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DEVELOPMENT OF A BROCHURE ON FOOT CARE FOR
THE DIABETIC CLIENT

Scholarly Project for the Degree of M. S. N.

MICHIGAN STATE UNIVERSITY

LEVONE McCULLOUGH

1998

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Development Of A Brochure On Foot Care For The Diabetic Client

Levone McCullough

Scholarly Project

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DEDICATED TO MY BELOVED BROTHER

IVORY MCCULLOUGH

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Abstract

Development Of A Brochure On Foot Care For The Diabetic Client

By

Levone McCullough

Disabling foot problems are often associated with diabetes and its progression. Of the 16 million diabetic persons in this country, about 25% will develop a severe foot or leg problem during their lifetime. Diabetics are 15 times more likely than non-diabetics to develop gangrene of the extremities. About 50% of all nontraumatic amputations occur in diabetics, accounting for about 120,000 amputation yearly. About 20% of hospitalizations for diabetes are due to foot infections, which account for more in-hospital days than any other complications of the disease. Since amputation is so devastating, preventive self-care is crucial. The Advanced Practice Nurses (APN) are in a particularly excellent position to give the diabetic client special consideration to the care of the extremities. Education about proper foot care can help prevent serious diabetic foot complications and assist in early detection of problems. Approximately 85% of diabetes care in the United States are being provided in the primary care settings. Therefore, the APN's, because of their practice within the healthcare system can play a key role in the educational process in the care of the diabetic foot. The purpose of this scholarly project is to develop an educational brochure for the diabetic clients to enhance their self-care skills in the assessment and management of foot-care in a primary care setting. This brochure will provide preventive behaviors for client self-care stressing primary preventive and early detection. The theoretical framework of Orem (1995) Self-Care Deficit Nursing Theory (SCDNT) and literature review guided the development of this educational tool. The expected outcome is that the client will have an increased awareness of self-care in diabetic foot-care.

Introduction

Background Of The Problem

Diabetes is a serious chronic disease that affects the body's ability to produce or respond to insulin, a hormone that allows blood glucose to enter the cells of the body and generate the body's energy. There are two major types of diabetes: insulin-dependent, also known as type 1 diabetes and non-insulin dependent or type 2 diabetes. Type 2 is more prevalent in adults over 45, accounting for 90 to 95 percent of all diagnosed cases of diabetes (Gavin, 199).

Approximately 16 million Americans have diabetes (Bash, Ledda, & Walker, 199). People with diabetes are at risk for chronic complications of the disease affecting the heart, kidneys, eyes, nervous system, and lower extremities. Diabetes related foot complications can results in amputation of the lower extremities and cause personal tragedy (Bodzin, 1997; Boyko, Reiber, & Smith, 1995; National Institutes of Health [NIH], 1995). More than 25 percent will develop some type of severe foot or leg problem during their lifetime. Nearly, 5 percent to 25 percent of people with diabetes will lose a foot or leg. The seriousness of the situation can be shown by the fact that two third of all amputation, not resulting from accident or trauma, happens to diabetics, resulting in about 120,000 amputation yearly. In addition, the direct health care cost is beyond forty five billion dollars annually (NIH,1995). With an additional cost of approximately forty seven billion dollars credit to diabetes indirectly through disability, work loss, and premature mortality (NIH, 1995). About 20 percent of all hospitalizations for those suffering from diabetes are due to foot infections, resulting in more hospital days than for any other complication of the disease (Basch, Ledda, & Walker, 1997). Amputation statistics reveal diabetes mellitus to be one of the leading causes of limb loss in the western world (American Diabetes Association [ADA], 1996). These alarming statistics, encouraged the U.S. Department of Health to set a goal for the year 2000 of a 40 percent reduction in amputation rates among diabetic clients (Department of Health & Human Services, 1991).

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Primary care settings are responsible for providing approximately 85 percent of diabetes care in the United States. However, because of the changing health care system structure clients are given 15 minutes or less per visit. This frequent practice does not allow the health care provider adequate time for routine assessment of their diabetic client's feet, unless it's their present health deviation. Therefore, the urgency to educate the client and their caregivers on foot-care, can contribute to the reduction in diabetic foot problems (Hunt, 1995).

Studies have shown that proper foot care can reduce the vast number and severity of diabetic foot problems. Proper foot care requires daily care and maintenance and can be effectively implemented with the necessary knowledge, attitudes, and preventive care skills. Educating clients with diabetes to care for their feet is recognized as a key to the prevention and early detection of podiatric problems resulting in lower-extremity amputation as well as a decrease in the overall disease related morbidity and mortality (ADA, 1993; Brown, 1991; Christensen et al., 1991; Healthy People 2000, 1990; Litselman, Langefeld, & Siemenda, 1993). Preserving the mobility of client with diabetes has always been a challenge. The APN is able to make an enormous difference in improving outcomes and reducing the cost of diabetes care, through early assessment and appropriate educational interventions (Hunt, 1995).

Purpose Of The Project

The purpose of this scholarly project is to develop an educational brochure for the diabetic client to enhance his/her self-care skills in the assessment and management of foot-care in a primary care setting. Providing foot-care education for low/or high risk diabetic clients reduces the incidence of foot ulcers (ADA , 1993; Edmonds et al., 1986). Therefore, the client and their caregivers need to learn the importance of self-assessment . It is a skill that every such client must learn as his/her best defense against one of the most serious and costly complications of diabetes, which is amputation. The ultimate aim of this project is to provide guidelines for client's self-assessment for the prevention of potential foot problems and early detection.

Literature Review

The literature reviewed included the diabetic foot and diabetic self-care education, focusing on early prevention, detection, and the need for self-care education.

Diabetic foot

The goal of this literature review is to critic research findings related to the triad of intrinsic systemic disorders frequently cited as contributing to diabetic foot disease. These, include peripheral neuropathy, peripheral vascular disease , and impaired resistance to infection (Ahroni, 1993 ; Frykberg, 1991; The Diabetic Control and Complications Trial Research Group (DCCT), 1993).

Peripheral Neuropathy

Peripheral neuropathy is an extremely common complication of diabetes mellitus, affecting approximately 50% of clients with long-standing (5-10 years for NIDDM, and 10-20 years for IDDM) diabetes (Bridges, 1994; DCCT, 1993 ; Frykberg, 1991). The prevalence of neuropathy has been directly related to the duration of diabetes and poor metabolic control (DCCT, 1993; Dridges, & Deitch, 1994). The exact pathogenesis of diabetes neuropathy is uncertain, but is probably multifactorial. Accumulation of abnormal metabolic-by-products within peripheral nerves and microcirculatory failure with succeeding ischemic neuropathy are presumed to be important factors (Boulton, 1994; Flynn, & Tooke, 1992). Peripheral neuropathy is categorized into sensory, motor, or autonomic components. With combinations of these types present in many diabetes clients (Frykberg, 1991).

Sensory neuropathy presents in the classic glove-and-stockings distribution symmetrically affecting the toes first and gradually moving proximally (Frykberg, 1991). The most common symptoms includes loss of deep tendon reflexes, proprioception, vibratory, pain, and light-touch sensation (Caputo, Joshi, & Weitekamp, 1997; Frykberg, 1991). As the symptoms progress in the diabetic client the feet lose protective sensation. As a result, areas of redness or early

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blistering on their feet aren't painful, because of sensory loss. These processes may then progress to frank ulceration if left undetected and untreated (DCCT, 1993).

To successfully manage the foot problems of the majority of insensate diabetic client, the primary care provider should understand how the psychology of sensory loss affects the behavior of clients. The senses of touch and pain originates from hundreds of thousands of receptors covering the entire surface of the body. These receptors form a protective boundary between the person and the environment. When we are touched or when a painful stimulus penetrates this boundary, we are touched psychologically as well as physically. This effect was demonstrated in several classic studies such as, Fisher, Heslin, and Rytting (1976) that suggests that even the slightest touch alters the individual's perception of other people and their surroundings. Also a study by Kleinke (1968), further indicated that touch not only affects perception but can be used to manipulate behavior as well. For example, a small pet scratch on the ankle or foot of an insensate diabetic client can go undetected for several days or weeks prior to seeking medical attention for a preventable infection. According to Fisher et al. (1976), and Kleinke (1968), this behavior could be related to the concept of the body's disassociation from the insensitive areas. Therefore injury to the insensitive parts become less important and less personalized to the individual since there is a loss of painful sensation.

Motor neuropathy obviously results in muscle weakness, atrophy, and gait disturbance (Conti, & Chaytor, 1995; Frykberg, 1991). In the diabetic foot, loss of motor fibers that lead to intrinsic muscle atrophy causes imbalance between flexor and extensor muscles. Clinical presentations includes clawing of the toes, prominent metatarsal heads, and anterior displacement of an already atrophied plantar fat pad, which leads to pressure points and the formation of calluses. Subsequent continued pressure easily results in foot ulceration (Boulton, 1988; Cavanaugh et al., 1991; Yarbough, & Goodwin, 1992).

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Autonomic neuropathy has gained attention in recent years as an early manifestation of peripheral neuropathy and significant factor in foot ulceration (Frykberg, 1995). Autonomic neuropathy is characterized as the dysfunction of thermoregulatory mechanisms in the foot resulting in an altered vascular tone and skin blood flow as well as anhidrosis (lack of sweating). The presence of wide-spread arteriovenous shunting, divert blood flow from the nutrient capillary beds and possibly impairing normal healing of dry, cracked skin, common precursors to infection and ulceration in the diabetic foot (Birke et al., 1991; Conti, & Chaytor, 1995; Ryder et al., 1988).

Early detection of neuropathy influences on the diabetic foot can possibly prevent ulceration. A study by Veves, Murray, Young, and Boulton (1992) investigated the association between foot pressure changes and foot ulcerations (n=100). Two experimental groups, one comprising diabetic subjects with neuropathy (n=28), plus one non-diabetic control group (n=14) were used. All diabetic subjects were given the same education about foot care and were provided with appropriate foot wear. Foot pressure measurements were made at the onset of the study and again after a mean period of 30 months. The results of this study suggested that high plantar foot pressures in diabetic persons are strongly predictive of foot ulcerations, especially in the presence of neuropathy. This study also identified changes in high plantar foot pressures across time. These results allow for early detection of elevated plantar foot pressure, which can be monitored, and measures to prevent the development of foot ulcers can be instituted and altered as indicated.

