EFFECTIVENESS OF FOOT CARE PACKAGE ON KNOWLEDGE AND SKILL REGARDING FOOT CARE AMONG DIABETIC CLIENTS AT SELECTED HOSPITAL, CHENNAI, 2011.

DISSERTATION SUBMITTED TO

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TABLE OF CONTENTS

CHAPTER	CONTENTS	PAGE NO.

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ABSTRACT

A true experimental study to assess the effectiveness of foot care package on knowledge and skill regarding foot care among diabetic clients at selected hospital, Chennai.

INTRODUCTION

Diabetic foot ulcer (DFU) is one of the most common complications of diabetes, have an annual incidence rate of 1% to 4% and a life time risk of 15 % to 25%. Peripheral neuropathy is a major contributing factor in the development of DFU, along with deformity, callus, trauma, and vascular insufficiency. DFUs are often recalcitrant to treatment and associated with serious medical complications, such as (osteomyelitis), lower limb ischemia, amputation and death. Approximately 15% of lower extremity amputations in patient with diabetes are precipitated by a foot ulcer.

Care of diabetic client's feet is extremely important to prevent foot ulcer and amputation, patient education about foot care should include advice on daily foot inspection, daily foot wash, Nail cutting and appropriate foot wear. Physical examination should be directed toward the underlying pathology of foot ulceration. Neuropathy may be easily evaluated by monofilament test.

Objective

To assess the effectiveness of foot care package on knowledge and skill regarding foot care among diabetic clients.

METHODOLOGY

Design

True experimental pre test and post test design.

Setting

Diabetic Out Patient Department, Sir Ivan Stedeford Hospital

Participants

60 diabetic clients, who fulfilled the sample selection criteria, were selected as samples using simple random sampling technique (Lottery Method).

Measurements and Tool

The level of knowledge was assessed using structured questionnaire and the level of skill was assessed using observational checklist. Both descriptive and inferential statistics were used for analysis.

Intervention Protocol

It consisted of foot care package in prevention of foot ulcer among diabetic clients

- ❖ **Brief discussion** on the definition, causes, development of foot ulcer, and its manifestation, complications and preventive measures.
- ❖ **Demonstration** of foot care technique to diabetic clients which includes daily inspection of feet, cleaning, creaming of feet, trimming of toe nails
- ❖ **Pamphlets** on foot care guidelines.

RESULTS

The findings of the study revealed that the overall pretest mean score of knowledge was 4.43 with S.D of 1.57 and the overall post test mean score of knowledge was 16.03 with S.D of 1.79 the mean improvement knowledge score was 8.96. It showed that after the administration of foot care package there was a high significant improvement in the knowledge level of the diabetic clients with a 't' value of 57.670 at $p < 0.001$, the overall pretest mean score of skill was 2.93 with S.D 0.78 and the overall post test level of skill score was 8.40 with S.D 0.49. it showed after the administration of foot care package there was a high significant

improvement in the skill level of the diabetic clients with a 't' value of 30.767 at p<.0.001 level.

DISCUSSION

There was a significant improvement on knowledge and skill of diabetic clients in the post test after giving the foot care package. Thus the foot care package was effective in improving the knowledge and skill of diabetic clients which in turn will improve the quality of life and prevent foot ulcer.

Implications for Clinical Practice

The nurses should update their knowledge by attending seminars, continuing education programmes, workshops and conferences. All nurses who care for the diabetic clients should cultivate the habit of educating prevention advices to the client and family members. The nurses should take initiatives to formulate protocols on various aspects of diabetic foot and render standardized nursing care during hospitalization and on follow up visits. Nurse led educational program should become a reality in India which invites the nurses with higher level of educational qualification should start education based diabetic foot clinic in every community.

CHAPTER – I

INTRODUCTION

BACKGROUND OF THE STUDY

Diabetes is the global epidemic with devastating human, social, and economic consequences. The disease claims as many lives per year as HIV/AIDS and places a severe burden on health care system and economics everywhere. Diabetes is the 4th leading cause of death by disease globally and accounts for 60% of total death annually.

World Diabetes Foundation (2010) estimated that 250 million people worldwide have diabetes representing roughly 6% of the adult population (20-70) age group. The number is expected to reach 438 million by 2030 representing 7.1% of the adult population.

Diabetes mellitus is a metabolic disorder of multiple etiologies characterized by chronic hyperglycemia with disturbance of carbohydrate, fat and protein metabolism resulting from defect in insulin secretion, insulin action or both. **(American diabetes association 2003)[2].**

Table 1: Complications of diabetes mellitus.

Acute Complications	Chronic Complications
Hyperglycemic Hyperosmolar State	Micro vascular Complications
Diabetic ketoacidosis	Macro vascular Complications
Diabetic coma	-

Micro vascular complications:

- ❖ Coronary artery disease (50%)
- ❖ Neuropathy (50%)
- ❖ Nephropathy (10-20%)
- ❖ Retinopathy (10%)

Macro vascular complications:

- ❖ Stroke (50%)
- ❖ Peripheral vascular disease (23%)
- ❖ Diabetic myonecrosis (9%)

Table 2: Global Prevalence of diabetes- World Health Organization (2005)

Country	In 2000	In 2030
Africa	1,71,000,000	3,66,000.000
America	33,016,000	66.812,000
Europe	33,332,000	47,973,000
India	31,705,000	79,441,00

Diabetes can affect the feet due to

1. Neuropathy
2. Peripheral vascular disease
3. Infection

Accidents are the primary cause for amputation among diabetic clients. After accidents diabetes associated foot problems are the second most common cause of lower limb amputation. The risk of lower limb amputation is 15-46 times higher in diabetes than in persons who don't have diabetes mellitus. Foot complications accounts for 25 % of all diabetic patients admitted in United States and Great Britain. **(American academy of family physician. 2007[41])**

Diabetic foot ulcer: **fig 1. Foot ulcer**

Diabetic foot problems and foot ulcers are the most serious and costly complications and important cause of morbidity in diabetic people over the years.

