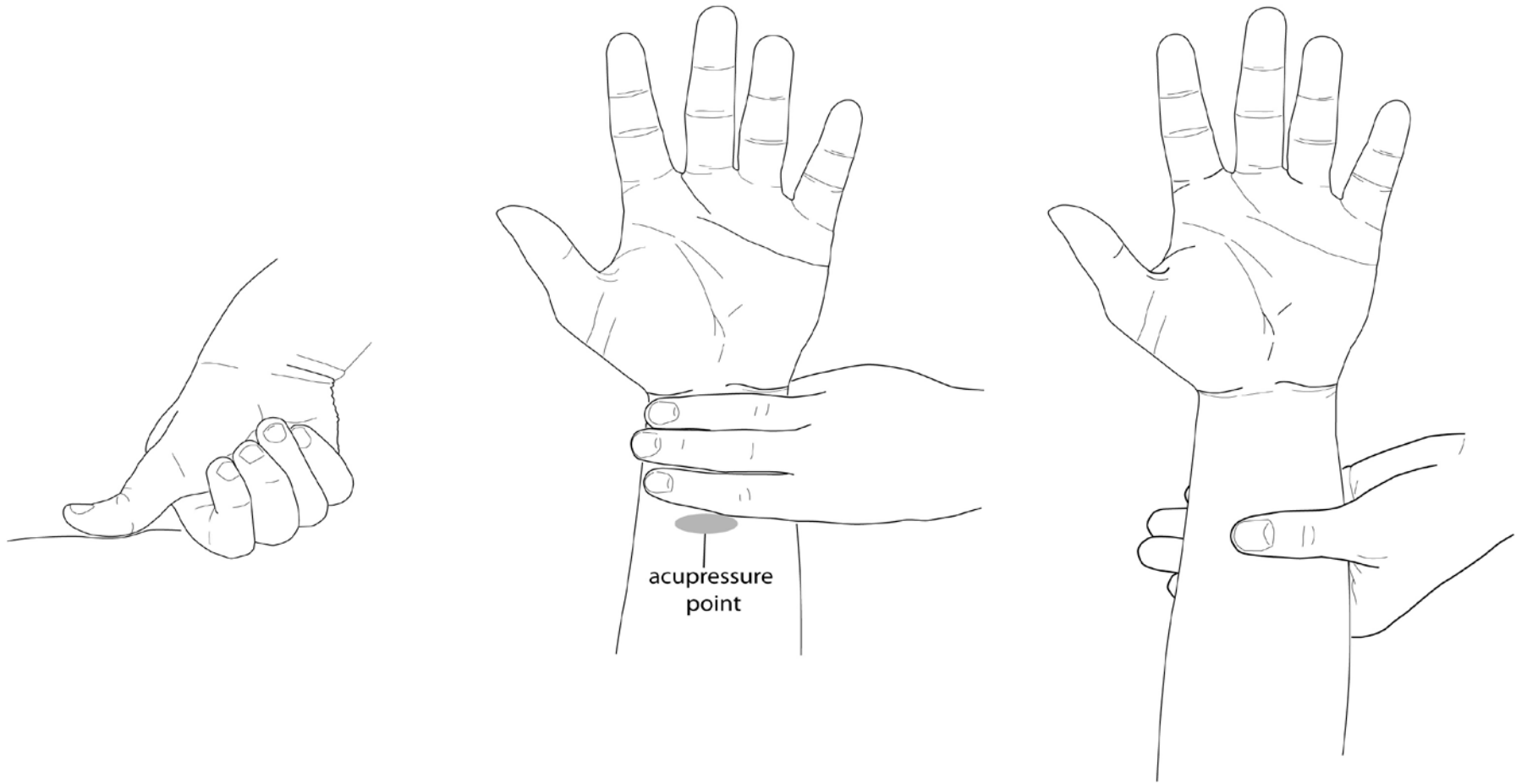


Figure 7.3
Flow Diagram

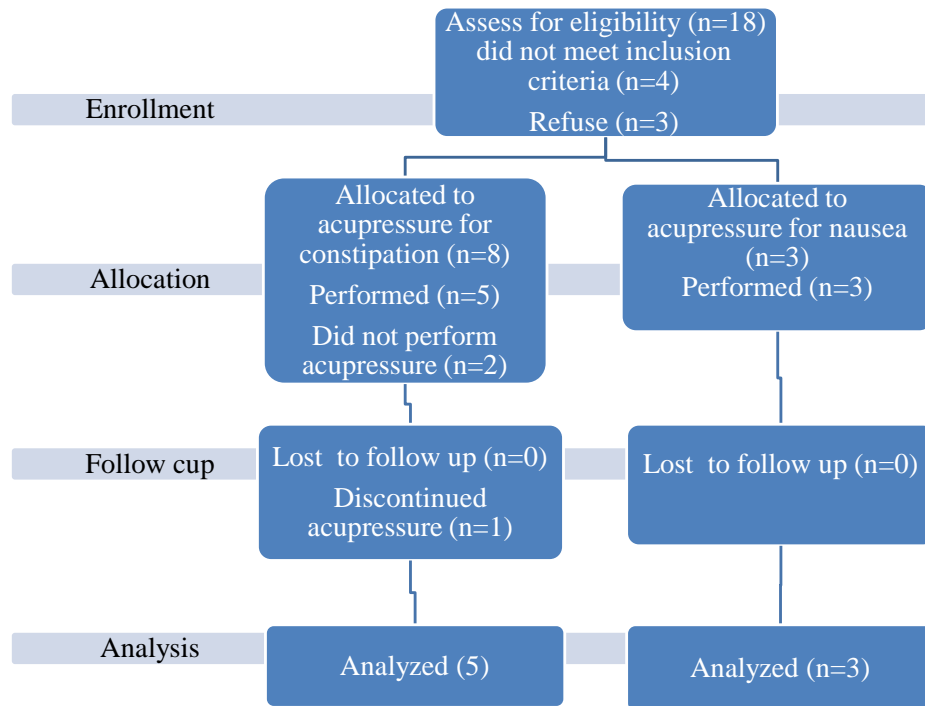