Peripheral neuropathy can be very devastating to a diabetic client, affecting every facet of his/her life. Fortunately this effect, of this invading disease can be minimized with proper diabetic management. The DCCT (1993) study, clearly demonstrated the significance of adequate glucose control in delaying the onset or progression of peripheral neuropathy. This longitudinal study included 1,441 clients with IDDM over approximately 6 1/2 years, clients with no neuropathy as baseline who followed the intense control regimen showed a 69% risk reduction for the appearance of clinical neuropathy at five years.

Based on this DCCT study (1993), the ADA (1993) recommend, annual office testing for neuropathy by checking knee and ankle reflexes as well as sensitivity of the feet to vibration, light touch, and pinprick. At first sign of sensory dysfunction in the extremities in client with IDDM or NIDDM, consider reevaluation of overall management program. Presently, this ADA recommendation continue to be part of the " Clinical Practice Recommendations of 1998" (ADA, 1998).

Peripheral Vascular Disease

Peripheral vascular disease (PVD), has been identified as the primary etiology of diabetic foot ulcerations. However PVD plays a dominant role in only one third of diabetic ulcers and co-exists with neuropathy (Frykberg, 1995; Garrison, & Campbell, 1993). In diabetics, PVD develops at an earlier age and is 20 times more prevalent in diabetic persons than in non-diabetics (Gerding, Piziak, & Rowbothman, 1991; Gibbons, & Freeman, 1987). In addition, when PVD develops in a person with diabetes, it's progression is more rapid than that in non-diabetics and occurs equally in women and men (Bessman, & Sapico, 1991).

PVD in diabetes mellitus affects both the large (macrovascular) and small (microvascular) blood vessels respectively (Conti, & Chaytor, 1995; Faris, 1986). Large vessel atherosclerotic lesions affecting the tibioperoneal trunk of the lower leg are the hallmark of diabetic macrovascular disease. Literature reviewed has cited PVD development in diabetes, as a result of increased low-density lipoprotein cholesterol and decreased high lipoprotein cholesterol and uncontrolled glycemic levels causing rapid arterial plaque formation (Foster, 1994; Frykberg, 1991; Gerding, Piziak, & Rowbothman, 1991; Joslin, 1992).

Diabetic microvascular disease refer to abnormalities of the capillaries, the hallmark being a thickening of the capillary basement membrane. Which leads to impaired diffusion; increased arteriovenous shunting with impaired hyperemic response to heat and inflammation; a blockage of oxygen utilization; loss of postural vasoconstriction; and increased capillary permeability; leading

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to edema and impaired client defenses against bacterial infection (Flynn, & Tooke, 1992; Jap, & Tooke, 1994)

In addition, the person with diabetes frequently has bilateral involvement, with multiple occlusions and decreased capacity for developing collateral circulation (Bennett, 1979; Cooppan, & Habershaw, 1995). This is different from the person without diabetes in whom the lesions are thought to be localized and unilateral (Foster, 1994; Donovan, & Rowbothman, 1986). Once arteriosclerotic disease is present in the small vessels in the diabetic foot there is minimal effective means of curing the problem. Presently, advances in vascular surgery have enabled successful reconstruction to the dorsalis pedis or posterior tibia arteries the limb-salvaging procedures of choice in most cases (Conti, & Chaytor, 1995; Frykberg, 1991).

The primary signs of PVD include hair loss; shiny or atrophic skin changes; cold feet; feet and ankles that are darker in color than the leg; and dependent rubor. Symptoms that consistently result from PVD are intermittent claudication (pedal pulses usually absent); in men, organic impotence on a vascular basis; rest pain relieved by standing or walking; failure of a wound to respond to appropriate treatment; and gangrene resulting in amputation. Also, in diabetics with PVD coronary artery disease and stroke are common (Coleman, 1992).

A typical scenario of a diabetic client with PVD, may report intractable toe pain unrelated to activity. Pain at night is often attributable to ischemia, which is often characterized by skin around the toes that is red, shiny, and lacking hair (Coleman, 1992).

Susceptibility To Infection

Infections of the feet are a major source of morbidity among diabetic clients and often lead to death. The pathogenesis of foot infection in clients with diabetes is multi-factorial. The triad of neuropathy, ischemia and altered client defenses is believed to contribute to most serious infections and places the diabetic client at high risk for amputation (Kaufman, & Bowsher, 1994; Frykberg, 1991).

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When diabetes is uncontrolled, the client may become susceptible to infection and have an altered client defense to fight infections, which has been cited as significant factors in the etiology of diabetic foot infections, ulceration and gangrene (Frykberg, 1991; Gerding, et al., 1991).

This immunodeficiency is due to a deficiency in the phagocytic activity of leukocytes, impaired intercellular bacterial killing, and a defect in normal chemotatic mechanisms. In this environment even common pathogens can result in lethal infections especially in the presence of peripheral neuropathy and PVD (Frykberg, 1991; Paduano, 1992).

It's not that diabetic clients are invaded by bacteria more frequently than non-diabetics, but because they handle the invaders less well than do non-diabetic individuals (Braverman, 1971; Felig, & Bergman, 1995). For example, a minor injury from the friction of new shoes, can set the stage for catastrophe events. Once the skin is broken on an insensate diabetic foot, bacteria may enter, causing infection that spreads rapidly because client's resistance is low and hyperglycemia impedes neutrophilic phagocytosis. The blood supply previously adequate for normal activity, is stressed by the demands of the infection; resulting in possible gangrene, and generalized septicemia (Felig, & Bergman, 1995).

Clinical presentations of diabetic foot infections varies in degrees, however the process start as red or warm spots which may go undetected (Foster, 1994; Levin, & O'Neal, 1988). Ulcers can therefore form, and become infected, producing erythema and or purulent drainage. Pain may be absent in clients with neuropathy. Subtle finding such as erythema, increased drainage, ankle or leg pain and crepitation may be the first signs of a limb-threatening infection. Fever, chills and leukocytosis are absent in two thirds of clients with limb-threatening infection (Gibbons, 1992). Fever, although frequently absent, may signify septicemia, deep tissue infection and or metastatic seeding (Grayson, et al., 1994). Also, unexplained hyperglycemia is an important clue to uncontrolled infection (Caputo, Joshi, & Weitekamp, 1997).

Diabetic Self-Care Education

Most foot ulcers and other infected lesions that lead to gangrene of the feet are preventable, nonetheless they continue to exact a tremendous toll in the diabetic population. Therefore, the primary care provider (i.e. APN) must emphasize to the client the importance of foot self-care (Graber, Wooldridge, & Brown, 1986; Hunt, 1995). Chronic illnesses, such as diabetes are incurable conditions that often require a tremendous amount of effort on the part of the client and family members to manage and control symptoms. These conditions have exacerbations and remission, but in the case of diabetes there are no holiday or vacation for the diabetic client, the management plan needs to be carried out daily, often several times each day. The management is essentially accomplished through self-care practices on the part of the client/family.

Self-care is defined by Orem (1995) as " the practice of activities that individuals initiate and perform on their own behalf in maintaining life, health, and well-being" (p. 104). For the diabetic client these activities include following dietary formulas, foot-care, exercise, and medication therapy (Rankin, & Stalling, 1990).

Diabetes education must provide understanding at a number of levels to be truly effective in supporting a client's self-care practices. Besides acquiring self-care skills and knowledge clients must be educated to comprehend, analyze, and integrate the information they gather into day-to-day living. This integration process and the decisions made as a result of this process can be taught and reinforced through on-going educational mediums, such as one-on-one teaching, group teaching, media, and written materials (Johnson, 1982; Rankin & Stalling, 1990).

A study by Kruger, and Guthrie (1992), investigated the effectiveness of a "hand-on" foot-care teaching/learning approach for adults with diabetes. By random assignment, the control group received a lecture presentation on foot-care, while the experimental group participated in a hands-on session on foot care in addition to the lecture presentation . Data concerning the subjects foot-care knowledge and skills, the condition of their feet, and their level of HbA-1c were gather prior to and six months after the foot-care educational session.

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The authors results indicates no significant increases in knowledge about foot-care were observed in the experimental group. The experimental group reported improvements in inspecting and washing their feet on a daily basis, and in care of the toenails. No significant differences were observed in the status of the subject's feet. The HbA-1c readings were significantly improved for both the experimental ($t=4.10$, $df=10$, $p=0.002$) and control ($t=2.25$, $df=9$, $p=0.051$) groups. Authors concluded that a hands-on educational session may improve foot-care practices temporarily. However, long term effects need to be studied to discover overall improvement of foot-care practices and physical status of the feet.

Another study by, Ledda, Walker, and Basch (1997), to develop, formatively evaluate, and pilot test a self-care, take-home program for the prevention of foot problems in African Americans with diabetes. The program included twenty-seven African American subjects with NIDDM from a foot clinic in New York City. Twenty-one were women and six were men. The age range was 45 to 83 years (mean=63). The following inclusion criteria were established: self-described as African American; diagnosis of NIDDM; > 40 years of age; completed at least 6 years of education; nonactive foot lesions; ulcers, or lower extremity amputation of any kind; and a home telephone.

The orientation session was a brief (15-minute), one-on-one meeting, and a reviewed and demonstrated short (16-item) foot-care behavior survey. The take-home program components included a two-sided folder containing the newly developed client instruction booklet with a reading level at or below sixth grade, a large hand mirror, a lotion sample, and an emery board. Through telephone follow-up 2 to 3 weeks after orientation, subjects reported the following: good to excellent overall rating of the program, favorable reactions to the client instruction booklet, and to the large hand mirror, and most importantly a positive effect on their daily foot-care practices.

In an earlier study to assess the affects of a home based diabetic education program, Rettig, Strauger, Recker, Gallagher, and Wittse (1988) measured client knowledge and self-care skills in both randomly assigned treatment and control groups of subjects. A total of 373 subjects (193 control, 180 treatment) were measured on self-care knowledge using a series of seventy multiple

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choice questions divided into four content areas; diet, urine testing, medication therapy, and foot-care. Client self-care skills were measured by one-to-one demonstrations and focused on skill in urine testing, medication use, foot-care, and diet recommendation skills as noted by ability to draw up a 24 hour meal plan. Foot-care skills were noted by nurse examination of the feet and included the presence of dirty foot soles, presence and type of socks, and methods of toenail clipping. In addition, a 16 item checklist for normal conditions of the feet was used to generate a total foot appearance score.

To analyze the effectiveness of the teaching program, mean self-care knowledge and skill scores plus foot appearance scores were used as some of the indices of program efficacy. Results indicated that knowledge and skill scores were significantly higher for the treatment group in all subject areas and in total. With regards to foot appearance scores, significant differences were noted between the two groups. With a possible score of 100, the treatment group obtained a mean score of 82.2 $\pm$ 0.7 and controls, 63.8 $\pm$ 0.7 (higher scores indicated better condition of the feet). The authors concluded that home-based diabetes education interventions can positively effect client knowledge and skill outcomes. The authors also concludes that further studies need to be done to enhance the validity and reliability testing of the self-care knowledge and skills instruments.