Diabetic foot ulcers are sores that occur on the feet of people with type 1 & type 2 diabetes mellitus. The two main risk factors that causes diabetic foot ulcer are peripheral neuropathy, micro as well as macro ischemia. Peripheral neuropathy causes loss of
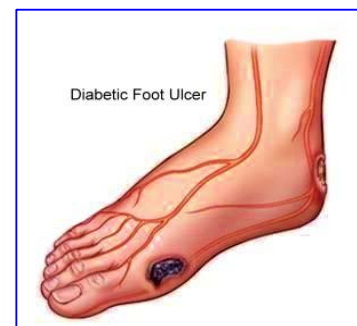
pain or feeling in the toes, feet, legs and arm due to distal nerve damage and low blood flow supply, (atherosclerosis, arteriosclerosis) very less oxygen and eventually death of tissues in feet occur.

Diabetic Foot Society of India (2005) estimated that 84 % of all lower limb amputations are preceded by foot ulcers in diabetic clients and every single day, 110 Indians have a foot or part of their leg amputated due to diabetic foot ulcer.

Table 3: Global Prevalence of Diabetic Foot Ulcer - International Diabetes Federation (2004).

Country	Prevalence
Netherland	20.4%
Iranian	20%
Nigeria	11.7%
India	6-11%
South east Asia	4-10%
Kenya	4.6%
America	1-4%
South India	3.6%

NEED FOR THE STUDY

Most amputations begin with foot ulcer, in developed countries up to 5% of people with diabetes have foot ulcers and one in every 6 people with diabetes will have an ulcer during their lifetime. Every 30 seconds a leg is lost to diabetics somewhere in the world **(The Lancet 2005)**.

For most people who have lost a leg life will never return to normal. Amputation may involve life long dependence, inability to work and much misery

even after amputation takes place. The remaining leg and the person's life can be saved by good follow up care from a multidisciplinary foot care team.

Journal of American Podiatric Medical Association (2005)[84] recommended that annual foot examinations by health care providers can substantially reduce the risk of lower extremity amputation. Incorporating foot care education into the foot screening process increases or reinforce patient knowledge of self care.

The American Diabetes Association (2005)[88] reported that all patients with type 2 diabetes should be screened for poly neuropathy upon diagnosis and at least annually thereafter. It's recommended that patients with diabetes should have a comprehensive foot exam, including assessment of the skin, bone, muscles, circulation, and sensation. Upon examination, a decrease in deep tendon reflexes is often found. This may be the only indication of neuropathy changes in a patient who's asymptomatic. The healthcare provider may assess protective sensation in the feet by touching them with a monofilament (similar to a bristle of a hairbrush) or by pinprick. Patients who can't feel the touch have loss of protective sensation and are at increased risk for foot injury.
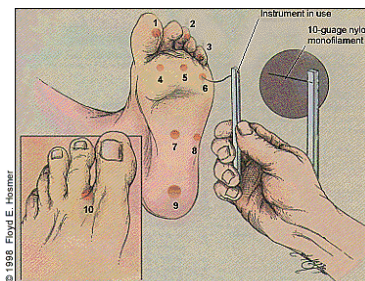
Fig.2: Monofilament Test

Vedhara K (2008)[82] conducted a qualitative study to assess patient perspectives on foot complications in type 2 diabetes mellitus, most participants were unsure of what are the causes of foot ulcer and complications of diabetic foot, preventive measure. This study concluded that people with diabetes have different beliefs on diabetic foot complications that hampers foot self care

practices. So health care personnel need to explore the beliefs underlying patients foot self care practices.

Diabetic foot complications can have dramatic effects on the patient's health and general well being and can be expensive to treat. For example, in 2001, diabetes-related foot ulcers and amputations were estimated to cost U.S. health care payers $11 billion. Although much effort has been made to determine cost-effectiveness of the care of diabetic individuals with foot ulceration and those who require amputation, It cost only 3 US dollar to educate a diabetic client so he will be able to take care of his feet and prevent foot ulcers where as it costs an estimated 650 US dollars to amputate a limb and another 524 dollars for limb prosthesis. So it is better to educate a client on foot care than manage foot complications.

Ramachandran, et al., (2007)[67] had conducted amputation preventive initiative among 4872 diabetic clients in South India to determine the effectiveness of foot care strategy to prevent foot ulcer. 57 % followed the instruction strictly and 43 % did not follow well. A significantly larger proportion who did not follow the advice developed foot ulcer (26%) than who followed the advice (5%). The study concluded saying that foot care education are helpful in preventing foot ulcer.

International Diabetes Federation (2010) guidelines for prevention of foot ulcer are as follows
- Annual inspection of foot
- Identification of foot at risk
- Education of people with diabetes and health care professionals.
- Use of appropriate foot wear.

The investigator had personal experience of witnessing client with diabetic foot ulcer and its impact on personal and family life. Most of the client land up with complications like foot ulcer due to ignorance and lack of motivation. Investigator being specialized in the field of medical surgical nursing from her clinical

experience, review of literature and discussion with experts felt a strong need to promote healthy means for control of diabetic foot complications. So the investigator decided to do a study on the effectiveness of foot care package on knowledge and skill regarding foot care among diabetic clients.

STATEMENT OF THE PROBLEM

A true experimental study to assess the effectiveness of foot care package on knowledge and skill regarding foot care among diabetic clients at selected hospital Chennai.

