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## Nonadherence to Venous Compression Garments in Patients with Recurrent Venous Ulcers

David Sundberg

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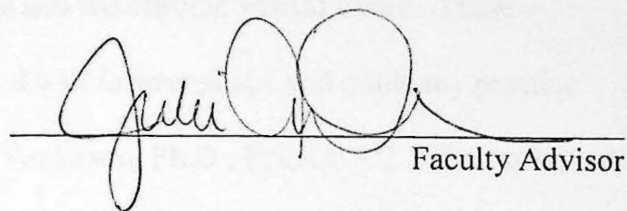
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An Independent Project  
Submitted to the Graduate Faculty  
of the  
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in partial fulfillment of the requirements  
for the degree of Master of Science

Grand Forks, North Dakota  
May 2010



This independent study, submitted by David P. Sundberg in partial fulfillment of the requirements for the Degree of Master of Science from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done and is hereby approved.

  
Faculty Advisor

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## ABSTRACT

It is well known venous insufficiency and venous ulcers affect long term health outcomes. People with recurrent leg ulcers frequently suffer years or decades of decreased quality of life and costly treatments. Current research findings emphasize the importance of compression therapy in healing and preventing venous ulcerations. The purpose of this project is to gain expert knowledge related to the barriers to adherence of compression garments in patients with recurrent venous ulcers and to investigate substantive ways to promote usage. This project identified reasons why patients stop using compression garments once a venous ulcer is healed, leading to a recurrent ulceration and the need for future research.

The theoretical framework used in this project was Dorthea Orem's theory of self-care. This theory examines the practice of activities individuals begin and perform on their own behalf in maintaining life, health, and well being. If individuals are not capable of self-care, the theory accommodates that through total compensation, partial compensation, and educative/supportive actions.

A comprehensive review of the literature and current practice guidelines from a variety of sources helped the author gain expert knowledge in the field of compression therapy in venous insufficiency management. After gaining this knowledge, Poster presentation was presented at the University of North Dakota Graduate Forum. Content of the presentation included review of current practice guidelines, identified barriers to compression therapy in patients with previous healed ulcers, and implications for healthcare practice.

Several nursing implications were identified to advance awareness and health promotion. Broadening healthcare provider's knowledge base in regards to barriers to venous compression has the potential to affect patient education, healthcare policy, practice and research. It also will strengthen the role nurse practitioners play in the healthcare team.

## CHAPTER I

### INTRODUCTION

Venous insufficiency results from dysfunction in the venous system or failure of the calf muscle pump (Valencia, Falabella, Kirsner, Eaglstein, 2001). Chronic venous insufficiency is associated with complications from pain, swelling, skin changes to ulcerations (Meissner, Gloviczki, Bergan, et al., 2007). The clinical presentation of venous insufficiency varies. Focal symptoms include pain, itching, or burning. General symptoms can comprise leg aching, heaviness, swelling, and fatigue. Symptoms are frequently more noticeable at the end of the day, mainly after periods of prolonged standing, and can abate when individuals sit and elevate their legs. Women are more likely than men to report symptoms (Bradbury, Evans, Allan, Lee, Ruckley, Fowkes, 1999). Risk factors for venous insufficiency include chronic cough, constipation, family history of venous disease, female sex, obesity, older age, pregnancy, prolonged standing and occupations associated with orthostasis (Beebe-Dimmer, Pfeifer, Engle, Schottenfeld, 2005).

Venous ulceration is a common problem that is frequently misdiagnosed and not well understood by many clinicians (Carr, 2008). There are an estimated 5 million people in the United States with venous insufficiency and the proportion of individuals with the condition is increasing as the population ages. Of the 5 million, 500,000 will go on to develop a venous ulcer comprising 70% to 90% of all chronic leg ulcers (Hess, 2003).

Treatment goals for venous insufficiency are to reduce pain and edema, to heal venous ulcers and to prevent recurrent ulcers (Valencia et al., 2001). The simplest means to reduce venous insufficiency and its sequelae is bed rest and elevation of the lower extremities, but is often impractical. Compression therapy plays an essential role in the management of venous insufficiency, by reducing pain, edema and prevention of the development of venous ulcers. Compression can correct or improve venous insufficiency resulting in healing and preventing of recurrent venous ulcers (Valencia et al., 2001).

#### Clinical Problem

Chronic venous insufficiency (CVI) is one of the most commonly reported chronic medical conditions and a substantial source of morbidity in the United States and the Western world. The incidence and prevalence of chronic venous insufficiency varies. Prevalence estimates vary widely by geographic location, with the highest reported rates in Western countries. Reports of prevalence of chronic venous insufficiency vary from 1% to 40% in females and from 1% to 17% in males. Prevalence estimates for varicose veins are higher, 1% to 73% in females and 2% to 56% in males. Most of the epidemiological studies have taken place in Europe and very few have been done in the United States (Beebe-Dimmer, et al., 2005).

A cross-sectional study by Criqui, et al. (2003), looked at a multiethnic sample of 2,211 men and women in San Diego, California between 1994 and 1998 and the prevalence of venous insufficiency. It showed prevalence of venous insufficiency at 35% in males and 65% in females. Ethnic prevalence was as follows: a) Non-Hispanic White,



58%; b) Hispanic, 15%; c) African American, 14%; d) Asian, 12%. Of the 5 million people in the United States with venous insufficiency, 500,000 will go on to develop a venous ulcer (Hess, 2003).