Diabetic foot ulcers and amputations rank high among the disabling complication of diabetes mellitus. Although it has been estimated that one half of the amputations in clients with diabetes are preventable with proper foot care education (ADA, 1996; Edmond, et al., 1986; Levin, 1989). Unfortunately, because of the limited time allotted for diabetic foot screening and foot care education, many clients are not taught the skills necessary to protect their feet from injury subsequent chronic ulceration and possible limb loss (Ahronid, 1993; Griffiths, 1981).

Several classic studies have shown that people who have diabetes are not well versed in the care of the foot. In one study of 372 clients with NIDDM, 41 percent reported that they had not been told to take especially good care of their feet (Michigan Diabetes Research and Training

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Center, 1986). In another study of 75 diabetic clients, nearly three out of four, all whom had been taught other aspects of self-care, had not been taught proper foot-care (D'Eramo, & Fain, 1988). Although simple preventive strategies on the part of the health care provider or client can reduce the likelihood of amputation, many of these procedures are not being systematically applied (Wylie-Rosett, et al., 1995).

There is increasing evidence to suggest that education on foot-care is essential for clients with diabetes (Ahroni, 1993; Kruger, 1992). This concept was realized by the Rehabilitation Service of the San Diego Veterans Administration Medical Center (SDVAMC), and prompted , the development of a nurse-run diabetic foot clinic to provide diabetic clients with comprehensive foot-care education. A retrospective analysis of the nurse-run clinic was made to determine whether it was effective in it's services. One hundred male diabetic foot clients, ranging in age from 50 to 80 years, were referred to the outclient nurse-run diabetic foot clinic over a one year time frame. All of the clients had experienced some type of foot lesion that had healed prior to referral to the nurse-run clinic. Of the 100 clients referred to the nurse-run diabetic foot clinic, 86% achieved this goal, 12% were able to become independent of the clinic, remaining vigilant in their foot-care and free of lesions. The results of this retrospective analysis indicated that the concept of a nurse-run diabetic foot clinic can effectively teach clients how to care for their diabetic feet and avoid debilitating foot problems (Joseph, 1989).

A majority of educational programs feature foot-care as a small component (Barnett, & Odugbesan, 1987). One study that was devoted to foot-care demonstrated that diabetic client's knowledge increased following instruction (Fletcher, 1990) Another study, by Litzelman et al. (1993), clients were questioned about their regular foot-care routine and were asked to show how they examined their feet. During their self-examination, nurse clinicians observed whether clients scrutinized the toenails, the sole of the feet, and the area between the toes. Musculoskeletal and dermatology abnormalities were assessed, pulses palpated, and lesions noted.

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In a clinical setting clients received education at each visit. Results indicated a decrease in serious foot lesions, and some appropriate foot-care behaviors increased.

Another study using a pre-test and 6 month post-test control group design. Krugh and Guthrie (1992), examined the effectiveness of a one-week client education program on foot-care. Inclusion criteria required subjects (n=50) to have a 5-year history of diabetes mellitus, but no frank pathology of the feet. A participative, hands-on teaching / learning treatment was used. Through findings indicated that in some areas of evaluation there were small differences between the experimental (n=23) and control (n=27) groups. The authors found no statistically significant differences. The failure to detect significant differences between experimental and control groups may be due to inadequate sample size. The authors cited high subject attrition in the experimental group from pre- to post-test as one reason for no significant findings.

An earlier study by, Delbridge, Appleberg, & Reeve (1988) sought to determine factors associated with the development of foot lesions in clients with diabetes (> age 50 years). Eighty subjects were divided into four groups based on the nature and severity of foot problems (none, ischemic, ulcer, and septic). By group, subjects were fairly matched on age, duration of disease, and treatment modality for diabetes control. Subjects were measured on the variables glycosylated hemoglobin (i.e. HgA1c); frequency of hospital admissions for diabetes control; degree of vascular impairment; history of smoking; presence of neuropathy; delay in treatment for foot lesions; and client understanding and education of diabetes, diabetes management, foot complications and care of the feet. Groups did not differ significantly with regard to HgA1c levels, frequency of hospital admissions, or presence of neuropathy. Subjects with foot lesions did exhibit, however, significantly higher degree of vascular impairment, history of smoking, increased delay in referral for foot lesion treatment, and lower scores on the knowledge test.

The authors conclude that education of clients related to foot care management can effect the development of foot lesions. Without ascertaining if subjects had received any diabetes education, the authors claim that subjects with foot lesions may not have wanted to "know" about problems

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with their feet. As such, these subjects may engage in "willful self-neglect" as evidenced by indifference to diabetes complications. This claim and speculation about the lack of self-care motivation was based on a knowledge test without indices of reliability or validity. It is possible that the instrument lacked construct validity in that it failed to address or capture critical factors of foot self-care knowledge. Furthermore, the knowledge measure may not have been internally consistent (i.e. reliable). Nonetheless, the authors conclusively stress that education of diabetic clients related to foot-care management can be crucial in preventing the development of foot lesions. Education on the diabetic foot has been proven imperative. Clients with diabetes and their significant others must be taught and repetitively reinforced on the diligent care of the diabetic foot, to prevent or delay lower-extremity complications that can result in amputation.

Summary

In summary, there is an abundant amount of literature on the pathogenesis of diabetic foot complications. Also, the wide variety of literature reviewed has demonstrated that with proper foot-care, education, and glycemic control, peripheral neuropathy, PVD, and foot infections can be prevented or delayed in persons with diabetes mellitus.

There is generous amount of research to date, indicating that education is essential for the diabetic client to enhance self-care for early detection, and prevention of foot complications. Such as, research done by DCCT (1993); Delbridge, Appleberg, & Reeve (1988); Graber, et al. (1986); Kruger, and Guthrie (1992); Rettig, et al. (1988); and Veses et al. (1992), identified an improvement in foot-care after sessions of educational presentations. However, the majority of research indicated a temporary improvement in self-care-foot-care, which has been identified as a weakness in findings. Also, the literature reviewed failed to identify the effective mode of education. Therefore, the need for research on the long-term effect of education and the effective mode of education for clients with diabetes is forthcoming.

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Because of the limited time allotted per client by primary care providers, foot care education and screening are frequently omitted until complications develop. Therefore, the ability of the client or health care provider to perform self-care-foot-care is vital for healthy feet !.

Conceptual Framework

This section will discuss the conceptual framework of Orem's (1995) Self-Care Deficit Nursing Theory (SCDNT). Also, an explanation of related theoretical constructs as they are linked to the development of the proposed education brochure. Concluding with an adapted model to illustrate the relationship between the proposed diabetic foot care brochure, Advanced Practice Nurse (APN), and the theoretical constructs of Orem's (1995) SCDNT.

Orem labels her SCDNT as a general theory composed of three related theories : (1) the theory of self-care (describes why and how people care for themselves); (2) the theory of self-care deficit (describes and explains why people can be helped through nursing); and (3) the theory of nursing systems (describes and explains relationships that must be brought about and maintained for nursing to be produced) (figure 1). An examination of the major constructs of these theories were necessary in the development of this educational brochure. The major constructs of these theories begins with **self-care**. Self-care, "is the practice of activities that maturing and mature persons initiate and perform, within time frames, on their own behalf in the interests of maintaining life, healthful functioning, continuing personal development, and well-being" (Orem, 1995 p. 461).

Subdivision of the self-care theory includes self-care agency, (which is the complex acquired ability of mature and maturing persons to know and meet their ongoing requirements for deliberate, intentional action to regulate their own human functioning and development); dependent care agency (person other than the individual who provides care, such as a spouse caring for his/her mate with a chronic illness); self-care needs (the reasons for which self-care is undertaken); and therapeutic self-care demands (refers to those self-care activities required to meet the self-care needs) (Orem, 1995; Wesley, 1994).

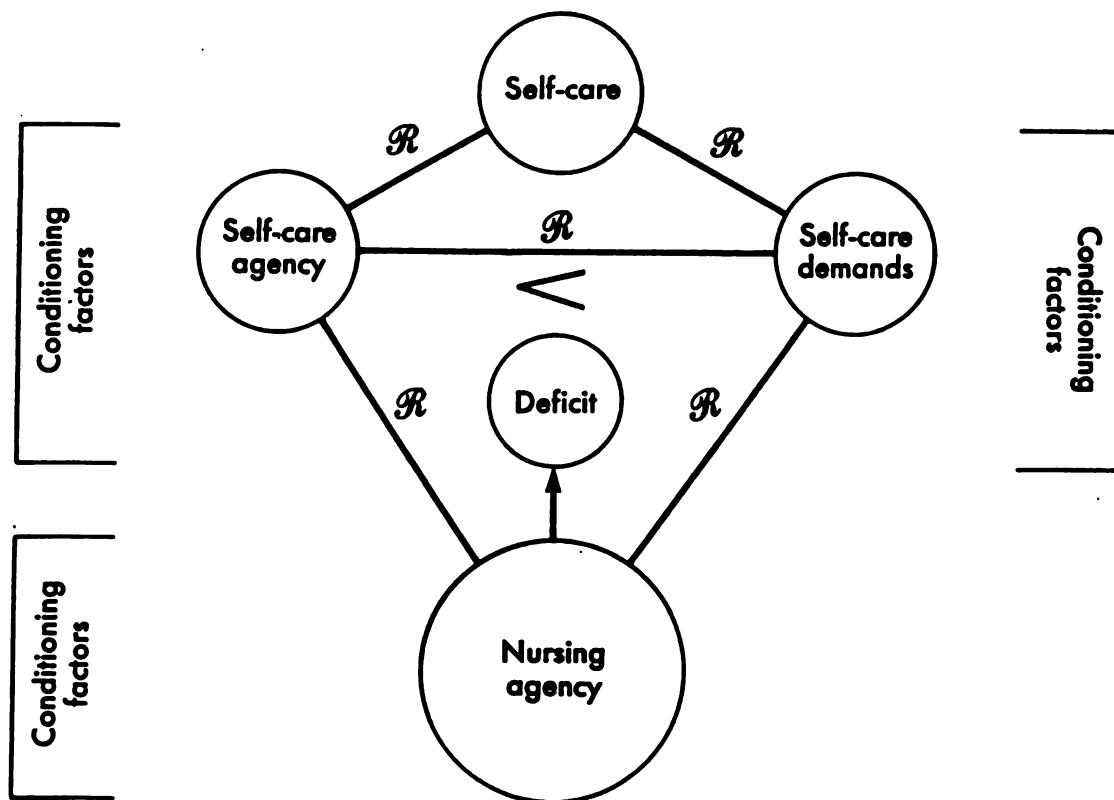


Figure 1: Orem's conceptual framework for nursing (Orem, 1995, p. 35). R, relationship; < deficit relationship, current or projected.