OBJECTIVES

1. To assess the pretest and post test level of knowledge regarding foot care among Group A and Group B.
2. To assess the pretest and post test level of skill regarding foot care among Group A and Group B.
3. To compare the pretest and post test level of knowledge and skill regarding foot care among Group A and Group B.
4. To compare the pretest and post test level of knowledge and skill regarding foot care between Group A and Group B.
5. To correlate the mean differed level of knowledge with mean differed level of skill regarding foot care among Group A and Group B.
6. To associate the mean differed level of knowledge and skill regarding foot care with their selected demographic variable among Group A and Group B.

OPERATIONAL DEFINITIONS

Effectiveness

It refers to the outcome of foot care package which includes changes in the level of knowledge and skill on foot care in prevention of foot ulcers, which was assessed using structured questionnaire and observational checklist

Foot Care Package

It is a groups of interventions administered to diabetic client in order to keep the feet healthy and free from injury and infection which includes,

❖ **Brief discussion** on the definition, causes, development of foot ulcer, and its manifestation, complications and preventive measures.

❖ **Demonstration** of foot care technique to diabetic clients which includes daily inspection of feet, cleaning, creaming of feet and trimming of toe nails

❖ **Pamphlets** on foot care guidelines.

Knowledge

It refers to the existing and changes in the level of information on foot care measures known by diabetic clients. It was assessed using structured questionnaire.

Skill

It refers to learned ability of the diabetic client to perform foot care with ease.

Foot Care

It refers to the self cleaning measures performed by the diabetic clients to keep their feet healthy.

Diabetic Clients

Adults who are aged 40 yrs and above, who are medically diagnosed with diabetes mellitus and are on regular treatment of Oral hypoglycemic agent or Insulin.

ASSUMPTIONS

1. Diabetic clients are prone to develop foot ulcer due to improper foot care.
2. Diabetic clients may have some knowledge and skill on foot care.
3. Providing foot care package may enhance their knowledge and skill on foot care in prevention of foot ulcer.

NULL HYPOTHESES

NH$_1$:   There is no significant difference in the pretest and post test level of knowledge regarding foot care among Group A and Group B at p<0.05 level.

NH$_2$:   There is no significant difference in the pretest and post test level of skill regarding foot care among Group A and Group B at p<0.05 level.

NH$_3$:   There is no significant difference in the pretest and post test level of knowledge and skill regarding foot care between Group A and Group B at p<0.001 level.

NH$_4$:   There is no significant correlation between the mean differed levels of knowledge with mean differed level of skill regarding foot care among Group A and Group B at p<.05 level.

NH$_5$:   There is no significant association between the mean differed level of knowledge and skill regarding foot care with the selected demographic variables among Group A and Group B at p<.05 level.

DELIMITATIONS

The study was limited to a period of 4 weeks

CONCEPTUAL FRAMEWORK

A conceptual framework is a structure of concepts and or theories pulled together as a map for the study (**Betty M. Johnson, 2005**)[7]**.**

Interaction theories are based on the relationships among persons. Emphasis is given on the person's perceptions, self concept and ability to communicate and perform roles there by goal is achieved through reciprocal interaction.

In view of explaining and relating various aspects of the phenomena being studied related to the interaction between the Nurse Investigator and the diabetic clients regarding prevention of foot ulcer the investigator has adopted **Evelyn Adams** interpersonal theory to conceptualize the research study.

Evelyn Adams was one of the earliest nurse theorists born in 1929 in her theory she focused on nurse's independent contribution to health services which she calls independence nursing. Adam insist that the helping relationship and the system process are important to achieve professional goal

She focused on the following component
- Interaction
- Assessment
- Goal setting
- Intervention
- Change in behaviour

Interaction:

Human relationship between the beneficiary and the professional that aids the helpee (diabetic clients who are at risk for foot ulcer) to live more fully. In interaction phase the nurse investigator and patient together interacted and developed helping relationship. This relationship and systemic process helped the nurse investigator to render foot care package with less difficulty.

Assessment

Assessment is the instrument used in collecting information about the beneficiary e.g., the nursing history tool and data collection tool. In this phase assessment refers to the assessment of demographic variables, risk assessment and estimation of knowledge and skill on foot care among Group A and Group B. Nurse Investigator used foot risk assessment tool to identify the risk and assessed the pre-test level of knowledge and skill using structured questionnaire and observational checklist.

Goal Setting

It refers to at the end the investigator and clients strive to achieve change in behaviour, in this study it refers to prevention of foot ulcer.

Intervention

It refers to the Focus and modes of the professional intervention to bring changes in client's behaviour. In this study the intervention phase refers to administration of foot care package by the investigator to the diabetic clients.

Change in Behaviour

A substitution of one thing in place of another (an alteration). In this study it refers to the new behaviour indicated by the positive outcome in the attainment of adequate knowledge and favourable skill regarding foot care. This may be reinforced by further teaching.

The nurse investigator believes that the positive outcome will lead to the attainment of strengthened evidence based practice among diabetic clients through the utilization of foot care package which will improve the quality of life and prevent foot complication

OUTLINE OF THE REPORT

CHAPTER I   **:**   Dealt with the back ground of the study, need for the study, statement of the problem, objectives, operational definitions, null hypotheses, assumptions, delimitations and conceptual frame work.

CHAPTER II   **:**   Focuses on review of literature related to the present study.

CHAPTER III   **:**   Enumerates the methodology of the study.

CHAPTER IV   **:**   Presents the data analysis and data interpretation.

CHAPTER V   **:**   Deals with the discussion of the study

CHAPTER VI   **:**   Gives the summary, conclusion, implications, recommendations and limitations of the study.

The study report ends with selected Bibliography and Appendices.