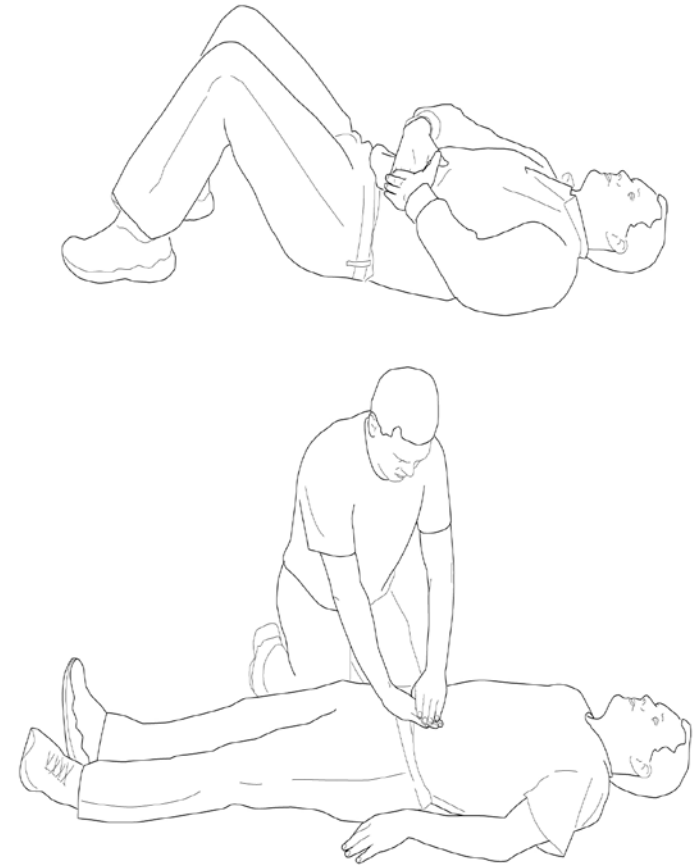
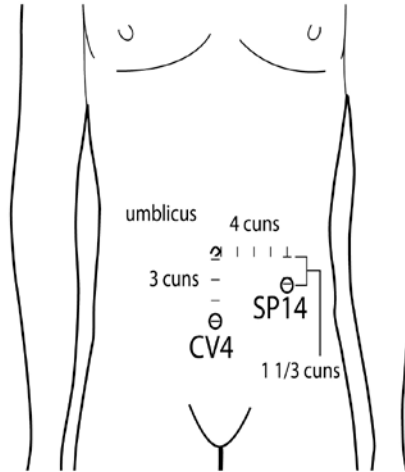
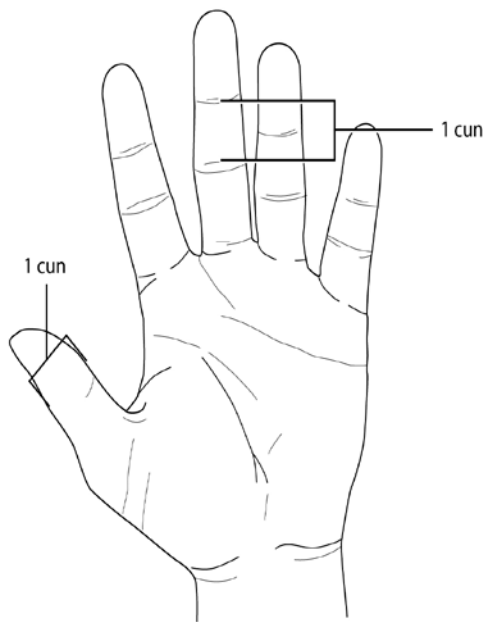