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According to Orem (1995), **self-care** is the voluntary, deliberate action performed by individuals for themselves or for others to maintain life, health, and well-being. Deliberate action by the adult to maintain a state of health for themselves (self-care agency) and their dependents involves (dependent-care agency) self-care. Self-care action requires a base of education in the home, at school, and from practical experiences in self-care. These self-care actions are learned activities, learned through interpersonal relations and communication. Acquiring good health habits are necessary in preserving health, but the ability to alter old habits to meet new requirements may be essential. That's why education in self-care, not just training in self-care practices is essential for the development of knowledge, skills, and favorable attitude toward self-care and health. Knowing what actions to perform and having the skills to perform the actions are combined with learned knowledge of events and expected result of those performances. For example, a diabetic client or dependent-care agency deliberate assessment of his/her feet daily, is a series of purposefully actions resulting in early detection or prevention of foot ulcers. However, a lack of this self-care knowledge, is a self-care need unmet creating a self-care deficit that may require nursing agency intervention.

The **self-care deficit theory**, " is a relation between the human properties, therapeutic self-care demand and self-care agency in which constituent developed self-care agency are not operable or not adequate for knowing and meeting some or all elements of the existent or projected therapeutic self-care demand, and explains when nursing is needed and how people with chronic illnesses can be helped through nursing" (Orem 1995, page 461). Self-care deficit may be influenced by certain conditioning factors, such as age, gender, developmental state, health state, sociocultural orientation, health care system factors, and family system factors, pattern of living, environmental factors, resource availability and adequacy (Orem, 1995).

Self-care deficit theory is the essential element of the SCDNT. The theory expresses why individuals require and can be helped through nursing (Orem, 1995 ; Parker, 1990). According to Orem (1995), deficit, stands for the relationship between the action that individuals should take

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and the action capabilities of individuals for self-care or dependent-care. This theory includes two client variables, self-care agency and therapeutic self-care demand, and the nurse variable, nursing agency. In the conceptualization of the theory self-care deficits, the client variables are considered as related, and the theory of nursing system, nursing agency is considered as related to both client's variables. Therefore, SCDNT demonstrates and explains the relationship between what actions individuals are capable of and their demands for self-care.

This relationship is vital to the examination of self-care. Self-care agency, is one who cares for his/her own care, or the ability of individuals to participate in their own self-care (Orem, 1995 ; Cavanagh, 1991). The capability to engage in self-care is a learned behavior, that is influenced by internal and external factors. Such as, culture, community, and health care providers (Denyes, 1988). The human capability named self-care agency, the power to engage in self-care develops in the course of day-to-day living through the automatic process of learning. This same concepts was utilized in the conceptualization of this proposed project.

Some types of health problems lend themselves more easily to self-care than others. Diabetes is one of these, therefore the need for educational intervention is essential for proper and effective self-care. Management of diabetes mellitus requires lifestyle changes, modification of dietary intake, and life time family and client education, alone with ongoing follow up and support. Because of the complexity of this chronic disease, the primary health care system can and should be the client's/family's source for acquiring the skill necessary for promoting their self-care abilities, to maintain optimal health-status.

Self-care agency requires acquiring skills to care for oneself. This includes the client's understandings of the diagnosis, management and complications. A client's primary care provider, such as an APN, is essential in the teaching of day-to-day preventive foot-care in diabetes. Since foot infections are the most common problems for diabetics and can frequently lead to amputation. Therefore client teaching should be directed toward prevention and early detection of any foot abnormalities (Donohue-Porter, 1985; Miller, 1982).

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There comes a time in one's life when internal and external factors hinder self-care through self-care agency. These factors such as, maturity, age, health status, and etc... can prevent one from caring for themselves, a dependent-care agency may become necessary for well-being. A dependent -care agency, is a maturing adolescent or adult who accept and fulfill the responsibility to know and meet the self-care needs of relevant others, who is unable to independently perform appropriate self-care skills .

The development of dependent care-agency by individuals is usually a response to needs (self-care deficit) and acceptance of family members or significant others for assistance with their continuing self-care (Orem, 1995). Dependent-care agency, like self-care agency must be able to perform the day-to-day actions to meet therapeutic self-care demand, knowing the capabilities and limited actions of the self-care agency. For example, a diabetic client who is unwilling and disinterested in learning and performing preventive foot-care, therefore his spouse willingly takes on the role of dependent-care agency to accomplish the goal of self-care. This scenario illustrate the conceptualization of dependent -care agency within the development of this project.

Dependent -care agency can be enhanced through a primary care provider, such as an APN, to improve the skills of the dependent-care agency for the prevention of abnormalities and promote health. Orem (1995) refer to this intervention as the nursing system the third construct of SCDNT.

The final construct of the SCDNT is the **nursing system theory** (figure 2) which includes a series and sequences of deliberate practical actions of nurses performed at times in coordination with actions of their client to know and meet components of their client's therapeutic self-care demands and to protect and regulate the exercise or development of client's self-care abilities.

This system is composed of three sub-systems: (1) wholly compensatory, is used when a client's self-care agency is so limited that the client is totally dependent on the nurse for well-being; (2) partly compensatory, is used when a client can meet some of his/her needs creating a nurse/client partnership but needs the nurse to meet others; (3) **supportive-educative, is used when the**

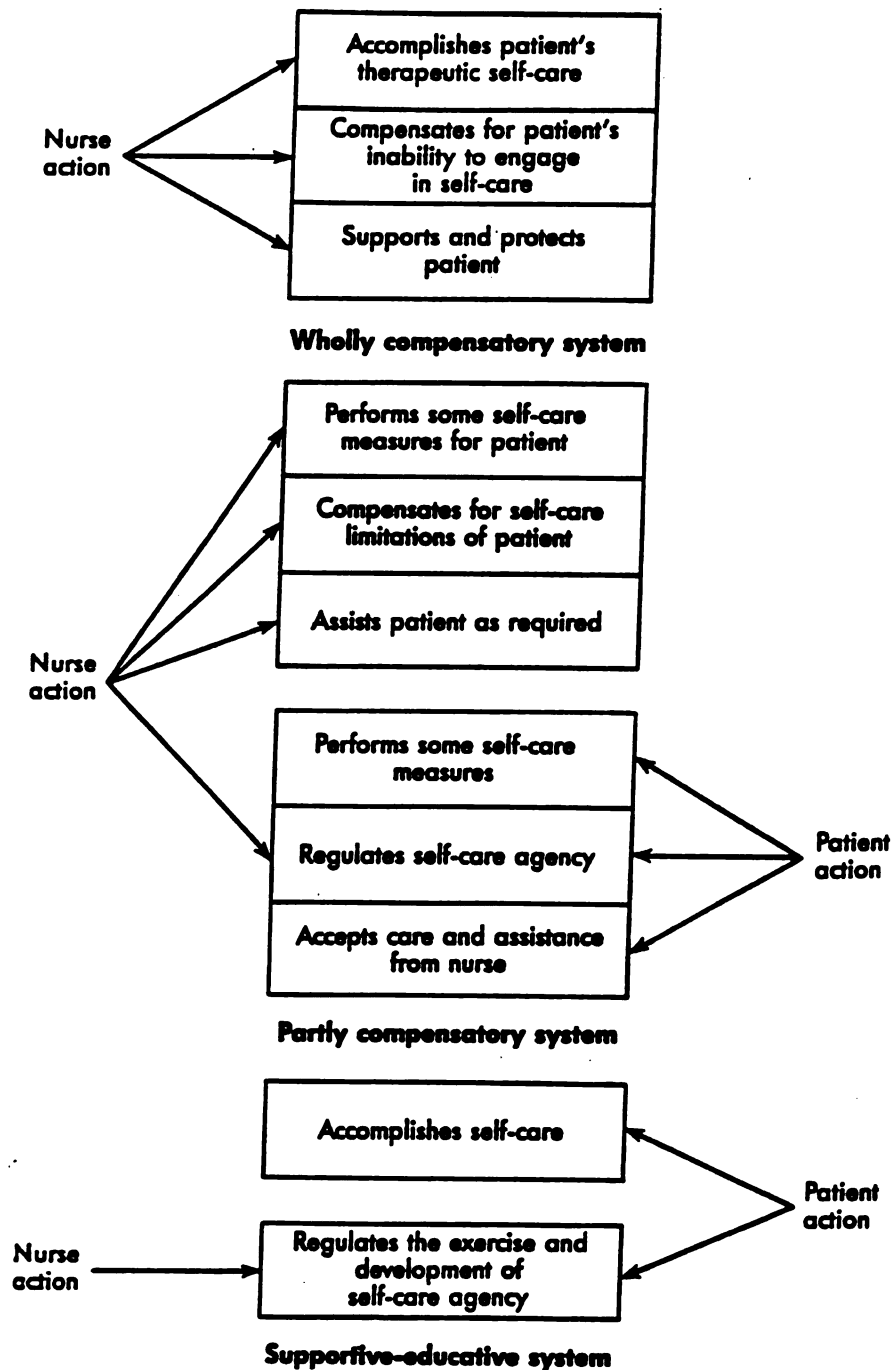


Figure 2: The Basic Nursing Systems. This project focused on the supportive-educative system; part of the basic nursing systems within Orem's conceptual framework for nursing. The practice of nursing: The individual as the unit of service (Orem, 1995, p. 307).

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client can meet self-care demands but needs assistance with decision making, behavior control, and acquiring knowledge and skills (figure 2); (Orem, 1991, and 1995).

Definition Of Concepts

The following definitions of concepts will be utilized for the purpose of this scholarly project.

Self-care : Is the practice of activities that the diabetic client initiate and perform on his/her own behalf in assessment and management of foot-care.

Self-care agency : The diabetic client who performs the foot self-care activities.

Self-care deficit : The self-care agency is unable to perform his/her foot self-care activities because of limitations (i.e. visually impaired, obese, lack of knowledge and skills).

Nursing agency : a registered nurse with a master's degree and has advanced education and clinical training in family health care. Therefore, this advanced practice nurse (APN) is able to work with diabetic clients of all ages and their families, providing the information necessary to enhance their self-care skills in the assessment and management of foot-care.