CHAPTER – II

REVIEW OF LITERATURE

This chapter deals with the related literature review which aids to generate a picture of what is known and not known about a particular situation it includes a written summary of the state of existing knowledge on the research problem. The review of literature includes a broad comprehensive, in-depth, systematic and critical review of scholarly publications, unpublished scholarly print materials, and personal communication in the study topics for the logical sequence of that chapter is organized in the following sections.

LITERATURE REVIEW

Section A :   Studies related to general information on diabetic foot ulcer.

Section B :   Studies related to efficacy of Seims Weinstein monofilament test.

Section C :   Studies related to effectiveness of foot care package in prevention of foot ulcer.

SECTION A: STUDIES RELATED TO GENERAL INFORMATION ON DIABETIC FOOT ULCER

Lavery, LA., et al., (2008)[56] did descriptive study in USA to identify causal pathways and pivotal factors associated with the development of foot ulcers, among 103 patients 87 patients were with recently healed foot ulcer. A cluster analysis found pathways accounted for 64.1% of cases. They were namely 1) neuropathy, 2) peripheral vascular disease 3) penetrating trauma 4) ill-fitting footwear**.** The study results suggested that if the casual factors are identified and addressed with appropriate intervention it may reduce the risk for the cascade of events towards ulceration and subsequent amputation.

Unnikrishnan, AG., etal., (2008)[79] reported that Diabetic foot disease is an important cause of morbidity and mortality in persons with diabetes mellitus. The commonest presentation of diabetic foot is an ulcer. Neuropathy, ischemia and infection are the main pathogenic factors involved. Clinical examination and investigations are focused on identifying the etiology as well as the extent of foot disease.

Frigg A., & Fard, AS., (NOV 2007)[95] conducted a cohort study in Canada with 100 diabetic foot ulcer client on the basis of risk factor assessment and physical examination. Approximately 20 % of hospital admissions among diabetic clients were as the result of foot problems and had never attended diabetic clinic, not followed foot care measures. At the end he concluded that awareness of nurses about foot problems, regular foot care, patient education, simple hygienic practices and provision of appropriate foot wear can decrease ulcer occurrence by 50%.

Viswanathan, V (2007)[109] conducted descriptive study on diabetic foot complication at India. A total of 1319 type 2 diabetic clients were selected from four different centers across India the prevalence of neuropathy was 15% (n=193) and PVD was 5% (n=64). Infections were present in 7.6% (n=100) of patients. Nearly 3% of subjects had undergone a minor or major amputation. He concluded that Neuropathy (15%) was found to be a major risk factor for diabetic foot infections.

Armstrong, DG (2007)[41] conducted a study on diabetic foot ulcer and found that foot ulcer is one of the major complications of diabetes mellitus it occurs in 15% of all patients with DM and precedes 84% of all lower leg amputation. Major increase in mortality among diabetic patients observed over the past 20 years is considered to be due to the development of macro and micro vascular complications including failure of the wound healing process.

SECTION B: REVIEWS RELATED TO SEIMS WEINSTEIN MONOFILAMENT TEST

Argianna GV., et al., (2011)[40] conducted a cross sectional study in Greece to assess the effectiveness of monofilament test to check diabetic neuropathy, the results revealed that 80% amputation in clients with diabetic are preventable by neuropathy testing, monofilament test is simple, reproducible and widely available and has a high sensitivity for the diagnosis of clinical or sub clinical neuropathy.

Journal of vascular surgery (2010)[54] reported that the seims Weinstein monofilament examination is a significant predictor of the risk of foot ulceration and amputation in patients with diabetes mellitus, irrespective of type of diabetes mellitus all clients should be screened for risk of developing diabetic foot ulcer by monofilament test.

Pataky Z. (2007)[64] conducted a large population based study with foot disease in diabetic clients. Elderly diabetic clients are particularly burdened by foot disease, the main cause for foot disease are peripheral neuropathy which could be detected accurately by using seimms Weinstein monofilament test.

Fletcher J. (2006)[49] published the Prevention of diabetic foot ulcer in a primary care setting. Brief history and screening for loss of protective sensation via the Semmes Weinstein monofilament test may enable clinician to stratify patient based on risk and help determine the type of intervention like patient education, glycemic control, smoking cessation, diligent foot care.

SECTION C: STUDIES RELATED TO EFFECTIVENESS OF FOOT CARE PACKAGE IN PREVENTION OF FOOT ULCER

Abbas., ZG., (2011)[38] did retrospective study in Tanzania on importance of transfer of knowledge and foot complication. In 2004-2007 3860 people screened to have risk for foot ulcer and foot care education was given to all clients and reassessed after 6 month, results revealed that 29% had amputation. The study

concluded that there was a significant increase in the knowledge level after education programme (p <0.001).

Mcinnes A., (2011)[63] conducted an observational study in Europe on quality of care provided to diabetic clients. In this study four main health behaviors were identified. Those at low risk of developing foot complications are control of blood glucose levels; attendance at annual foot screening examination; reporting of any changes in foot health immediately; and the engagement in a simple daily foot care routine. Study concluded that foot health measures should be followed strictly to reduce the occurrence of ulcer.

Tan LS. (2010)[77] conducted a descriptive study in Calcutta found that high prevalence of neuropathy promotes recurrence of foot ulcers. As well as hyperglycemia is a major contributor factors for foot problems. Regular inspection of the feet for signs of neuropathy and other risk factor would play a major role in the prevention of foot ulcer. Patient education for foot care and early institution of preventive measures by the nurses in view of the high prevalence of neuropathy test will help in reducing the morbidity and economic burden from diabetic foot.

Al wahbi, AM., (2010)[39] conducted experimental study in Saudi with 41 diabetic clients (study group=21, control group=20) to assess the impact of a diabetic foot care education programme on limb amputation rate. The rate of amputation was 70% in control group and 61.9% in study group after supplementation of foot care education programme. The study identified the significant role of foot care education program in prevention of diabetic foot disease and decreased rate of extremity amputation.