Figure 7.4
Revised Experimental Protocol



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CHAPTER EIGHT

Conclusion and Discussion

The purposes of this dissertation were: 1) to describe four theories of traditional Korean medicine; 2) to review mechanisms of acupuncture and moxibustion and develop a conceptual model; 3) to review findings from randomized controlled trials that tested the effects of acupressure used for the management of symptoms such as nausea, pain, and dyspnea; 4) to examine the reliability and validity of the Patient Health Questionnaire-9 (PHQ-9) in heart failure patients with constipation compared to those with gastrointestinal disease; 5) to describe how Korean women experienced constipation and how constipation affected their quality of life and the experience of using complementary and alternative medicine for constipation; 6) to test the effect of acupressure on constipation and to examine the quality of life and depressive symptoms in cancer patients with constipation.

This dissertation includes six papers: traditional Korean medicine theory, mechanisms of acupuncture/moxibustion, a systematic review on the effect of acupressure, psychometric properties of the Patient Health Questionnaire-9, the experience of having constipation, and the effect of acupressure on constipation.

In chapter two, four theories of traditional Korean medicine were described. Traditional Korean medicine is based on Yin-Yang theory, five element theory, Sasang constitutional medicine theory, and meridian theory. Yin and Yang are the two interrelated forces which together with the concept of qi form the foundation of Oriental medicine. Yin and Yang are mutually exclusive and together form a whole so that when they are in balance, there is a state of harmony and health and when out of balance, there is illness. The five element theory is based on the observation of the natural cycles and interrelationships in both our environment and within ourselves. The foundation of the theory rests in the correspondence of each element to a variety of phenomena (Yinyanghouse, 2007). Human beings also maintain a balance of Yin and Yang in the five elements and this relationship is very important in approaching Oriental medicine. The meridians are the channels in the body through which the life force flows. In Oriental medicine the meridians are seen as the railroad, the acupuncture points on the meridians as the stations, and energy as the train. In the normal healthy organism, all are maintained in balance and in a continuous circulation of energy. Illness is the result of the energy flow becoming disarranged (Kang, 1993).

Finally, Sasang constitutional medicine theory emphasizes the importance of harmonizing food and herbs according to body types (Koh, 2006).

Oriental theories were not described well in most experimental studies using complementary and alternative medicine (CAM). Therefore, further studies are needed to examine the description of theories in experimental studies using complementary and alternative medicine. There are few studies to test the utility of Oriental theories. For example, further studies are needed to test the effect of Sasang constitutional diet on various diseases.

In chapter three, probable mechanisms for acupuncture/moxibustion effects on pain, gastric activity, myocardial ischemia, irritable bowel syndrome, spinal cord injury, epilepsy, drug addiction, and stroke have been revealed.

Acupuncture/moxibustion decreases pain by stimulating the pain receptors (nerve endings), causing the secretion of neurotransmitters in the central nervous system and in the plasma, and by decreasing substance P. Acupuncture/moxibustion increases gastric activity by increasing serotonin and activating the dorsal vagal complex. Moxibustion/acupuncture decreases chronic visceral hypersensitivity by decreasing serotonin and hypothalamic corticotrophin-releasing hormone.