Application To Project

Orem's SCDNT (1995) is frequently used in clinical practice, education and research within the nursing profession. Orem's SCDNT (1995) provides directions to practicing nurses in their clients assessment in identifying deficit and the depth of nursing intervention (s). An analysis of the relationship among the variables in this scholarly project is grounded on the construct of **self-care**.

The focus of this project is primarily on the **supportive-educative system** as the nursing intervention to enhance the diabetic client's self-care abilities. The supportive-educative system is further defined as a system where the individual is able, or can and should learn to perform the required self-care measure, but cannot do so without assistance. Valid helping techniques in these situations include combinations of support, guidance, provision of a developmental environment and teaching (Orem, 1995). Therefore, the APN would mainly function as a practitioner, assessor or educator for the diabetic client on foot-care.

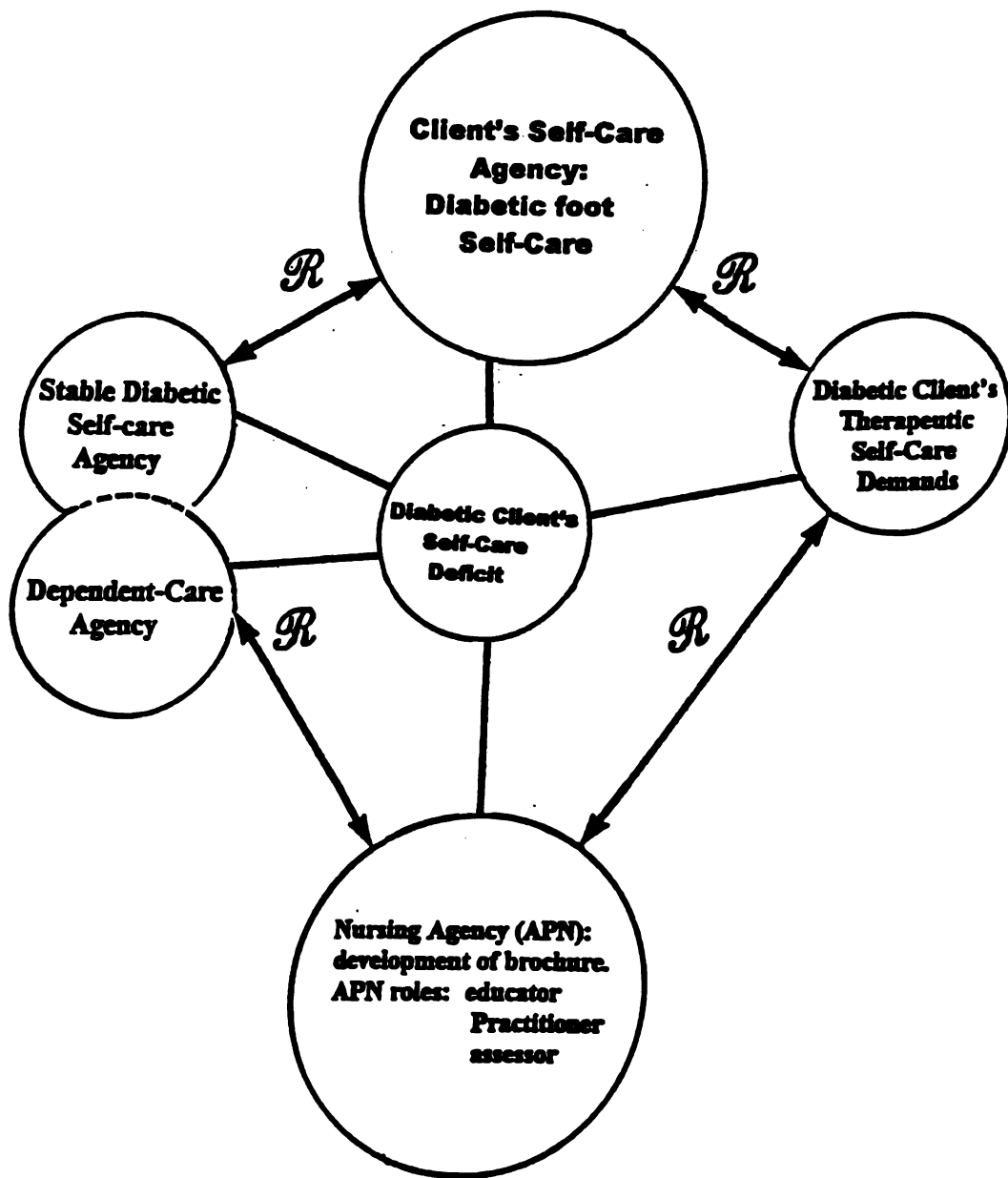
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The action of the diabetic client would be to accept and perform regular routine foot-care, to prevent potential foot problem through early detection of podiatry problems.

In conceptualization of this project and Orem's theory of SCDNT, the client variables are viewed as related, and within the theory of nursing system, nursing agency is viewed as related to both client variables. A modified Orem's model (figure 3) illustrates the relationship among the client and nursing variables that pilot the development of this educational brochure indicating the significant of self-care agency, dependent-care agency, therapeutic self-care demands and nursing agency. This model represents the outcome of all diabetic clients, which is to obtain self-care, whether it's through the assistance of a dependent-care agency or nursing agency to enhance his/her self-care in assessment and management of foot-care.

A self-care agency as shown in the model (figure 3) can be affected from time to time by limitations that do not allow him/her to meet their therapeutic self-care demands. These limitations may occur because of factors that are internal or external to the individual, such as lack of resources or an accident. However this model focused on resource availability of the diabetic self-care agency. This event may hinder the self-care agency in meeting therapeutic self-care demands creating a deficit (figure 3). Because of the direct effect this deficit has on acquiring diabetic self-care, the assistance of a nursing agency or dependent care-agency may be required for stable diabetic self-care (figure 3).

The italic *R* indicate a continuous feedback of communication and interaction between the client's and nurse's variables, to obtain independent diabetic self-care. Orem refers to this nurse/client relationship as a "whole system of action" (page 71) to achieve therapeutic self-care demands (Orem, 1995). The development of this nurse/client relationship is client's choice, however the continuation is a joint agreement based on self-care capabilities. Another integral element is the nurse/client/dependent care agency relationship, the nursing agency must recognize this essentially for uncomplicated ongoing self-care in the diabetic client (figure 3).



Key _____
R; direct relationship and
 feedback communication

Figure 3: A modified model: Client's self-care agency, focusing on diabetic foot-care.

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Dependent-care agency is explained indirectly in Orem's theory, and illustrated synonymously as self-care agency within the SCDNT model (figure 1). However, for this project (figure 3) dependent-care agency is referred to as a separate concept, but directly influence the balance of self-care for the diabetic self-care agency. Although, this feedback communication and relationship has the potential of being nontherapeutic (figure 3), which may require nursing intervention. Recognizing the importance of this relationship either therapeutic or non-therapeutic, together with the dependent-care agency can balance the diabetic day-to-day self-care activities (figure 3).

The nursing agency (APN) (figure 3), is understood as the developed and developing abilities of a nurse to provide nursing for an individual diabetic client or groups. Methods of delivering nursing to a diabetic with legitimate deficit (s) within the nursing systems varies, however the primary focus of this project is the supportive-educative system (figure 2). The essential techniques used by this system include a combination of support, guidance, provision of developmental environment, and teaching (Orem, 1995). Therefore, the APN's (nursing agency) action would mainly be as a practitioner, assessor or educator in the self-care agency or dependent -care agency development of self-care abilities to accomplish self-care (figure 3). However, all previous mentioned APN's roles are utilized at onset of relationship (figure 3) and less visible as self-care capabilities are improved (figure 3).

Brochure Development

Methodology

The development of this conceptual model was grounded on the literature review and Orem (1995) SCDNT. This brochure was developed for use in a primary care facility to reinforce other teaching methods. The key component "**self-care**" was obtained from Orem's (1995) SCDNT for practical application in primary health care. The brochure consists of two main parts; self-care; inspecting your feet (therapeutic self-care demands), and self-care; keeping your feet healthy (self-care skills).

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Part I: Daily visual inspection is the diabetic client's first line of defense (Sage, 1991). The brochure contains visual early warning sign for the diabetic client. Such warning signs as below:

1. Color changes
2. Swelling
3. Temperature changes
4. Sensation changes
5. Hot spots
6. Cracks, sores, and ulcers
7. Ingrown toenails
8. Drainage and odor

To aid in visual inspection a hand mirror is encouraged. If self-inspection is impaired (e.g. has visual impairment or is obese) requesting support from a relative or friend is also encouraged. The brochure stresses the immediate notification of client's primary care provider if a foot problem is detected.

Part II: The brochure will also emphasize self-care; keeping your feet healthy by encouraging the diabetic client to practice the following approaches in foot-care:

1. Check shoes and socks
2. Exercise your feet
3. Take special care
4. Control your diabetes

Diabetes does not have to lead to serious foot problems. The primary care provider and client can work as a team to keep the diabetic feet healthy and treat any problems that occur. But, keeping the diabetic feet fit takes effort and commitment from the most important team member—— "THE Client".

Target Group

The target client group for this brochure includes type I or type II diabetic clients. It can be reviewed with and given to a newly diagnosed client, established diabetic client, or those diabetic clients who are new to the clinic. Other intended characteristics of the client who can benefit from the contents of this brochure includes: age range 10 and greater; intact visual abilities; can read English; reading ability of at least sixth-grade level.

This brochure was specifically designed to be used as an adjunct diabetes educational tool by primary care providers (i.e. APN) in primary care settings (i.e. private clinics, or managed care groups). However, the brochure contents is general enough to enhance any diabetic educational program, with medical follow-up available.

Time

The primary care provider or auxiliary personnel would on the average spend five minutes reviewing the brochure with the diabetic client or significant other, prior to taking it home. Since more than half of all nontraumatic amputations in the United States are directly related to preventable diabetic foot complications (Christensen, et al. 1991). Therefore, taking this five-minutes to review the foot-care brochure could be the first step toward prevention and early detection of diabetic foot complications. Treatment of foot ulcers starts with prevention and prevention starts with awareness. In the case of foot-care, awareness means knowing how to prevent problems before they develop and how to cope with those that do.

Cost

The implementation of any educational tool is highly influenced by start-up cost and long-term cost. Fortunately brochures are a cost-effective mean of providing health care education to a large population such as diabetic clients. This cost also includes the cost of personnel time in preparing and delivering material. The projected cost per brochure range from \$0.02 to \$0.05 each, because it can be reproduced within the clinic.

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The nominal cost per brochure can easily be justified if only one diabetic client identified or prevented a foot ulcer, because of acquired self-care skills from this educational brochure.