Flahr, D., (2010)[48] did a quasi experimental study to assess the effect of weight bearing exercise on diabetic foot ulcer at Canada. 10 patients (88.9%) were randomized to ankle exercise treatments and nine (50%) continued routine care. The result of the study showed that 60% of patients who were projected to ankle

exercise had no risk of foot ulcer where as in control group 52% had high risk of foot ulcer, study concluded that foot exercise also an element to prevent foot ulcer and it can be used in foot care strategies.

Anselmo, MI., (2010)[90] conducted a pre experimental study among 60 diabetic clients in Brazil to evaluate the impact of foot care on risk for foot ulcer. On routine visit standardized education on foot care given, analysis showed that 8.7 % had a regular foot wear, 65% done a foot inspection, 28.3% had done a additional inspection, 77 % did creaming, 83% done a nail care, 77 % inspected shoe, 95 % had avoided bare foot walk, risk for foot ulcer shows only 30%, the result suggested that regular foot care is essential to prevent foot ulcer.

Cisneros, LL., (2010)[93] had done an experimental study with 53 diabetic clients to evaluate the effectiveness of foot care education. After 1 year the ulcer incidence rate was 38.1 % compared to 51.1 5 in the control group, after two year the participants in the intervention group had a 75 % chances of being ulcer free, compared with 61 % in the control group and these results are more evident to show the importance of foot care education in prevention of foot ulcer.

Sun, PC., (2009)[76] conducted retrospective study to evaluate the self care behavior on foot care among 302 diabetic clients in Taiwan. 155 patients received group education on foot care, 147 patients did not receive any education both the group had showed inappropriate self care behavior on foot care the study results revealed that giving disease specific information such as twice a day foot wash, avoiding bare foot walk can prevent development of foot ulcer.

Heureux M., etal. (2009)[100] rehabilitation medicine USA reported that Diabetic foot ulcerations are a costly and common public health challenge. Although several organizations have emphasized the need to increase awareness of this problem and called health care providers to action to decrease the incidence of

ulceration and amputation, there is limited evidence regarding what interventions are best suited to accomplish this goal.

Vatankah., (2009)[81] conducted experimental study in Tehran to evaluate the impact of a simple educational program on the knowledge and practice of people with diabetes. 2148 people with diabetes underwent face-face education on foot care .The applied educational intervention had improved their knowledge and practice about diabetic foot care (p<.001 and p+.001) In conclusion the findings of the study showed that a simple face to face education is an effective and applied method to improve the knowledge about foot care.

Vedhara, K., (2009)[82] did qualitative study in India to assess the patient perspectives on foot complication in type 2 diabetes mellitus,8 samples were selected, most participants were unaware of foot ulcer, causes and preventive measures, complications of diabetic foot. Findings of the study concluded that people with diabetic have different belief on diabetic foot complications that hampers foot self care practices. So health care personnel need to explore the beliefs underlying patients foot self care practices to prevent foot ulcer.

Lewis, C., (2007)[59] conducted experimental study among 59 diabetic clients in San Francisco to assess the efficacy of education on foot complication. Analysis of the data showed statistically significant increase in foot care knowledge after the teaching session compared with before. (69% to 85% p<.001). study concluded that clients knowledge on foot care was improved after an education program.

Rasli, MH., (2008)[69] had done prospective study among 557 diabetic clients on foot problem and effectiveness of foot care education at royal hospital Australia. Among 557 clients 312 clients found to be at risk for foot ulcer. Foot care education was given and patients were examined; significant reduction of modifiable foot problem was seen at follow up. This study highlighted the

importance of foot examination and foot care advice for diabetic clients to optimize preventive intervention.

Schmidt, S., (2008)[73] conducted cross sectional study among 269 diabetic clients in Germany, to assess the self care activity. Patients who had participated in more than 3 educational program performed significantly better self care than patients who had no training program. The study concluded that patients with a foot at risk need more professional support for their daily self care activities to prevent diabetic foot ulcer than patient who had no risk for foot ulcer.

Ramachandran, etal., (2007)[67] conducted large clinical based study on diabetic foot complications in Chennai. He found that diabetic foot disease is dreaded complication, Causing severe economic and social burden, mental and physical agony and severe morbidity and mortality. This complication is largely preventable if the risk factor such as peripheral neuropathy and peripheral arterial disease are detected early and appropriate measures are taken. He also focused on the need for preventive care for diabetic foot complications for industry in India.

Rodrigo C. (2007)[71] conducted pre experimental study on patient awareness of foot care in turkey. 59 patients recently diagnosed with diabetes mellitus were recruited for 7 sessions. Foot care education was given, Analysis of the data showed a statistically significant improvement in foot care knowledge. Study concluded that increased level of knowledge had beneficial effect on small group.

May field, JA., (2007)[62] conducted population based case control study among Pima Indian at USA to assess the importance of foot examination. 61 clients who had amputation were compared with 183 clients who had no amputation. Analysis of the finding revealed that client with amputation had 3 times foot examination/case, where as client without amputation had 7 foot examination/case and study confirmed that foot examination decrease the risk of amputation and effective in reducing the amputation risk.

Kalish, J (2007)[54] conducted cross sectional study with 148 diabetic clients to assess the knowledge and practice of foot care in Iranian people. Non literate patients were the least knowledgeable (p=.008), 56% not aware of the effect of smoking on the feet, 60% failed to inspect the feet and 42% did not know to trim their nail, 62% were followed the high risk practices. The results revealed that inadequate knowledge have relationship with poor self care among Iranian people.

Morritt taub., etal., (2006)[104] conducted an experimental study in United Kingdom to determine whether intensive education and case management of diabetes will prevent amputation. He included 83 diabetic clients, study group underwent a diabetic education program on self care monitoring and control group underwent routine care. The result of the study revealed that there were no amputation in the study group where as 5 amputations where noted in the control group.