Venous ulcers account for 70% to 90% of chronic leg ulcers, and the incidence of these ulcers increases with age. They are often difficult to heal and often recurring (Hess, 2003). Nonadherence to compression garments can result in the recurrence rate as high as 70% and increasing the burden on patients and healthcare resources (Samson & Showalter, 1996). People with recurrent leg ulcers frequently suffer years or decades of chronic ill-health and costly treatments (Finlayson, Edwards, Courtney, 2008). The average direct cost of treatment is \$10,000 and involves on average seven clinic visits which goes up with prolonged healing and recurrence (Hess, 2003). In the United States, treatment costs are \$2.5 to \$3 billion dollars and a loss of 2 million work days per year (McGuckin, 2002).

Compression garments are considered the mainstay for the prevention and treatment of venous ulcers. It is also generally accepted that nonadherence with compression garments adversely affects ulcer healing and recurrence (Moffatt, 2009). Patients who do not adhere to the prescribed compression therapy were at 20 times greater chance for recurrence of a venous ulcer (Nelson, 2006). Nonadherence rates in patients have been seen as high as 80% (McGuckin, 2002).

#### Purpose

The purpose of this project is to gain expert knowledge related to the barriers to adherence of compression garments in patients with venous insufficiency that develop recurrent venous ulcers. This will identify reasons why patients stop using compression

garments once a venous ulcer is healed leading to a recurrent ulceration. This knowledge will be based on the review of current literature and consultation with vascular specialists. The goal of this project is to complete a comprehensive review of the literature in order to address current compression guidelines, identify barriers to compression therapy, and identify implications for healthcare practice. After gaining this knowledge, poster presentation will also be given at the University of North Dakota's Spring 2010 Graduate Forum.

#### Definition of Terms

For the purpose of this project the following terms are defined:

Venous insufficiency: Disorder of the venous system in the lower limbs resulting in venous congestion (Porth, 2005).

Venous ulcer: Skin and subcutaneous lesions resulting from chronic venous hypertension and edema (Baranoski & Ayello, 2008).

Recurrent venous ulcer: A venous ulcer that has healed and reoccurred.

Compression garments: Elastic stockings or bandages to lower extremities used to promote venous return and reduce venous congestion.

Nonadherence: The inconsistent or non use of prescribed or recommended compression garments.

#### Theoretical Framework

Dorthea Orem's theory of Self Care provides the framework for this project. According to Orem (1980), Self Care is the practice of activities that individuals begin

and perform on their own behalf in maintaining life, health, and well being. Self Care is an adult's ongoing involvement to their own continued existence, health and well-being (Orem, 1980).

There are three types of Self Care requisites identified by Orem; universal, developmental, and health-deviation. These requisites are based on three assumptions. People have a common need for the intake of materials and for bringing about and maintain living conditions that support life processes, the formation and maintenance of structural integrity, and the maintenance and promotion of functional integrity. People need to create and maintain the conditions that promote known developmental processes at each period of the life cycle. Defects and deviations from normal structural and functional integrity and wellbeing bring about necessities for their prevention, regulatory action to control their extension, and to control and mitigate their effects (Orem, 1980).

Universal Self Care requisites are common to all people, adjusted to age, developmental state and environmental factors. Developmental Self Care requisites are associated with developmental processes and with conditions and events occurring during various stages of the life cycle and events that can negatively affect development. Health-deviation Self Care is associated with genetic, constitutional, structural, and functional deviations and with their effects and medical diagnosis and treatment (Orem, 1980). Prevention of the recurrence of venous stasis ulcers is a secondary level of health promotion. Orem states that health-deviation self care includes practices from this level. This includes periodic health examinations, and accurate observation of signs and symptoms. The application and adherence to venous compression garments is also a secondary health promotion in patients with venous stasis. Health care requirements are



met when the effects of the disease are kept under control and the causative agents of the disease is prevented. Health deviations may also bring on feeling of illness, or not being able to function normally. These feelings, whether related to the health deviation, will influence what the person may choose to do. By utilizing Orem's theory in this project, the author and healthcare professionals will develop a better understanding of the contributing factors to nonadherence to compression garments.

#### Assumptions

This project has assumptions on the topic of nonadherence to compression garments, they include the following:

1. Several patients who are prescribed compression garments do not wear them.
2. Healthcare professionals are interested in information on compression therapy and can help increase their use.
3. Healthcare professionals will understand the importance of compression and the effects they have on preventing ulcer recurrence.
4. After this project, healthcare professionals will be skilled in identifying patients who would benefit from compression garments.

#### Limitations

The limitations of this project include the following:

1. This project is not intended to measure the number of patients who benefit from compression garments.
2. This project is not intended to measure outcomes of compression therapy.
3. This project is not intended to advance the technology of compression garments.

## Summary

It has been well documented the benefits of lifelong compression therapy in healing, prevention and reducing the recurrence of venous ulcers. However, a large percentage of patients do not comply with compression garments prescriptions or therapy after their ulcer has healed resulting in recurrence. This not only is costly in terms of patient health but also healthcare dollars. Thus, it is important to inform healthcare providers to the potential causal reasons for nonadherence to venous compression garments and the consequences for future health.