Distribution

Educational material, whether written or verbal, can be distributed and communicate in four ways, such as personal, mass, direct, and interactive. Of these four, two have been shown effective in the distribution of the brochure. Mass distribution includes advertising, direct mail and public relations and can be very impersonal in nature. Direct distribution is personalized neutral communication which is directed to named receiver(s) (Gronroos, 1990). This project will focus on the direct distribution method.

Improving client foot care skills can be a vital asset in the prevention, initial diagnosis, and early treatment of diabetic foot disease. A diabetic's first line of defense in controlling and delaying further complications of their disease, is in their own self-care capabilities. Clients with diabetes ought to be taught simple common sense approaches to daily foot inspection techniques and foot hygiene and advised about choosing proper shoe wear. Simple reminders, such as never go barefoot or looking for objects inside shoes before putting them on, are essential in preventing ulceration or infection. This brochure will provide the diabetic client and/or family with the basic guidelines for these self-care activities at home at their own pace thus exercising more control over the learning experience. That is why, it is important that this brochure be distributed in the form of direct distribution in the clinic before, during, or after the exam, each timing has advantages.

Distribution before and after contact with primary care provider allows the client to read the information over and to formulate questions. During the foot-exam, the client can be taught proper foot self-care skills, and enhanced by the brochure after departure from the clinic/primary care provider. Either method of distribution can be effective, so long as awareness of self-care in the assessment and management of foot-care is emphasized for the prevention and early detection of ulceration and infections.

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A chronic disease such as diabetes has many disabling side-effects, one in particular can be deteriorating vision. For these clients this brochure's print can effectively be enlarged before distribution.

Evaluation

With direct distribution of this brochure , increased foot self-care knowledge would hopefully be the outcome. The influence of proper foot self-care assessment can be measure by the increased in compliance to preventive measures and early detection of complications. This can be evaluated with chart review, it could show the progress or lack of, that diabetic clients may make in regards to foot-care as documented subjective and objective observations of abnormalities and physical status of the feet. Another way of measuring the brochure's effectiveness, is by increased awareness of the feet. The simple act of removing shoes and socks prior to contact with their primary care provider, can encourage partial or full foot inspection. Also, a follow-up phone call or a survey mailed to the recipients can help in evaluating and determining the outcome of the teaching/learning effectiveness of the brochure.

The use of written material such as a brochure requires assessment of it's readability. There are various means of assessing the readability of materials. In general, such methods attempt to "grade" a teaching tool based upon sentence length, number of syllables or word length, number of words per page, and number of illustrations per number of words (Fry, 1997; Hafner, 1996; Klare, 1974; McLaughlin, 1969). This brochure readability was measured using SMOG formula, which is one of the most common method of measuring readability. The variables used in the SMOG formula includes; average number of words of 3 syllables or more per 30 sentences (McLaughlin, 1969). Also, a selection of 5 diabetic clients was used to assess the readability for the layperson. They were able to evaluate the level of understanding and significance of contents for the intended target group (i.e. diabetic clients).

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This brochure contents and organization can also be fully evaluated by answering "yes" to the following questions:

1. Are sentences and item length as short as possible?
2. Is unfamiliar jargon avoided?
3. Are instructions limited to "must know" facts?
4. Is information organized in a logical way?
5. Is a shopping list provided for equipment/medications?
6. Does client/family know how to identify problems, what to look for?
7. Does client/family know what to do if problems arise?
8. Who is to be called if problem occur?

The convenience of a peer group (2 APNs) or two diabetic educators in the state of Michigan could be used to review the brochure's contents and effectiveness, and provide information on: How do providers perceive the benefits of using this brochure in encouraging diabetic foot self-care? What are providers currently using as diabetic educational tools to influence foot self-care? What other factors and or variables are important to include to self-care activities? Answers to these questions can be used to provide education to all providers caring for diabetes to at least maximize the effectiveness of foot self-care as a means of maintaining long-term viability of the diabetic feet.

Implications For Advanced Nursing Practice

The implication for nursing practice will be discussed within the concept of 'self-care' adapted from Orem (1995). According to Orem the nurse's goal is to increase the client's ability to perform self-care. Self-care is defined as "the practice of activities that maturing and mature persons initiate and perform, within time frames, on their own behalf in the interests of maintaining life, healthful functioning, continuing personal development, and well-being" (Orem, 1995, p. 461).

When working with the diabetic client, the goal of the nurse in advanced practice is to increase the diabetic's self-care capabilities.

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Therefore, the diabetic client is able to achieve his/her maximum health potential and is able to adequately care for his/her feet. The nursing challenge is to identify ways to increase awareness of proper foot self-care among the diabetic population. By developing an educational brochure on foot self-care the diabetic client and or /family can learn assessment behaviors that contribute to healthy feet. The nurses in advanced practice, because of their practice within the healthcare system, play key roles in the assessment, education, and referral of problem in the care of the diabetic foot. The nurse in primary care can provide accessible, continuous, coordinated care to the diabetic client and /or family.

The APN (as an assessor) may already have access to a data base useful in identifying newly diagnosed; clients at high-risk; and recovering diabetics clients, because of previous contact with the clinic. Because the APN develops a continuous relationship over time the APN has the potential to impact the diabetic client's foot self-care abilities. Self-care abilities previously assessed may be updated and applied to the development of strategies that enhance the diabetic foot self-care abilities. In addition, the APN in primary care is in an ideal position to assess foot self-care skills of all diabetic clients served.

In utilizing Orem's (1995) concept, supportive/educative nursing intervention, the APN can regulate the delivery and development of foot self-care abilities, while the client himself/herself accomplishes foot self-care. By developing an intervention to promote foot self-care ,such as the development of this brochure, the APN can aid the diabetic client to his/her goal of foot self-care.

Within the clinical setting an APN has multiple functions, however in developing, distributing, and evaluating a diabetic educational brochure his/her roles are narrowed. Generally , the APN's roles will mainly be to help in making decisions and communicating knowledge and skills. Utilizing Orem's (1995) concept, supportive/educative nursing intervention, the APN will function initially as an assessor which was previous discussed. For the purpose of this project the APN's main functions are, educator and practitioner to promote foot self-care.

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As educator, the APN can provide education to the diabetic clients on short and long term benefits of proper foot self-care. These long term benefits are decreased morbidity, mortality and amputations through prevention. Short term benefits are that they may be able to identify and report early changes in their feet during daily inspection.

As practitioner, the APN has expert knowledge in disease processes and presents alternative for working through a problem for the diabetic client and /or family. Improving foot self-care can be complicated if client's self-care needs are not met, the client and /or family may need guidance. The APN is brought in as a resource to prevent the client and /or family from having to use trial and error method to manage care. The APN should provide needed information and periodic updating as required. Also the APN as practitioner, can reduce individual health care cost, and treatment of early foot abnormalities, through knowledge of and utilization of all available resources to provide their clients with the best possible foot-care.

In the wake of managed care organizations controlling the health care system of this nation, the APN's effectiveness in providing cost-effective and high-quality care need documented positive enrollees outcomes. The implementation of this educational brochure by APN's through-out a managed care organization (e.g., Health Alliance Plan , [HAP]), to it's diabetic population could be beneficial to the organizational matrix. That is, the client is provided with preventive health care education and care, the APN as an effective primary care provider is evident, and the potential cost-saving outcomes realized by the organization's leaders.

Realistically, this author found it cumbersome utilizing Orem's SCDNT in the development of the education brochure for use in a primary care setting. Because, Orem's SCDNT is complex and at times the compound use of terms leads to some awkwardness for the practicing nurse user of the model. However once the various uses of terminology (e.g., self-care actions, self-care demand, self-care agency shared with others) are mastered, then the directions for nursing practice application become clear.

Implications For Nursing Education

Health care education has been emphasized in the literature as a major means to assure an effective therapeutic management program for the diabetic client and /or family. The key to the care of diabetes for the individual is self-care and this is best achieved through the educational process.

The importance of foot self-care capabilities should be integrated into the curriculum on management of the diabetic client for all levels of nursing education. Specific foot care education, may reduced both the incidence of disease and the expense associated with admission to hospital. Also, nurses are frequently the educator to diabetic clients on various health care skills. As a result, the nurse has more opportunities to address and /or intervene in the prevention, initial diagnosis, treatment, and education of self-care capabilities of the diabetic client.

Nursing education programs must also include the concept of self-care, especially in the changing arena of health care today, with it's increased focus on promotion and maintenance of health. Diabetes and it's complications (i.e. foot ulceration, and infections) can be minimized, and Orem's self-care approach may be helpful in encouraging self-care with this client population to increase foot self-care capabilities. Therefore, Orem's SCDNT, should be introduced at all levels of nursing education.

The advanced nurse should be a graduate level prepared nurse. The APN should have knowledge of health promotion and self-care, whether it be for persons who have no disease or for the person who have chronic health problems, is critical in our current health care system. Implementation of care that focuses on health promotion and self-care has been shown to be cost-effective (Safriet, 1992). Nursing has a tradition of placing emphasis on client education and counseling. Clients must be prepared to become active participants in their health care. To assure that APN can be effective in teaching and counseling, inclusion in curricula of content on educational strategies that are effective is necessary.

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The teaching of foot self-care in the diabetic population, can contribute to decreasing health care cost, by decreasing the potential for complications which in turn requires hospitalization, for the diabetic client. The APN who is Master prepared to promote early detection and self-care education can impact positively to the health care cost, and the overall well-being of the diabetic population and their feet.

All nurses should be informed about the perplexity of managing a chronic illness like diabetes, especially in regards to the health and well-being of their feet. The nursing professional has an obligation to empower clients and thus equip them with the knowledge to control their diabetes rather than to allow their diabetes to control them.

Implications For Future Research

The topic of the diabetic foot has been studied over a number of years and the climate of the public seems to indicate, that current attention given this topic will continue. Self-care in the diabetic client is also a topic that has been frequently studied and proven effective in preventing or delaying foot complications. However, the long-term effectiveness of foot self-care education will need longitudinal studies. Thus, it is recommended that the educational tool developed in this project be utilized at some point in time to address the following research questions.

1. Will the recipients of the review and take home brochure have improve retention of foot-care knowledge?
2. Will the recipients of the review and take home brochure have improve foot-care practices?
3. If there's improvement in foot self-care, is this a long or short term effect?
4. Are there specific sociodemographic variables that affect foot self-care education compliances?

APN's because they are cost-effective are being utilized for longitudinal studies such as the before mentioned recommendation, to collect and analyze data to see if positive outcomes are achieved. Finding from these studies , utilizing this brochure would be valuable in refining and improving the brochure to further enhance diabetic foot self-care education.