Nair DG (2006)[105] **conducted case record study in MV diabetes centre Chennai.** He found that diabetes mellitus is well known for development and progression of peripheral arterial however by advocating an aggressive approach to peripheral arterial disease management good result in survival and limb salvage can be achieved. Diabetic clients will be at most risk so that preventive measures can be undertaken to prevent foot ulcer.

Green, T., (2005)[97] conducted a population based case control study with 100 diabetic clients to evaluate the effectiveness of foot education program. Two session of education program was provided to all participants on foot self examination, foot washing, proper foot wear. Study found that education program improved the foot care knowledge and behavior of high risk patients who attended education program, than those who has not attended educational program.

Kumar (2005)[55]conducted a cross sectional survey in Chandigarh on 60 diabetic clients to assess the existing knowledge and practice on foot care and complication of diabetes mellitus. The study revealed that foot care was done by 63.3 %, client oriented foot care educational program was given to all 60 clients and reassessment done after 3 months post test was done it showed 83% of people perform regular foot care after educational program.

American orthopedic foot and ankle society (2005)[111] recommended guidelines for foot care. The screening examination include evaluation of peripheral neuropathy, skin integrity, ulcer or wounds deformity, vascular insufficiency and foot wear, foot specific patient education includes instruction on self examination and foot care practices. Individualized foot specific patient education is indicated for patient with peripheral neuropathy. Treatment combines patient education, orthose, foot wear and a time table for ongoing skin and nail care.

Journal of Indian medical association, (2004)[61] reported micro vascular and macro vascular complications in relation to diabetes mellitus. Uncontrolled diabetes mellitus is responsible for major morbidity and mortality condition. The highest priority at present to prevent diabetic neuropathy is the education of patients and their family about the detection and treatment of early neuropathy. Amputation in diabetic foot can be dealt with a no of prevention strategies like .careful self examination, use of fitted shoes, Minimization of trauma.

Pollock RD (2004)[66] said that diabetic foot screening is to identify foot problem, determine a foot risk category for patients, and to instruct patients with diabetes and their families in proper foot care. The screening technique is simple and can be used in clinical setting or at the bed side. Incorporating foot care education into the foot screening process increases or reinforces patient knowledge of self care, such knowledge empowers patients to join with their health care team to decrease the incidence of ulceration and amputation.

American Journal of family physician practice (2004)[44] (unpublished theses) diabetic foot complications are common and often result in recurrent morbid event. several studies have indicated that prevention practice are effective in preventing the development of foot ulcer and amputation .the first step in lower extremity ulcer prevention program is a systematic foot examination and risk stratification to select patients for more intensive prevention efforts.

Valk, GD., Kriegsman DM., (2002)[80] carried out Randomized Control Trial to assess the effectiveness of patient education on foot ulcer prevention among diabetic clients of north America. A study involving high risk patients reported a reduction in ulcer incidence. 2 trials showed that participant's foot care knowledge significantly improved with education. In one RCT patient education as a part of complex intervention to reduce the prevalence of foot lesion at 1 year and improved foot care behavior. The results showed that foot care education holds promise in reducing the chance of foot ulcer.

Pinzur, MS., (2002)[110] carried out an experimental study to assess the effectiveness of foot screening, foot care education program among 403 diabetic clients in USA. The ulcer incidence was decreased from 66.5% to 43% among the study group after the foot care education program. So the study concluded that foot screening and foot care is effective in reduction of foot ulcer.

Plummer ES (2001)[65] conducted cross sectional study with 136 diabetic clients in los angels. Peripheral vascular disease was found in 25% of patients. Neuropathy found in 53% of patients a screening algorithm was developed to provide guidelines for individualizing foot care education and referral of patients with diabetic foot disease. The recommendation included that annual diabetic foot assessment and education for those at risk for foot ulcer was given.

CHAPTER – III

RESEARCH METHODOLOGY

This chapter deals with the methodology adopted for the study. It includes the research design, variables, setting, population, sample, sample size, sampling technique, and criteria for selection of the sample development and description of the tool, content validity, pilot study, and reliability of the tool, data collection procedure and plan for data analysis.

RESEARCH DESIGN

The research design used for this study was true experimental pre test and post test design. Based on **Polit and Hungler (2011)[30]** the schematic representation of true experimental (pretest and post test design) study frame work was;

<table>
<tr><th rowspan="7">Randomization</th><th>Group</th><th>Pretest
O_1</th><th>Intervention
X</th><th>Post Test
O_2</th></tr>
<tr><td>Group A</td><td>Assessment of pretest level of knowledge and skill regarding foot care among diabetic client was assessed by using structured questionnaire and observational checklist</td><td>Administration of foot care package with hospital routine care</td><td>Assessment of post test level of knowledge and skill regarding foot care among diabetic client was assessed by using same tool</td></tr>
<tr><td>Group B</td><td>Assessment of pretest level of knowledge and skill regarding foot care among diabetic client was assessed by using structured questionnaire and observational checklist</td><td>Hospital routine Care such as administration of OHA, Insulin, routine follow up.</td><td>Assessment of post test level of knowledge and skill regarding foot care among diabetic client was assessed by using same tool.</td></tr>
</table>

VARIABLES

Independent Variable

Foot care package for diabetes mellitus clients.

Dependent Variable

      Knowledge and skill on foot care of diabetes mellitus clients.

Extraneous Variables

      Age, gender, education, income, occupation, dietary pattern, family history of diabetes, duration of disease, treatment method, co-morbid illness, personal habits, previous knowledge on foot care and types of foot wear.