## CHAPTER II

### LITERATURE REVIEW

Chronic venous insufficiency is one of the most commonly reported chronic medical condition. This condition is a result of a pathological process in the venous system (Beebe-Dimmer, et al., 2005). This chapter will explore the physiology behind this disease process along with research on compression and adherence.

#### Venous System

The venous system of the lower extremities can be broken down into three main parts a) the superficial compartment, b) the perforating veins, and c) the deep compartment. Blood flow in the venous system leads from superficial to deep through the perforating system, which connects the superficial veins of the leg to the deep veins. Within the deep system, the flow proceeds back towards the heart from the legs via the popliteal vein, femoral or deep femoral vein toward the common femoral vein, the external iliac vein, and the common iliac vein toward the inferior vena cava on its return to the right side of the heart (Deatruck, 2010). The major agents of this action are the muscles of the calf, which can generate pressures of up to 300 mmHg. To maintain the blood flows in the proper direction, the veins contain one-way valves, which prevent backflow during this sequence of compression. Failure of valves to close and efficiently direct the flow of blood to the deep and central venous systems leads to venous insufficiency, or pooling, stasis, and congestion of the veins in the lower extremities leading to distension of the superficial veins (Valencia et al., 2001).



Chronic Venous insufficiency is associated with a wide clinical range of problems from cosmetic varicose veins, to severe symptoms including edema and ulcerations (Meissner, Gloveczki, Bergan et al., 2007). Five million people in the United States are estimated to have venous insufficiency and this number of people is steadily increasing as the population continues to age. Of these 5 million, 500,000 will go on to develop a venous ulcer comprising 70% to 90% of all chronic leg ulcers (Hess, 2003).

Compression garments such as bandages or hosiery are often applied for ulcer prevention (Nelson, Syer, & Cullum, 2000). Compression is considered the "Gold Standard" in venous insufficiency management.

#### Venous Compression

The principle of compression relies on external pressure applied to the calf muscle, which raises the interstitial pressure, decreases the superficial venous pressure, and improves venous blood return. The decrease of venous hypertension means a more regular physiological exchange between the tissue and circulation system can take place. (London & Donnelly, 2000). Venous compression leads to decrease in inflammatory cytokine levels. Increased inflammatory cytokine levels can result in venous ulcerations and prolong healing (Wlaschek & Scharffetter-Kochanek, 2005). Beidler, Douittel, Berndt, et al. (2009) performed a study with thirty limbs with venous insufficiency and venous ulcers. Treatment included compression wraps for 4 weeks. Tissue biopsies were obtained pre and post treatment. The authors found with compression therapy, lower levels of pro-inflammatory cytokines and high levels of anti-inflammatory cytokines which promoted wound healing.

## Contraindications for Venous Compression

Compression is contraindicated in the event of severe peripheral artery disease when the ankle-brachial pressure index (ABI) measured by Doppler is less than 0.6. Compression, using a high level of pressure, is contraindicated in the event of an ABI less than 0.8. Compressing an extremity with an ABI less than 0.8 can lead to tissue ischemia and necrosis. Another contraindication to compression therapy is patients with cardiogenic edema caused by heart failure as this can cause worsening cardiogenic edema. Close medical monitoring is required with patients with diabetic microangiopathy as compression can cause tissue ischemia and necrosis (Maylor, 2001). Other contraindications include severe skin infections and allergies to textile materials (Hirsch, Haskal, & Hertzner, 2006).

## Venous Compression Research

A 2009 systematic review of randomized controlled trials (RCT) of the clinical effectiveness of compression bandages or stocking systems in the treatment of venous leg ulcerations was performed by O'meara, Cullum, and Nelson, (2009). Thirty-nine (39) randomized controlled trials were included in this meta-analysis. One arm of the review examined six trials evaluating any form of compression bandage or compression stockings in patients with venous leg ulcers. Comparators included no compression. The authors concluded compression therapy increases ulcer healing rates when compared to no compression and should be considered the cornerstone to therapy. In one trial, the recurrence rate in non adherent patients was 32% compared to 19% in adherent patients after 3 to 5 years of follow up.



## Venous Ulcer Prevention Guidelines

The Wound, Ostomy, and Continence Nurses Society (WOCN) is an organization founded in established in 1968. They are a professional, international nursing society consisting of more than 4,200 healthcare professionals who are experts in the care of patients with ostomy, incontinence and wounds, which include venous ulcers (Wound, Ostomy & Continence Nurses Society, 2007). In 2005, they developed the *Guideline for management of wounds in patients with lower-extremity venous disease* and it continues to be the current guideline (National Guideline Clearinghouse, 2009). There evidenced based recommendations for the prevention of venous ulcers include improved calf muscle strengthening and compression therapy (WOCN, 2005).