References

- Ahroni, J.H. (1993). Teaching foot care creatively and successfully. The Diabetes Educator, 19 (4), 320 - 324.
- American Diabetes Association. (1993). National standards for diabetes patient education and American Diabetes Association review criteria. Diabetes Care, 16, (2), 113 -118.
- American Diabetes Association. (1994). Medical management of non-insulin dependent (type II) diabetes. 3rd ed. Alexandria, VA: Author.
- American Diabetes Association. (1998). Clinical practice recommendation 1998. Diabetes Care, 21 (1).
- Barnett, A., & Odugbesan, O. (1987). Foot-care for diabetics. Nursing Times, 83(22), 224-26.
- Bennett, P. H. (1979). The basement membrane controversy. Diabetologic, 16, 280.
- Besssman, A. N., & Sapico, F. L. (1991). Infectious complications: A multifactorial problem. Diabetes Specialist, 4, 68.
- Bild, D. E., Selby, J V., Sinnock, P., Browner, W. S., Braveman, P, & Showstack, J. A. (1989). Lower extremity amputation in people with diabetes: Epidemiology and prevention . Diabetes Care, 12, 224 -31.
- Birke, J., Novick, A., Hawkins, E., & Patout, C. (1991). A review of causes of foot ulceration in patients with diabetes mellitus. Journal of Prosthetic and Orthotics, 4,(1), 113 -22.
- Bodzin, J. B. (1997). Type II diabetes: New treatment options. Home Healthcare Nurses, 15,(1). Lippincott-Raven Publishers.
- Boulton, A. J. M. (1998). The diabetic foot. Medical Clinics North America, 17, 1513 -1530.
- Boulton, A. J. M. (1994). The pathway to ulceration: Aetiopathogenesis. In: Bolton, A.J., Connor, H., Cavanagh, P. R.,eds. The foot in diabetes. 2 nd.ed. Chichester: Wiley. 37 -48.
- Braveman, I. M. (1971). Cutaneous manifestations of diabetes mellitus. Medical Clinic North Ameica. 55,1019.
- Brenner, M. A. (1987). Management of the diabetic foot. Baltimore: Williams & Wilkins.

Development 41

Bridges, R. M., & Deitch, E. A. (1994). Diabetic foot infections: Pathophysiology and treatment. Surgical Clinics North America. 74, 537 -555.

Brown, S. A. (1990). Studies of educational interventions and outcomes in diabetic adults. Patient Education Counseling. 16, 189 - 215.

Caputo, G. M., Joshin, N., & Weitekamp, M. R. (1997). Foot infections in patient with diabetes. American Family Physician. 56(1), 195 -202.

Cavanagh, J. S. (1991). Orem's model in action. MacMillan Education LTD.

Cavanaugh, P. R., Derr, J. A. , Ulbrecht, J. S., Maseer, R. E., & Orchard, T. J. (1991). Correlates of structure and function in the diabetic foot. Diabetologia. 34(2), A39.

Christensen, M. H., Funnell, M. M., Ehrlich, M. R., Fellows, E. P., & Floyd, J. C. (1991). How to care for the diabetic foot. American Journal of Nursing.

Coleman, W. C. (1992). Foot care in diabetes. Management of diabetes Mellitus: Perspectives of care across the lifespan. St. Louis, Mo: Mosby.

Conti, S. F., & Chaytor E. R. (1995). Foot care for active patient who have diabetes. The Physician and Sportsmedicine. 23(6), 55 -68.

Cooppan, R. & Habershaw, G. (1995). Preventing leg and foot complications. Patient Care. 35 -47.

Davidson, M B. (1986). Diabetes Mellitus, Diagnosis and Treatment, 2nd ed. New York, John Wiley & Sons.

Day, J. L. (1986). Patient education-how may recurrence be prevented. In: Connor, H., Boulton, A. J. M., & Ward, J. D., eds. The Foot in Diabetes. John-Wiley & Sons, Chichester. 135 -145.

Delbridge, L., Appleberg, M., & Reeve, T. S. (1988). Factors associated with development of foot lesions in the diabetic. Surgery. 19(6), 503 - 508.

- Denyes, M. (1988). Orem's model used for health promotion: Direction for research. Advances in Nursing Science, 11(1), 13 -21
- Department of Health and Human Services. (1991). Healthy People 2000: National Health Promotion and Disease Prevention Objectives. Washington, D. C.: Government Printing Office, 71 -117 (DHHS publication no. 91 - 50213).
- D'Eramo, G. & Frain, J. A. (1988). Adult foot care perceptions and practice. Practical Diabetology, 7(6), 1 -2.
- Diabetes Control and Complications Trial Researcher Group. (1993). The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. New England Journal of Medicine. 329, 977 -986.
- Donohue—Porter, D. (1985). Insulin - dependent diabetes mellitus. Nursing Clinic of North America, 20(1), 191 - 198.
- Donovon J. C., & Rowbotham, J. L. (1986). Foot Lesions in Diabetic patient: Cause, Prevention and Treatment. In: A. Marble, ed.
- Draskiewicz, C. (1992). Comprehensive care of the diabetic foot. Orthopedic Nursing, 11(2), 79 - 82.
- Ebskov, B. & Josephsen, P. (1980). Incidence of re-amputation and death after gangrene of the lower extremity. Prosthetic Orthotics, 4, 77 - 80.
- Edmons, M. E., Royle, J., Foster, A., & Watkins, P. J. (1986). Education reduces the recurrence of neuropathic foot ulceration. Diabetic Medicine, 3(3).
- Faris, I. (1986). The Management of the Diabetic Foot. Edinburgh: Churchill-Livingston.
- Felig, P., & Bergman, M. (1995). The endocrine pancreas: Diabetes mellitus. In: Endocrinology & Metabolism, 3rd ed, McGraw-Hill.
- Fisher, J. D., Rytting, M., & Heslin, R. (1976). Hands touching hands: Affective and evaluative effects of an interpersonal touch. Sociometry, 39, 416.

Development 43

- Fletcher, E. M. (1990). Foot care education in the community for people with diabetes. Practical Diabetes, 7, 171 -172.
- Flynn, M. S. & Tooke, J. E. (1992). Etiology of diabetic foot ulceration: A role for the microcirculation?. Diabetic Medicine, 9, 320 - 329.
- Foster, D. W. (1994). Diabetes Mellitus. In: Harrison 's Principles of Internal Medicine, 13th ed. McGraw-Hill. 1979 - 2000.
- Fry, F. B. (1977). Fry's readability graph: Clarification, validity and extension to level 17. Read, 21, 242 - 252.
- Frykberg, R. G. (1991). The High Risk foot in Diabetes Mellitus. New York, New York: Churchill Livingstone.
- Garrison, M. W., & Campbell, R. K. (1993). Identifying and treating common and uncommon infections in the client with diabetes. The Diabetes Educator, 19,(6), 522 -529.
- Gavin, J. R. (1997). Diabetes. Ebony. Johnson & Johnson Publication.
- Gerdomg, D. N., Piziak, V. K., & Rowbotham, J. L. (1991). Saving the diabetic foot. Patient Care, 25, 84.
- Gibbons, G. W. & Freeman, D. (1987). Vascular evaluation and treatment of the diabetic. Clinical Podiatry Medical Surgery, 4, 377 - 381.
- Gibbons, G. W. (1992). Diabetic foot sepsis. Vascular surgery, 5, 244 - 248.
- Graber, A. L., Wooldridge, K., & Brown, H. (1986). Effects of intensified practitioner-patient communication on control of diabetes mellitus. South Medical Journal, 79, 1205.
- Grayson, M. L., Gibbons, G. W., Habershaw, G. M.,& Rosenblum, B. I. (1994). Use of ampicillin / sulbactam verses imipenem /cilastatin in the treatment of limb-threatening foot infection in diabetic patients. Clinical Infections Disease, 18,(68), 3 - 93.
- Gregerman, R. I. (1995). Diabetes mellitus. Principles of Ambulatory Medicine, 4th ed. Baltimore, MA: Williams & Wilkins.

Development 44

Griffiths, J. (1981). Foot care for the diabetic patient. Health and Social Services, 91(4742), 533 - 536

Gronroos, C. (1990). Managing customer-perceived service quality. Service Management and Marketing, 49 - 70. Lexington, Mass: Lexington Books.

Hafner, L. (1966). Cloze procedure. Read, 9, 415 - 421.

Healthy people 2000, national health promotion and disease prevention objectives. (1990). U. S. Department of Health and Human Services, Public Health Services. Rockville, Md.

Hodges, D., Kumar, V. N., & Redford, J. B. (1986). Management of the diabetic foot. American Family Physician, 33, 189 - 195.

Hunt, C. (1995). NP's role in diabetic foot care is essential. NP news, 3(2), 7 - 9.

Jap, A. J., & Tooke, J. E. (1994). Is microvascular disease important in the diabetic foot ?. In: Boulton , A. J., Connor, H., & Cavanagh, P. R., ed. The Foot in Diabetes. 2nd ed. Chichester, Wiley.

Johnson, J. B. (1982). Diabetes education: It is not only what we say. Diabetes Care, 5, 343 - 345.

Joseph, A. C. (1989). The value of a nurse-run diabetes foot clinic. Diabetes Educator, 15(3), 223 -224.

Joslings, M. (1992). Diabetes Mellitus, 12th, ed. Philadelphia: Lea & Febiger.

Klare, G. R. (1974). Assessing readability. Journal of Reading, 10, 62 - 102.

Kruger, S. & Guthrie, D. (1992). Foot-care: Knowledge retention and self-care practices. The Diabetes Educator, 18(6).

Ledda, M. A., Walker, E. A., & Basch, C. E. (1997). Development and formative evaluation of a foot self-care program for African Americans with diabetes. The Diabetes Educator, 23(1), 48 - 51.

Levin, M. E., & O'Neal, L. W. (1988). The diabetic foot: Pathophysiology evaluation and treatment. In: Levin, M. E., & O'Neal, L. W. eds. The Diabetic Foot. St Louis, Mo. Mobsy Co.

Development 45

Levin, M. E. (1989). Diabetic foot lesions: Pathogenesis and management. Journal of Enterostomal Therapy, 17,(7), 29 - 34.

Litzelman, D. K., Slemenda, C. W., Langefeld, C. D. (1993). Reduction of lower extremity clinical abnormalities in patients with non-insulin diabetes mellitus: A randomized controlled trial. Ann Intern Medicine, 119(1), 336 - 41

McLaughlin, G. H. (1969). SMOG grading: A new readability formula. Journal of Read, 12, 39 - 46.