Acupuncture/moxibustion treats drug withdrawal by regulating dopamine, serotonin, and gamma-aminobutyric acid (GABA). Acupuncture recovers cardiac function by regulating nitric oxide synthase (NOS) expression in myocardium; relieving arteriospasm, inhibiting extreme dilatation of blood capillaries, modulating imbalance of micro-vasomotion of the coronary artery, improving myocardial blood-supply, and promoting normalization of electrical activities of the ischemic myocardium and decreasing β_1 -adrenergic receptors, G α protein, and cAMP. Acupuncture decreases blood sugar by stimulating somatic afferent fibers and muscle contraction, increasing insulin binding in various tissues followed by increasing insulin responsiveness, and increasing beta endorphin levels. Acupuncture treats epilepsy by decreasing GABA and increasing the expression of GAD (67) mRNA in the DG granular cell layer. Acupuncture treats strokes by decreasing the number of apoptotic cells and expression of the proapoptotic Bax gene and increasing the expression antiapoptotic gene Bcl-2, regulating GABA, decreasing infarct size, and increasing the production of endocannabinoid 2-arachidonylglycerol and N-arachidonylethanolamine-anandamide. Moxibustion increases immunity by increasing CD3+ and CD4+ T-lymphocytes, increasing the levels of interleucin-2, interferon

gamma, and the activity of natural killer cells of the spleen, and suppressing natural killer (NK) cell cytotoxicity. Moxibustion suppresses immunity by decreasing CD8+ T-lymphocytes and down-regulating expression of interleukin-1b (IL-1b) and IL-6 mRNA.

The conceptual model proposes a pathway for acupuncture/moxibustion as a positive and negative feedback system. For example, the review of mechanisms showed that acupuncture or moxibustion might increase (Qu & Zhou, 2007) or decrease serotonin (Zhou, et al., 2009) by different acupuncture points. Moxibustion might enhance or suppress the immune system by subjects' status regardless of the use of the same acupuncture points (Kung, Chen, & Hwang, 2006). Further studies are needed to examine the effect of acupuncture/moxibustion on constipation or diarrhea using ST (stomach) 25, 27, or SP (spleen) 14; the effect of acupuncture/moxibustion at ST 36 (stomach) on gastric emptying in rats with/without vagotomy; and the different action of acupuncture or moxibustion at ST 36 using serotonin and cholecystokinin.

In chapter four, a systematic review of 48 studies was conducted. Twenty seven studies investigated the use of acupressure for the management of nausea and vomiting; authors of 14 of the 27 studies concluded acupressure was effective. Investigators of 10 of 11 studies concluded that acupressure was an effective pain management strategy. Investigators of all five studies of acupressure for dyspnea concluded that it was an effective management strategy. Authors of all five studies on fatigue concluded that acupressure was effective in improving fatigue and insomnia. Support for the effectiveness of acupressure for nausea and vomiting during surgery and chemotherapy was equivocal. There is evidence to support the use of acupressure to reduce pain, fatigue, and dyspnea. Currently, there is insufficient evidence to support the use of acupressure for other symptoms.

There are few studies to compare the effect of acupressure with other strategies such as medications, physical therapy, or diet. Further studies are needed to examine the effect of acupressure with other strategies. There are few studies on the dose of acupressure. Further studies are needed to examine the relation between the intervention time and the effect of acupressure. High quality randomized clinical trials using appropriate design and placebos are needed.

In chapter five, a study on psychometric properties of Patient Health Questionnaire-9 was conducted. Based on the cutoff of ≥ 5 on the PHQ-9, 50% of the

total sample reported depressive symptoms; and 57% of those with GI disease and 65% of those with constipation reported depression. Cronbach's alphas for the PHQ-9 were .87 in the total sample, .87 for those with GI disease, and .89 for those with constipation. The correlation between the PHQ-9 and the BDI-II was .81 ($p < .01$) in those with constipation. The PHQ-9 was inversely related to the PSSS in those with heart disease ($r = -.29$, $p = .01$); however, the correlation between the PHQ-9 and the PSSS was not significant in those with constipation. In patients with constipation, the correlations of the PHQ-9 with the BSI subscales were: .77 ($p < .01$) with anxiety, .68 ($p < .01$) with depression, and .51 ($p < .01$) with hostility. The PHQ-9 is valid and reliable in screening patients with heart disease, gastrointestinal disease, or constipation for depression. The PHQ-9 is an effective screening tool for depression because it is short, easy to complete, and easy to score.