### Compliance and Adherence

Compliance has been studied since the 1950's; however, there is no agreed upon definition for compliance and is often used interchangeably with adherence or concordance. Compliance has been studied from a wide range of scientific perspectives, including medicine, nursing, psychology and health economics (Kyngas, Duffy, & Kroll, 2000). In 1976, Sackett defined compliance as "the extent to which a person's behavior coincides with medical or health advice". This definition is not well accepted because it infers that the patient has little or no part in the decision making process regarding their healthcare. Merriam-Webster, (2009), defines adherence as "steady or faithful attachment." According to Moore (1995), adherence is intended to be less disparaging than compliance. It is crucial that healthcare providers who work on the same team, including the patient, agree on the meaning of compliance and the behaviors expected of the patient (Kyngas et al., 2000). Healthcare providers should also be aware of factors

that are associated with compliance and this may need to be determined individually. Healthcare providers must focus on to the quality of interactions between patients and themselves and to get to know patients and their life-styles. If patients can implement health care regimens as a regular part of their lifestyle, this will promote compliance (Kyngas et al., 2000). Healthcare providers should recognize that compliance is only one element of an individual's life among other needs, personal priorities and social roles. Treatment plans should be adjusted to patients' normal life styles as much as possible in order to improve adherence. Compliance is a critical subject in nursing and needed for good self-care (Kyngas et al., 2000).

#### Preventing Venous Ulcer Recurrence Research

Nelson, Bell-Syer, and Cullum (2000) performed a systematic review of RCTs evaluating compression bandages or hosiery for the prevention of venous ulcers. They could not identify any trials that compared recurrence rates of venous ulcers versus without compression. They identified two trials, involving 466 patients with healed venous ulcers. They found ulcer recurrence was strongly associated with not wearing compression hosiery. One study identified lower ulcer recurrence with higher compression. They also found higher compliance rate to medium compression than with high compression. There is no discussion on what reason was given for the non adherence to the higher compression. They concluded patients should be offered the highest compression they will adhere with (Nelson, Bell-Syer, & Cullum, 2000).

There is currently a RCT recruiting subjects called *Legtest Multi Centre Testing of the Lively Legs Program for Promoting Compliance in Leg Ulcer Patients* (National Institutes of Health, NIH, 2009). The purpose of this study is to identify the program

effects with compliance with compression therapy and exercise levels, time to leg ulcer recurrence, and cost effectiveness from a social perspective. This study is being conducted in the Netherlands and expected to have approximately 380 patients with venous ulcers.

Nelson, Harper, Prescott, et al. (2006) conducted a RCT of 300 patients with newly healed venous leg ulcers over a two year period. The median age in this study was 64 years with 125 males and 175 women. They found patients with higher levels of compression were more likely to be non adherent (42%) compared to patients with moderate levels of compression (28%). A limitation to this trial is it did not have any valid methods for assessing adherence with compression therapy.

A qualitative study by Flanagan, Rotchell, Fletcher, and Schofield (2001) looked at what community nurses and patients with healed venous leg ulcers attributed to leg ulcer recurrence in the United Kingdom. This study included 15 district nurses, 15 social service health carers, and 12 patients. The nurses reported health promotion activities as a method of reducing leg ulcer recurrence as ineffective. They also reported that nurses believed the compression stockings were too hard to put on, and the patients were reluctant to make the necessary lifestyle changes. They also stated time and staffing constraints also made it difficult to provide the necessary care. Patients reported that the nurses were blaming them for recurrence of their ulcer. They also cite inconsistent information about health promotion being given regarding the importance of venous compression. They conclude more awareness in health promotion by the healthcare team and improved understanding of the connection between motivation provided by healthcare team and patient adherence is required (Flanagan et al., 2001).



## Barriers to Adherence

A study by Raju, Hollis, and Neglen (2007) focused on the use, adherence, and efficacy of compression stockings. It involved 3,133 patients with chronic venous disease that were followed from 1998 to 2006. Only 21% of the patients reported using the stockings on a daily basis and only 12% used them most days, and 4% admitted using them less often. The remaining 63% admitted to not using the stockings at all. The reasons given for not using the stockings are as follows: a) unable to specify a reason, 30%; b) not prescribed by the primary physician, 25%; c) they did not help, 14%; d) binding/"cutting off of circulation", 13%; e) "too hot" to wear, 8%; f) limb soreness, 2%; g) poor cosmetic appearance, 2%; h) unable to apply without help, 2%; i) contact dermatitis or itching, 2%; and j) cost and work situation, 2%. They did not see any difference in adherence between gender or age groups (Raju et al., 2007). Although there was adequate sample size, all patients were from the same regional tertiary center.

One study identified was the *Study of Individualized Wound Prevention Instruction to Prevent Venous Ulcer Development* conducted in Seattle Washington. The purpose of this study was to "determine whether individualized wound prevention instructions will lengthen the ulcer-free period in veterans with recently healed venous ulcers" (NIH, 2009). However, due to delays for over a year by research shutdown at Seattle Veterans Affairs and the study designer leaving the study, it was terminated (NIH, 2009). The primary outcome of this research study would have been if wound aftercare including self-care instructions for venous ulcer prevention increase the ulcer free period. Secondary outcomes would be if there was a change in quality of life, satisfaction with care, and adherence with self-management goals.

A study using a decision analysis model by Korn, Patel, Heller, et al. (2002), looked at the cost comparison of prophylactic treatment of venous ulcers with compression garments compared to costs accumulated with the treatment of the ulcers themselves and subsequent sequelae. They found a lifetime savings of \$5,904 could be achieved by providing compression garments prophylactically to patients with venous disease when providing two sets of garments every six months. They also found a savings of \$22,412 to \$39,496 in lifetime costs related to lost days of employment when compression garments are provided prophylactically on a six month basis. The authors stated that insurance companies should cover the cost of compression garments as it is more cost effective than the treatment of sequelae they currently will cover (Korn et al., 2002). A limitation to this study is there is an assumption that cost and reimbursement is the only reason for nonadherence with compression therapy. Another limitation is the assumption the compression garments retain their compression benefits for six months before need to be replaced. It is possible that compression garments may need to be replaced at even sooner intervals to insure adequate delivery of compression is maintained.