SETTING OF THE STUDY

      The study was conducted in Sir Ivan Stedeford Hospital, Chennai. It is 220 bedded Multi Specialty hospital, approximately 100 diabetic clients are attending the diabetic outpatient department (OPD) every day. The diabetic outpatient department (OPD) functions from Tuesday to Saturday between 8am-1pm, under the control of 6 diabetologist. Round the clock inpatient services also provided to diabetic clients.

POPULATION

      The study population included were the diabetic clients those who attended the diabetic outpatient department at Sir Ivan Stedeford Hospital, Chennai.

Target Population

      The target population for the study was Diabetic clients who were registered at diabetic outpatient department of Sir Ivan Stedeford Hospital.

Accessible Population

      Accessible population for the study was diabetic clients with risk for foot ulcer who were available during the period of data collection.

SAMPLE

      Diabetic clients who fulfilled the inclusive criteria were selected for the study as samples.

SAMPLE SIZE

Sample size of 60 clients with diabetes mellitus who fulfilled the inclusive criteria were selected for the study 30 of each was allotted to Group A and Group B.

SAMPLING TECHNIQUE

The samples were selected by simple random sampling technique. Every day the investigator collected all diabetic clients those who had registered from 8am to 1pm in diabetic out patient department (OPD). The investigator screened all the registered diabetic clients for risk of diabetic foot ulcer using Modified University of Texas Foot Risk Assessment tool. Those who were at risk of foot ulcer randomized using lottery method as 30 in group A and 30 in Group B.

CRITERIA FOR SAMPLE SELECTION

Inclusive Criteria

1. Diabetic clients both men and women aged 40 years and above who are at risk for diabetic foot ulcer.
2. Diabetic clients who can understand Tamil.
3. Diabetic clients who are willing to participate.

Exclusive Criteria

1. Clients who is a known diabetic foot ulcer.

DEVELOPMENT AND DESCRIPTION OF TOOL

The tool for data collection consisted of 3 sections

SECTION A:

This section deals with demographic variables which includes age, gender, education, income, occupation, family history of diabetes, duration of disease, treatment method, co-morbid illness, previous knowledge on foot care, personal habits and types of foot wear

SECTION B:

Part I: Assessment of Level of Risk for Foot Ulcer

Diabetic client those who are at risk for foot ulcer was assessed by using Modified University of Texas Foot Risk Assessment Tool.

S.NO.	RISK FACTOR	NO. OF ITEM
1.	Dermatology	2
2.	Vascular	2
3.	Neurology	1
4.	Acute deformity	3
5.	Foot wear	1
6.	Foot care	1
	Total	**10**

Scoring key: Each risk factor was assigned '1' mark so total score was '10' and minimum score was '0'

Score	Level of Risk
0-5	Mild risk
6-7	Moderate risk
8-10	High risk

Part II: Assessment of Level of Knowledge on Foot Care

In the structured questionnaire 20 questions were formulated under separate sub heading to assess the knowledge of the diabetic clients on foot care.

S.NO.	ITEMS	NO. OF QUESTIONS
1-7	General information on foot ulcer	7
8-13.	Prevention of foot ulcer.	6
14-20.	Foot care measures	7

Scoring Key:

Each item was a close ended multiple choice questions with a single correct answer. Scoring for the correct answer was "1"and the wrong answer was "0".

Total score of the items was "20'. The Maximum score was 20 and minimum score was 0.

Score	Level of Knowledge
≤ 50%	Inadequate knowledge
51-75%	Moderately adequate knowledge
≥76%	Adequate knowledge

SECTION C: ASSESSMENT OF LEVEL OF SKILL ON FOOT CARE

Observation check list was developed to assess the skill in doing foot care measures among diabetic clients.

S.NO.	STEPS	ITEMS
1.	Pre procedure	1
2.	During procedure	8
3.	Post procedure	1

Scoring Key

Total score was 10 marks, item were rated as "1" for yes and "0" for no.

≤ 50%   Inadequate skill

51-75%   moderately adequate skill

≥75%   adequate skill

SECTION D: THE INTERVENTION PROTOCOL ON FOOT CARE PACKAGE

It consisted of foot care package it includes

❖ **Brief discussion** on the definition, causes, development of foot ulcer, and its manifestation, complications and preventive measures.

❖ **Demonstration** of foot care technique to diabetic clients which includes daily inspection of feet, cleaning, creaming of feet and trimming of toe nails

❖ **Pamphlets** on foot care guidelines.

CONTENT VALIDITY

The content validity of the data collection tool and intervention tool was ascertained from the expert's opinion in the following field of expertise.

Diabetologist – 2

Nursing experts (Educational set up) – 3

Modifications were made as per the experts' suggestions that were suggested and incorporated in the tool. All the experts had their consensus and then the tool was finalized.

ETHICAL CONSIDERATION

The ethical principle followed in the study were

1. Beneficiary

i. freedom from harm and discomfort

Participants were not subjected to unnecessary risks for harm during the study period.

ii. Protection from exploitation

Participants were assured that their participation or information they provided would not be used to harm them in any way.

2. Respect for human dignity

Participants were given full rights to ask question, refuse to give information and also to withdraw from the study. A written consent was obtained from the participants initially for the willingness to participate in the study.

3. Justice

The selection of study participants was completely based on research requirements. A full privacy was maintained throughout the process of data collection.

PILOT STUDY

The pilot study was conducted after obtaining ethical committee clearance from ICCR and written formal permission from the Principal of Omayal Achi College of Nursing, Manager and Nursing Superintendent of Sir Ivan Stedeford Hospital, Chennai during the month of June for a period of one week.

The investigator selected 6 diabetic clients using simple random sampling technique who are at risk of foot ulcer by modified university of Texas foot risk assessment tool. 3 diabetic clients were randomly assigned to Group A and 3 were assigned to Group B.