This study found a high prevalence of depression among patients with gastrointestinal disease or constipation compared to the studies by Addolorato and colleagues (2008). Therefore, screening depression among the GI population is important to reduce the cost of treatment. Addolorato and his colleagues (2008) suggested that the approach to patients affected by gastrointestinal disease should be managed by a team including gastroenterologists, psychologists and/or psychiatrists, or alternatively they should be managed by gastroenterologists who have expertise in the treatment of psychological disorders. The sample size of the constipation population was very small in this study. Further study is needed to examine the psychometric properties of the PHQ-9 with a larger sample of patients with constipation.

In chapter six, a qualitative study on the experience of having constipation was conducted. Four themes were identified: subjective definition of constipation; efforts to find the reason for constipation; efforts to find solutions for constipation (sub-theme: frequent use of enemas, laxatives, and suppositories, expectation and disappointment for CAM, finding individually effective solutions for constipation); and negative impact on quality of life (sub-theme: mental discomfort, changed appetite, difficult relationships with people). Ten women reported that they had used exercise, massage, yogurt, vegetables, seeds of tangles, mineral oil, milk with plums, mixed rice, walnuts, grapefruit, apples, oranges, aloe, oatmeal, soymilk, sweet potatoes, ground flax seed, and alcohol as a strategy for relieving constipation. Participants had used herbs, acupuncture, acupressure, moxibustion, cupping therapy,

hand acupuncture, Senna tea, and soy bean past fomentation. In conclusion, living with constipation is an irritable and uncomfortable experience and it motivated these women to select a variety of methods to reduce constipation.

This finding supports the evidence that constipation is one of the factors that has a negative impact on quality of life (Norton, 2006). This finding also supports the idea that constipation puts patients in a bad mood, which affected both their families and contact with their friends. Conflict could occur because of their irritability. In order to avoid conflicts, feelings of discomfort, and the fear and uncertainty that something would happen in a public place, they chose not to meet others (Friedrichsen & Erichsen, 2004). There are few qualitative studies on constipation. Further studies are needed to examine quality of life and experience of complementary and alternative medicine using different populations with constipation. This study found that constipation might be related to the quality of life. Interestingly, several participants who had a long history of constipation said that constipation caused depressive moods. Further study is needed to examine the relation between quality of life, depressive symptoms, and the severity and duration of constipation.

In chapter seven, a pilot study using a randomized controlled trial design was conducted. The experimental group (n=5) performed acupressure at SP 14 (spleen) for 5 minutes daily for one week. The placebo group performed acupressure at PC 6 (pericardium) for 5 minutes daily for one week. The experimental group had 60% improvement in either number of bowel movements or severity of constipation using the Constipation Assessment Scale (CAS). The placebo group had 33% improvement in the number of bowel movements and the use of laxatives. Two patients who had diarrhea reported acupressure did not help in spite of more bowel movements and decreased use of laxatives and stool softeners. There was negative correlation between severity of constipation and quality of life. Cancer patients with less than a 4-month history of constipation had higher quality of life and fewer depressive symptoms compared to patients with more than a 4-month history of constipation. Cancer patients with less severe constipation had higher quality of life than patients with more severe constipation. There were no adverse effects in this pilot study. Acupressure could be a safe and cost-effective intervention to decrease constipation in cancer patients.

Another study should be done using a revised experimental protocol and inclusion criteria. The revised experimental protocol is acupressure at CV4 and SP14

for 10 minutes daily for one week with a lying down position with bended knees. Added inclusion criteria are patients who have a score more than 1 on the CAS and who agree not to increase laxative use before acupressure. For weak and elderly patients, teaching caregivers is recommended. A randomized controlled trials with a larger sample are recommended with a modified experimental protocol.