Jull, Mitchell, Arroll, et al. (2004) studied 129 patients with a mean age of 75 years to identify the factors influencing patient adherence with compression stockings after venous leg ulcer healing. They administered a questionnaire with 55 questions that included details of compression stockings both current and in the first six months following healing of a previous ulcer. They identified two factors that influenced patients' adherence to compression stockings. The first is the belief compression stockings prevent reoccurrence which increases the probability the patients will wear

them. The second is the belief compression stockings are uncomfortable which decreases the probability the patient will wear them. The study also identified patients that were concerned about cost are more willing to wear the compression garments compared to patients that felt cost was no concern. There was no relationship found between age, sex, difficulty in applying stockings, and cosmetic appearance related to stocking use. The authors suggest providers try to increase the perceived value of compression garments and will lead to increased adherence. Limitations to this study include a lower response rate as participants choosing not to participate may not be adherent to compression therapy. Another limitation is the findings were derived from self-reporting data based on recall from the participants that may be inaccurate (Jull et al., 2004).

A retrospective study by Poore, Cameron, and Cherry (2002) reviewed 110 patient charts for patients who had attended an ulcer clinic. The authors found that difficulty applying compression stockings was a major contributor to nonadherence. Patient responses also included that the stockings were "too hot" to wear during the summer and the appearance of the compression garments were cosmetically dissatisfying. The authors recommended that patient education insure a good patient understanding on chronic venous disease and appropriate skin care. Regular examination and aftercare should be made by healthcare providers to make sure socks are fitting well (Poore et al., 2002).

#### Treatment

There are several health promotion strategies for the prevention of venous ulcerations in patients with venous insufficiency. The main strategies are compression, good exercise to improve calf muscle pump function, and intermittent elevation of the



lower extremities (Deatrick, 2010). Compression stockings, as previously discussed, is the cornerstone of health promotion strategies. Applying them first thing in the morning before getting out of bed is recommended (Raju et al., 2007). Calf muscle pump function can be maintained or improved with walking and other lower leg exercises (Deatrick, 2010). Intermittent elevation of the lower legs above the level of the heart can improved the symptoms of venous insufficiency (Valencia et al., 2001).

### Summary

Venous insufficiency is the result of damage of the valves and calf pump muscle, resulting in the blood flowing back and pooling in the veins (Porth, 2005). A number of studies have identified the benefit of compression therapy and compression garments in healing, and preventing the reoccurrence of venous stasis ulcers (O'meara, Cullum, & Nelson, 2009; Nelson, Syer, & Cullum, 2000; Moffatt, 2009). An understanding that adherence by patients is multifactorial and treatment plans should be tailored to the individual. There are a limited number of studies that have examined the barriers to lifelong compression therapy adherence in patients with healed ulcers. Barriers identified are lack of patient education or understanding of disease process, medical providers not prescribing compression stockings, comfort and appearance issues, difficulty applying, cost and lack of aftercare. There is even a lack of belief compression therapy is effective by some healthcare providers (Flanagan et al., 2001). It is imperative for healthcare providers to assess their patients' need for compression therapy and identify potential barriers patients may have.

## CHAPTER III

### METHODS

The understanding of compression therapy adherence and its effects on venous stasis reoccurrence is a mounting topic. As the incidence and prevalence of chronic venous disease continues to grow, it is compelling healthcare providers to examine the dynamics of compression therapy adherence and outcomes. Compression stockings play a vital role in the healing of venous ulcers and the prevention of reoccurrence. Current guidelines recommend compression therapy as a “gold standard” to venous insufficiency and ulceration.

The purpose of this project is to gain expert knowledge related to the barriers to adherence of compression garments in patients with recurrent venous ulcers. This will aide in identifying reasons why patients stop using compression garments once a venous ulcer is healed leading to a recurrent ulceration. This knowledge will be based on the review of current literature and consultation with vascular specialists. As a result, there will be an increased awareness regarding the causes for nonadherence to compression therapy after a venous ulcer has healed.

#### Target Audience

The target audience of this project was healthcare providers who care for patients with venous insufficiency. This project was focused specifically to build awareness among healthcare providers in a small Midwest chronic wound clinic. The targeted



audience included a vascular specialist, nurse practitioners, and nursing staff within the chronic wound clinic. This audience was selected because of proximity to the author of this project and is the only chronic wound clinic in this region of the state.

#### Study Procedures

A literature review was conducted in December 2009 using the electronic databases: PubMed, CINAHL, ScienceDirect, Cochrane Database, National Institutes of Health, and National Guideline Clearinghouse. Key words utilized were: recurrent, venous, ulcer, compliance, adherence, concordance, barriers, and insufficiency. Further articles were identified from bibliographies and obtained. Articles written in languages other than English were excluded. Full text articles were obtained electronically through databases or Interlibrary Loan through the University of North Dakota. Research studies were included from the last 10 years.