Michigan Diabetes Research and Training Center. (1986). Diabetes in Communities. Ann Arbor, MI: University of Michigan.

Moran, A., Hessett, C., Pooley, J., & Boulton, A. J. M. (1989). An assessment of patient's knowledge of diabetes, it's management and complications. Practical Diabetes, 6, 265 - 267.

National Institute of Health. (1995). Diabetes Statistics Publication, 96, 3926.

Orem, D. E. (1995). Nursing Concepts of Practice, 5th ed. St. Louis, Mosby.

Paduano, D. (1992). Skinful secrets. Caring for your outermost layer. Diabetes Self-Management, 9(1), 37 - 40.

Parker, E. M. (1990). Nursing Theories in Practice. New York, New York. National League of Nursing.

Pecoraro, R. E., Reiber, G. E., & Burges, E. M. (1990). Pathways to diabetic limb amputation: Basis for prevention. Diabetes Care, 13, 513 - 521.

Pecoraro, R., Ahroni, J., Boydo, E., & Stensel, V. (1991). Chronology and determinants of tissue repair in diabetic lower extremity ulcers. Diabetes, 40, 1305 - 1313.

Rankin, S. H., & Stallings, K. D. (1990). Patient Education: Issues, Principles and Practices. Philadelphia, PA: J. B. Lippincott Company.

Ratner, R. E. (1996). Review of diabetes mellitus. In: Haire-Joshu ed. Management of Diabetes Mellitus: Perspectives of Care Across the Life-Span 2nd ed. St. Louis, MO: Mosby.

Development 46

Reiber, G. E., Boyko, E. J., & Smith, D. G. (1995). Lower extremity foot ulcers and amputations in diabetes. In: Diabetes in America, 2nd ed. Washington, DC: National Diabetes Data Group, National Institute on Health.

Rettig, B. A., Schrauger, D. G., Recker., R. R., Gallagher, T. F., & Wittse, H. (1988). A randomized study of the effects of a home diabetes education program. Diabetes Care, 9(2), 173 - 178.

Ryder, R. E. J., Marshall, R., Johnson, K., & Ryder, A. P., Owens, D. R. Hayes, T. M. (1988). Acetylcholine sweat spot test for autonomic denervation. Lancet, 1,1305 -1310.

Safriet, B. J. (1992). Health care dollars and regulatory sense: The role of Advanced Practice Nursing. Yale Journal of Regulation, 9,417 - 487.

Sage, R. (1991). A fine design for foot care. Diabetes Forecast. 72 -75.

Teza, S. L., Wayne, K. D., Roland, G., & Hiss, M. S. (1988). Client knowledge compared with national guidelines for diabetic care. Diabetes Education, 14, 207 - 211.

Thai, A. C., & Eisenbarth, G. S. (1993). Natural history of insulin-dependent diabetes mellitus. Diabetes Review, 1,1 - 4.

Unger, R. H.,& Foster, D. W. (1990). Diabetes mellitus. In: William's Textbook of Endocrinology, 8th ed. Wilson, J. D., & Foster, D. W. eds. Philadelphia, PA. Saunders.

Wesley, R. L. (1994). Nursing Theories and Models, 2nd ed. Springhouse, PA. Springhouse.

Widmer, L. K. (1991). Critical Limb Ischemia Part 1: The Disease. Burgess Hill: Schering Health Care.

Wylie-Rosett, J., Walker, E. A., Shamoan, H., Engel, S., & Zybert, P. (1995). Assessment of documented foot examinations for clients with diabetes in inner-city primary care clinics. Archives of Family Medicine, 4(1), 46 - 50.

Yarborough, P.,& Gooddwin, R. (1992). OTC products for diabetic foot care. Practical Diabetology, 11,(1), 20 - 23.

Development 47

Zwemer, F. L. (1990). Amputations in diabetic Native Americans. The Provider, 15(8), 117 - 1120.

Appendix

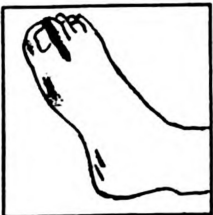
An educational brochure "Diabetic Self-Care Foot care" for the diabetic clients to enhance their self-care skills in the assessment and management of foot-care in a primary care setting.

1. Self - Care : Inspecting Your Feet

Inspecting your feet helps you catch small skin irritations before they become serious infections. Check daily for these warning signs that could mean your feet are in trouble. If you can't see your feet, ask a relative or friend to help. And see your primary care provider right away if you find a problem !

☐ Color Changes

Redness with streaks is often a sign of an infection. Pale or blue tones may mean poor circulation. Darkened skin is a sign that tissue has died.



☐ Swelling

Swelling, sometimes with color changes, may be a sign of poor circulation or infection. Symptoms include tenderness and an increase in the size of your foot.



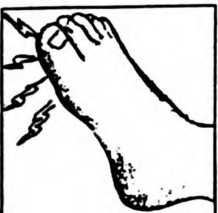
☐ Temperature Changes

Warm areas may mean that your feet are infected. Cold feet often are a sign that your feet aren't getting enough blood.



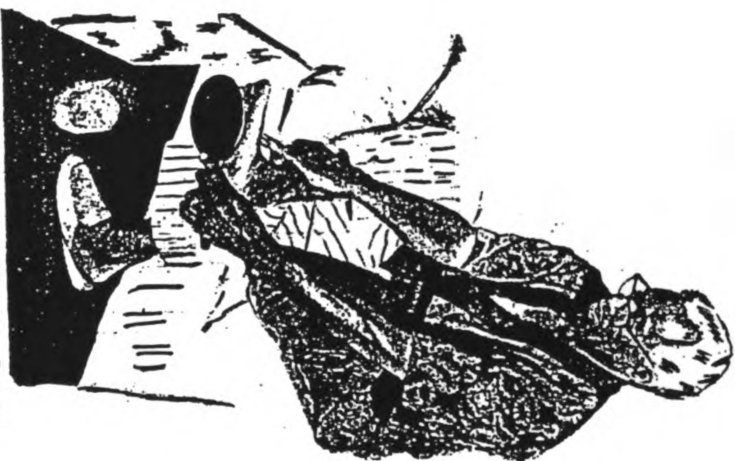
☐ Sensation Changes

Odd sensations like "pins and needles," numbness, tingling, burning, or lack of feeling may mean nerves are damaged.



Call your primary care provider if you notice:

- *redness or streaking
- *swelling
- *increased heat
- *fever and chills



A hand mirror is useful for checking the bottom of your feet.

☐ Hot Spots

Red "hot spots" are caused by friction or pressure. Hot spots can turn into blisters, corns (thick skin on toes), or calluses (thick skin on the bottom of the foot).



☐ Cracks, Sores, and Ulcers

Cracks and sores are caused by dry or irritated skin. They're a sign that skin is breaking down, which could lead to ulcers.



☐ Ingrown Toenails

Ingrown toenails are often caused by tight-fitting shoe or incorrect nail trimming. Symptoms include nails that are growing into the skin, swelling, redness, or pain.



☐ Drainage and Odor

Drainage and odor may develop from untreated ulcers. White or yellow moisture, bleeding, and odor are often signs of infection or dead tissue.

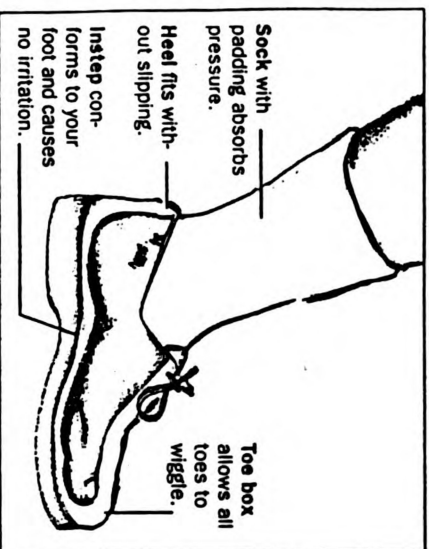


2. Self - Care : Keeping Your Feet Healthy

Keeping your feet healthy is a task you share with your primary care provider. One of the best ways to keep your feet in shape is to protect them with the right shoes and socks. What else? Do daily foot exercise, give your feet extra special care, and do what you can to control your diabetes.

Check Shoes and Socks

Shoes and socks that fit properly can prevent foot problems and keep existing problems from getting worse. Your primary care provider can make sure your shoes and socks fit well. When shopping for shoes, check that the toe box is roomy enough so you can wiggle all your toes. Avoid open-toed or open-heeled shoes. Choose soft, padded socks with seams that don't irritate your feet. Inspect your shoes and socks for anything that could rub against your feet.



Exercise Your feet

Exercising regularly can help the blood flow into and out of your feet and increase your flexibility. Special exercises for feet, as well as walking, swimming and bicycling, are good types of exercise. Call your primary care provider if exercising is uncomfortable, or if you notice any warning signs such as redness, burning, or tenderness during or after exercise.



Do your ABCs with each foot by spelling out the alphabet in the air. Doing ABCs can increase blood



Walk frequently. It's the best overall conditioner for your feet. Walking improves both your circulation and your general health.

Take Special Care

The self-care tips below can help prevent foot problems.

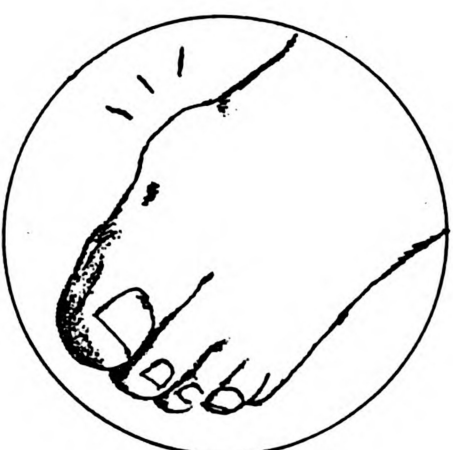
- Use warm water and mild soap to wash your feet every day, but don't soak. Dry well.
- Inspect your feet daily for cracks, blisters, scratches, or dry skin. If your feet are dry or scaly, use moisturizing cream.
- Avoid heating pads and hot water bottles. You could burn your feet.
- Don't cross your legs. It can reduce blood flow to your feet.
- Don't use razors or over-the-counter medications to treat corns and calluses. They could damage your feet.
- Don't smoke, since smoking can reduce blood flow to your feet.
- Never walk barefoot.

Control your Diabetes

A good foot care program includes controlling your diabetes. Eat low-fat, sugarless foods, monitor your blood sugar levels, take prescribed medications, and exercise daily. Regular checkups by your primary care provider can also help to control your diabetes. But the most important team player is **YOU!**

Diabetic Self-Care

Foot Care



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