There are few studies on the mechanism of acupressure. This study found that cancer patients with less than a four-month history of constipation had fewer depressive symptoms compared to patients with more than a four-month history of constipation. In the literature review, low serotonin is related to constipation and depressive symptoms. Acupressure might improve depressive symptoms by increasing serotonin. Therefore further study is needed to examine the effect of acupressure on depressive symptoms in cancer patients. Also, further study is needed to examine the effect of acupressure on serotonin. Kang, Sok, and Kang (2009) reported that acupressure for 10 minutes daily for 2 weeks improved depression compared to the control group in 56 stroke patients ($p=.0001$). According to the evidence by Kang and colleagues (2009), at least two weeks might be needed as the intervention period to examine the mechanism,

In conclusion, constipation decreases quality of life and is related to depressive symptoms. Acupressure could be a safe and cost-effective alternative medicine for constipation. Yin-Yang theory, Meridian theory, Sasang Constitutional theory, and Five Element theory explain how acupressure works differently according to the patient's status and constitution. There are few descriptions of Oriental theories in published articles. Further study is needed to examine the descriptions of theories in the experimental studies using acupressure. The mechanisms of acupuncture/moxibustion can be explained by neurotransmitter, hormones, brain activity using PET, and changes of cells, nerves, and neurons using skin biopsies. The conceptual model explains that different factors activate different mechanisms when acupuncture/moxibustion is conducted. Mechanisms of Oriental medicine can be described as a positive and negative feedback system. Further studies are needed to examine the utility of this conceptual model. There are few studies on the mechanism of acupressure. Further studies are needed.

Screening for depressive symptoms in patients with chronic disease would decrease medical costs. This study found high prevalence of depressive symptoms in heart failure patients with constipation. Constipation might be related to

biopsychosocial factors such as serotonin, gender, age, or depressive symptoms. Women and elderly people tend to have more depressive symptoms and constipation due to lower serotonin (Bosshard, Dreher, Schnegg, & Bula, 2004; Jovanovic, et al., 2008; Ohayon, 2009; Spiller, 2008). Acupressure might have effects on biopsychosocial factors. Acupressure might improve constipation via increasing serotonin as well as quality of life and depressive symptoms. Further study is needed to examine the biopsychosocial effect of constipation and acupressure using qualitative and quantitative designs.

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Appendix A

Interview Guide

1. Tell me about your constipation.

2. Tell me about how your constipation has affected the quality of your life.

Tell me about the influence of your constipation on eating, sleeping, mood, social activity, and finance so on.

How does your constipation affect emotion?

How does your constipation affect social interaction?

How does your constipation affect physical activity?

How does your constipation affect eating?

How does your constipation affect sleep?

How does your constipation affect economy?

3. Tell me about your strategy to relieve constipation.

What strategies do you use to manage constipation?

4. Tell me about your experience of using complementary and alternative medicine for constipation.

Have you tried complementary and alternative medicine for constipation?

What has been effective?

How did you choose the methods?

What are the benefits and side effects of each method?

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VITA

Eun Jin Lee

Date of Birth March 18, 1974
Place of Birth Busan, South Korea

EDUCATION

2007- 2010	PhD-psychiatric nursing	University of Kentucky
2005-2007	Post MSN-Family NP	Grand Valley State University
1998-2003	MSN-Psychiatric nursing	Yonsei University
1993-1997	BA-nursing	Inha University

PROFESSIONAL EXPERIENCE

2007-present	Teaching Assistant	University of Kentucky, Lexington, KY
2009-2009	Nurse	Kentucky Clinic, Lexington, KY
2005-2007	Research Assistant	Grand Valley State University Grand Rapids, MI
1997-2004	Nurse	Yonsei University Medical Center, Seoul, Republic of Korea

PROFESSIONAL HONORS

2010 Top ten student poster presentation by Southern Nursing Research Society

2008 P.E.O. international peace scholarship, Des Moines, Iowa \$8,000

2006 First prize in essay competition for international students' experience in USA by
Lewer agency, Grand Rapids, MI, 2006, \$2,500

2004 An excellent prize for my master's thesis at Yonsei University \$1,000

2001 Third prize for a research at Yonsei University Medical Center and an excellent
prize at Seoul Clinic Nurses Association (joint research about acupuncture)

1999 A prize for suggestion about education for kind service at Yonsei University
Medical Center

PROFESSIONAL PUBLICATIONS

- Lee, E.J.(In press). A case study of Internet game addiction. *Journal of Addictions Nursing*.
- Lee, E.J. (In press). Ultrasound before abortion: A multiple streams approach. *Journal of Nursing Law*.
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