The topic of nonadherence to venous compression garments in patients with recurrent venous ulcers was raised by the author of this project while observing patients in a chronic wound clinic in northeastern North Dakota. These observations were obtained from clinical experience during the course of the Family Nurse Practitioner specialization from the University of North Dakota. The author's clinical preceptor was a Family Nurse Practitioner with chronic wound care specialization. During the course of the clinical experiences it was noted numerous patients were referred to the chronic wound clinic because of recurrent venous stasis ulcers and not currently using compression therapy that had been previously prescribed. Neither my preceptor nor the vascular specialist knew of any definitive knowledge of what leads to nonadherence.

## Results of the Project

The anticipated outcome of this project was to promote awareness of the reasons for nonadherence to venous compression garments in patients with recurrent venous ulcers among healthcare professionals caring for patients with venous insufficiency. It is anticipated following this poster presentation, the target audience would have an increased awareness of the importance of identifying potential barriers to compression garments. With this knowledge they will have insight when evaluating and prescribing compression therapy in patients with venous insufficiency that will potentially increase adherence.

A presentation on the identified barriers to nonadherence to venous compression in patients with healed venous ulcers was planned to be held at the chronic wound clinic. The content was designed to include discussing the findings from the literature review, and the implications for nursing. An evaluation form was developed and included questions required by the institution (See Appendix A). The presentation was not held due to unanticipated constraints within the organization. A facility wide implementation of an electronic health record competed with the availability of the wound clinic staff. However, several discussion topics from this presentation were held informally with the wound care staff. This included a physician with a vascular specialty, two nurse practitioners with chronic wound specialization, and nursing staff. Topics included discussion about identified barriers to compression garments and implications for practice.

The poster presentation entitled, "Nonadherence to Venous Compression Garments in Patients with Recurrent Venous Ulcers", was developed based on a comprehensive review of the literature (See Appendix B). It defined venous insufficiency, results of venous stasis, nonadherence, and compression therapy. Identified causes of venous ulcer reoccurrence were discussed as well. Current venous insufficiency guidelines were reviewed. This presentation was presented in the form of a poster display at the University of North Dakota Graduate Forum.

#### SUMMARY

Review of current literature lead to the author gaining expert knowledge with compression garments and reasons for nonadherence. A presentation was planned to be presented at a chronic wound clinic; however, was not held due to facility constraints. Informal discussion was held with wound care staff. A poster presentation was presented at the University of North Dakota Graduate Form were results of this project were discussed.



## CHAPTER IV

### DISCUSSION

Compression therapy is an important concept when working with venous insufficiency and venous ulcers. With 5 million people in the United States confronted with venous insufficiency and ulcerations, it is important that health care professionals to be knowledgeable about compression garments and barriers that keep patients from using them (Carr, 2003). This chapter discusses the theoretical framework and implications for nursing practice.

#### Theoretical Framework

Dorthea Orem's theory of Self Care provided the framework for this project. Self Care is an adult's ongoing involvement to their own continued existence, health and well being. Self Care is the practice of activities that individuals begin and perform on their own behalf in maintaining life, health, and well being (Orem, 1980). I believe this project utilizes her framework by recognizing that patients to have health-deviation self-care requisites that need to be addressed. People have a universal need for the intake of materials and for bringing about and maintain living conditions which support life processes, the formation and maintenance of structural integrity, and the maintenance and promotion of functional integrity. Defects and deviations from normal structural and functional integrity and wellbeing bring about provisions for their prevention, regulatory action to control their extension, and to control and mitigate their effects (Orem, 1980). Health-deviation Self Care is associated with genetic, constitutional, structural, and functional deviations and with their effects and medical diagnosis and treatment (Orem,

1980). By utilizing Orem's theory in this project, the author and through the author, healthcare professionals developed a better understanding of the contributing factors to nonadherence to compression garments.

#### Implications for Nursing

The responsibility of the nurse practitioner in the healthcare arena is to care for people with primary, secondary, and tertiary prevention and health promotion (Pender, Murdaugh & Parsons, 2006). The nurse practitioner's scope of practice in prevention allows them to educate patients on actions that can be taken to prevent illness and promote a healthier lifestyle. By doing this, a patient's knowledge will be expanded and can allow them to achieve improved health through self-care.

#### Practice

The practice roles nurse practitioners hold include assessing, diagnosing, planning, implementing, and evaluating (Pender et al., 2006). Expanding their knowledge in understanding in nonadherence to compression therapy, will strengthen the role the nurse practitioner plays on the healthcare team and will solidify the education they bring with them to practice. Nurse practitioners can play a vital role in health promotion among men and women with venous insufficiency. The intent of this project was to increase the knowledge about barriers to compression therapy in patients with recurrent venous ulcers. As a result, nurse practitioners and other healthcare providers should counsel and provide patients with up to date guidelines regarding compression therapy in addition to assessing the patient's needs and understanding of illness. This would include early assessment and diagnosis of venous insufficiency, selecting the most appropriate compression garment and scheduled follow up to help with adherence.

## Research

While there are vast amounts of information regarding venous ulcerations, venous compression and venous insufficiency, there is limited research in regards to the reasons for nonadherence to compression therapy in patients with recurrent ulcers with even less being conducted in the United States. More research will need to be conducted in regards to barriers to compression therapy that leads to nonadherence. The review of the literature in this project may cause participants and readers to examine more closely reasons or potential reasons for nonadherence of compression garments in their patients. It may also lead to further research with patient's perceptions of adherence and benefits of compression garments.

## Education

Increased awareness and promotion of compression garments is key to the prevention of recurrent venous ulcers. Increased understanding will also provide healthcare providers with the means of promoting optimal health in patients with venous insufficiency. By having knowledge of venous insufficiency and barriers to compression, providers can help provide information and motivation to their patient's. Educating patients on the pathology and sequelae of venous insufficiency and venous ulcers along with the benefits of compression therapy is vital. Determining the patient understanding and ability will help with the selection of the most appropriate compression garment the patient is able to adhere to. This information then, in turn, can help patients make informed decisions about compression garments and will improve self care.



## Policy

An understanding in costs and insurance coverage is important with chronic venous disease. The knowledge why patients are not complying with treatment regimens resulting from no insurance coverage or cannot afford is important (Korn et al., 2002). Evidence on cost of preventative measures such as compression garments should be presented to insurance companies and Medicare agencies to insure patients compression garments are covered as it is far more expensive treating venous ulcers and their sequelae.

Providers having a good understanding of venous disease and barriers to compression therapy can lead to the adoption of institutional policies regarding treatment pathways. Institutional adoption of the Wound, Ostomy, and Continence Nurses Society's guidelines could allow all patients with venous disease access to current treatment options and products. This could also lead to less fragmented care.

## Summary

This project has the potential to have an effect on practice, education, policy, and research. With the identification of barriers to adherence to compression therapy in patients with recurrent venous ulcers, patients and healthcare providers will broaden their outlook on prevention and improve patient self-care. This knowledge may help to decrease the incidence of recurrent venous ulcers and help in the prevention of sequelae, and as a result, decrease the burden on healthcare assets, lost work days and financial resources. It would be beneficial for health care providers who see this patient population to be informed of the potential reasons for nonadherence to compression

garments. This will help them explore these issues on an individual level with each patient and develop a strategies that will improve adherence and decrease the health burden.



## References

- Baranoski, S., Ayello, E. (2008). *Wound care essentials: Practice principles*. (2<sup>nd</sup> ed.). Philadelphia; Lippincott, Williams, and Wilkins.
- Beebe-Dimmer, J. L., Pfeifer J. R., Engle J. S., Schottenfeld D.(2005). The epidemiology of chronic venous insufficiency and varicose veins. *Annals of Epidemiology*, 15(3), 175-184. Retrieved from PubMed database.
- Beidler, S.K., Douillet, C.D., Berndt, D.F., Keagy, B.A., Rich, P.B., Marston, W.A. (2009). Inflammatory cytokine levels in chronic venous insufficiency ulcer tissue before and after compression therapy. *Journal of Vascular Surgery*. April;49(4): 1013-1020. doi:10.1016/j.jvs.2008.11.049
- Bradbury A, Evans C, Allan P, Lee A, Ruckley C. V., Fowkes F. (1999). What are the symptoms of varicose veins? Edinburgh vein study cross sectional population survey. *British Medical Journal*, 318(7180):353-356. Retrieved December 14, 2009 from PubMed database.
- Carr, S. (2008). Diagnosis and management of venous ulcers. *Perspectives in Vascular Surgery and Endovascular Therapy*. March; 20(1):82-85. doi: 10.1177/1531003507313218
- Criqui, M.H., Jamosmos, M., Fronek, A., Denenberg, J.O., Langer, R.D., Bergan, J., Bolobm, B.A. (2003). Chronic venous disease in an ethnically diverse population: The san diego population study. *American Journal of Epidemiology*, 158(5), 448-456. doi: 10.1093/aje/kwg166

- Deatrick, K.B., Wakefield, T.W., Henke, P.K. (2010). Chronic venous insufficiency: Current management of varicose vein disease. *The American Surgeon*, February, 76: 125-132. Retrieved from PubMed Database.
- Finlayson, K., Edwards, H., Courtney, M. (2008). Factors associated with recurrence of venous leg ulcers: A survey and retrospective chart review. *International Journal of Nursing Studies*, 46, 1071-1078. doi:10.1016/j.ijnurstu.2008.12.012
- Flanagan, M., Rotchell, L., Fletcher, J., Scholfield, J. (2001). Community nurses', home carers', and patients' perceptions of factors affecting venous leg ulcer recurrence and management of services. *Journal of Nursing Management*. 9;153-59. Retrieved from PubMed Database.
- Hess, C.T. (2003). Managing a patient with a venous ulcer. *Nursing*, 33(4), 73-74. Retrieved from CINAHL database.
- Hirsch, A., Haskal, Z., Hertzner, N., (2006). ACC/AHA 2005 Practice Guidelines for the management of patients with peripheral arterial disease. *Circulation*; 113:e463. Retrieved from PubMed Database.
- Jull, A., Mitchell, N., Arroll, J., Waters, J., Latta, A., Walker, N. (2004). Factors influencing concordance with compression stockings after venous leg ulcer healing. *Journal of Wound Care*. March. 13:3;90-92.
- Korn, P., Patel, S. T., Heller, J. A., Deitch, J. S., Krishnasastry, K. V., Bush, H. L., Kent, K. C. (2002). Why insurers should reimburse for compression stockings in patients with chronic venous stasis. *Journal of Vascular Surgery*, 38(8), 950-57. Retrieved from PubMed database.

- Kyngas, H., Duffy, M. E., Kroll, T. (2000). Conceptual analysis of compliance. *Journal of Clinical Nursing*, 9, 5-12. Retrieved December 16, 2009 from CINHALL database.
- London, N.J., Donnelly, R. (2000). ABC of arterial and venous disease: Ulcerated lower limb. *British Medical Journal*. 320(7249): 1589-91. Retrieved from PubMed Database
- Maylor, M.E. (2001). Accurate selection of compression and antiembolic hosiery. *British Journal of Nursing*, 10(18), 1172-1184. Retrieved from PubMed Database.
- McGuckin, M., Waterman, R., Brooks, J., Cherry, G., Porten, L., Hurley S., Mernstein, M.D. (2002). Validation fo venous leg ulcer guidelines in the united states and united kingdom. *The American Journal of Surgery*, 183: 132-137. Retrieved from PubMed Database.
- Meissner, M.H., Gloviczki, P., Bergan, J., Kistner, R.L., Morrison, N., Pannier, F., Pappas, P.J., Rabe, E., Raju, S., Villavicencio, J.L. (2007). Primary chronic venous disorders. *Journal of Vascular Surgery*; 46:suppl:54S67S.  
doi:10.1016/j.jvs.2007.08.038
- Merriam-Webster. (2009). Adherence. Retrieved from: <http://www.merriam-webster.com/>
- Moffatt, C., Kommala, D., Dourdin, N., Choe, Y. (2009). Venous leg ulcers: Patient concordance with compression therapy and its impact on healing and prevention of recurrence. *International Wound Journal*, 6(5), 386-393.
- Moore K.N. (1995) Compliance or collaboration: The meaning for patients. *Nursing Ethics* February;(2), 71-77. Retrieved from PubMed Database.



National Guideline Clearinghouse. (2009). Guideline for management of wounds in patients with lower-extremity venous disease. Retrieved from:  
[www.guideline.gov](http://www.guideline.gov)

National Institutes of Health. (2009). Legtest multi centre testing of the lively legs program for promoting compliance in leg ulcer patients. Retrieved from:  
<http://clinicaltrials.gov/ct2/home>

National Institutes of Health. (2009). Study of individualized wound prevention instruction to prevent venous ulcer development. Retrieved from:  
<http://clinicaltrials.gov/ct2/home>

Nelson EA, Bell-Syer SEM, Cullum NA. Compression for preventing recurrence of venous ulcers. *Cochrane Database of Systematic Reviews* 2000, Issue 4. Art. No.: CD002303. DOI:10.1002/14651858.CD002303. Cited per Author's instructions.

Nelson, E.A., Harper, D.R., Prescott, R.J., Gibson, B., Brown, D., Ruckley C.V. (2006). Prevention of recurrence of venous ulceration: Randomized controlled trial of class 2 and class 3 elastic compression. *Journal of Vascular Surgery*, 44, 803-808.  
doi:10.1016/j.jvs.2006.05.051

O'Meara S, Cullum NA, Nelson EA. Compression for venous leg ulcers. *Cochrane Database of Systematic Reviews* 2009, Issue 1. Art. No.: CD000265. DOI:  
10.1002/14651858.CD000265.pub2. Cited per Author's instructions.

Orem, D. (1980). *Nursing: Concepts of practice*. (2<sup>nd</sup> ed.). New York: McGraw-Hill.



- Pender, J.N., Murdaugh, C.L., Parsons, M.A. (2006). Health promotion in nursing practice. (5<sup>th</sup> ed.). New Jersey: Prentice Hall.
- Poore, S., Cameron, J., Cherry, G. (2002). Venous leg ulcer recurrence: Prevention and healing. *Journal of Wound Care*. May. 11;5:197-200.
- Porth, C. (2005). Pathophysiology: Concepts of altered health states. (7<sup>th</sup> ed.). Philadelphia; Lippincott Williams and Wilkins.
- Raju, S., Hollis, K., Neglen, P. (2007). Use of compression stockings in chronic venous disease: Patient compliance and efficacy. *Annals of Vascular Surgery*. November; 21:790-795. Retrieved from PubMed Database.
- Sackett D.L. (1976) Introduction and the magnitude of compliance and noncompliance. In: Compliance with Therapeutic Regimens (Sackett D.L. & Haynes R.B., eds), The Johns Hopkins University Press, Baltimore, MD, 1-25.
- Samson, R. H., Showalter, D. P. (1996). Stockings and the prevention of recurrent venous ulcers. *American Society for Dermatologic Surgery*, 22(4), 373-6. Retrieved from PubMed database.
- Valencia, I. C., Falaella, A., Kirsner, R.S., Eaglstein, W. H. (2001). Chronic Venous insufficiency and venous leg ulceration. *Journal of the American Academy of Dermatology*. 44:401-21. doi:10.1067/mjd.2001.111633
- Wlaschek M, Scharffetter-Kochanek K. (2005). Oxidative stress in chronic venous leg ulcers. *Wound Repair Regen*, 13:452-61. Retrieved from PubMed Database.
- Wound, Ostomy, and Continence Nurses Society. (2007). Retrieved from:  
<http://www.wocn.org/>

Wound, Ostomy, and Continence Nurses Society (WOCN).(2005). Guideline for management of wounds in patients with lower-extremity venous disease. *Wound, Ostomy, and Continence Nurses Society*, 42 p. WOCN clinical practice guideline; Number 4.