The structured questionnaire was used to assess the existing level of knowledge on foot care in prevention of foot ulcer, observational check list to assess the level of skill on foot care among Group A and Group B. Foot care package was given to diabetic clients of Group A and hospital routine care was followed by Group B.

After 7 days Post test level of knowledge was assessed using the same structured questionnaire. Post test level of skill was assessed using observational checklist and data were analysed subsequently to check the feasibility to conduct main study. Pilot study findings revealed that there was a positive correlation and significant at $p < 0.05$ level.

The investigator expressed the issues faced during the pilot study presentation to ICCR committee executives. Hence they accepted and granted permission to demonstrate foot care for group containing 4 members instead of single member.

RELIABILITY OF THE TOOL

The reliability of the tool was established using an inter-rater method for knowledge and skill. The reliability score was **r = 0.98**. The 'r' value indicated that

there was a high positive correlation, hence the tool considered reliable to proceed with the main study.

PROCEDURE FOR DATA COLLECTION

The main study was conducted after obtaining formal permission from the Principal Omayal Achi College of nursing and ethical committee clearance from ICCR, written permission was obtained from the Chief Manager of Sir Ivan Stedeford hospital.

A brief self introduction and detailed explanation regarding the purpose of the study was given to the subject. The investigator obtained written informed consent from the participants and reassured regarding confidentiality of their scores.

Investigator screened the entire sample who had attended the Diabetic OPD from 8 to 1 pm, to detect who are at risk for foot ulcer by modified university of Texas foot risk assessment tool. Then sixty diabetic clients who fullfilled the sample selection criteria were selected as Group A and Group B respectively with 30 members in each group.

Pretest level of knowledge and skill was assessed using structured questionnaire and observational check list. The investigator administered foot care package which includes brief discussion on foot ulcer, demonstration of foot care technique, pamphlets on foot care guidelines to the group A and, group B followed the hospital routine (Oral Hypoglycemic Agent, Insulin therapy).

After 7 days post test level of knowledge and skill on foot care was assessed using the structured questionnaire and observational checklist. Foot care package was administered to the group B at the end of the study.

PLAN FOR DATA ANALYSIS

Data collected were analyzed using both descriptive and inferential statistics.

Descriptive Statistics

1. Frequency and percentage distribution was used to analyze the demographic variables of diabetic clients.
2. Mean and standard deviation was utilized to assess the level of knowledge and post test level of skill.

Inferential Statistics

1. Paired t test to compare the pre and post test level of knowledge and skill.
2. Karl-Pearson correlation co-efficient was utilized to find the relationship between mean differed levels of knowledge with mean differed level of skill.
3. One way ANOVA and unpaired 't' test to associate the mean differed level of knowledge and skill with selected demographic variables.

CHAPTER – IV

DATA ANALYSIS AND INTERPRETATION

The analysis is a process of organizing and synthesizing the data in such a way that the research question can be answered and hypotheses are tested **(Polit and Hungler, 2011)[30].**

This chapter deals with analysis and interpretation of the data collected from 60 diabetic clients. The data was organized, tabulated and analyzed according to the objectives. The findings based on the descriptive and inferential statistical analysis, are presented under the following sections.

ORGANISATION OF THE DATA

Section A: Description of the demographic variables of the diabetic clients in Group A and Group B.

Section B: Assessment of pre and post test level of knowledge regarding foot care among Group A and Group B.

Section C: Assessment of pre and post test level of skill regarding foot care among Group A and Group B.

Section D: Comparison of pre and post test level of knowledge and skill regarding foot care among Group A and Group B.

Section E: Comparison of pre and post test level of knowledge and skill regarding foot care between Group A and Group B.

Section F: Correlation of mean differed level of knowledge with mean differed level of skill regarding foot care among Group A and Group B.

Section G: Association of the mean differed level of knowledge and skill foot care among Group A and Group B with their selected demographic variable

SECTION A: **DESCRIPTION OF THE DEMOGRAPHIC VARIABLES OF THE DIABETIC CLIENTS IN GROUP A AND GROUP B.**

Table 4 (a) : **Frequency & percentage distribution of demographic variables in Group A and Group B** with respect to age, gender, educational status and occupation N=60

Demographic Variables	Group A		Group B	
	No.	%	No.	%
Age in years				
41 - 50 years	7	23.33	7	23.33
51 - 60 years	15	50.00	12	40.00
61 - 70 years	4	13.33	6	20.00
70 and above	4	13.33	5	16.67
Gender				
Male	10	33.33	10	33.33
Female	20	66.67	20	66.67
Educational Status				
Non-literate	12	40.0	12	40.00
Elementary school education	10	33.33	9	30.00
Higher secondary education	2	6.67	7	23.33
Diploma	6	20.00	2	6.67
Graduate & above	0	0.00	0	0.00
Are you employed?				
Yes	8	26.67	2	6.67
No	19	63.33	24	80.00
Retired	3	10.00	4	13.33
If Yes, your occupation?				
Professional	6	75.00	2	100.00
Skilled	2	25.00	0	0
Unskilled	0	0.00	0	0

Table 4 (a) depicts frequency and percentage distribution of age, gender, educational status and occupation.

With regard to demographic variables in group A majority 15(50%) were in the age group of 51-60 yrs, 12(40%) were non literate and 19(63.33%) were unemployed and 20(66.67%) were female. In group B majority 12(40%) were in the age group of 51-60 yrs, 12(40%) were nonliterate.

Table 4 (b): **Frequency and percentage distribution of demographic variables in Group A and Group B** with respect to family income, dietary pattern, treatment modality, previous information on foot care.

N=60

Demographic Variables	GROUP A		GROUP B	
	No.	%	No.	%
Family income/month in Rs.				
Less than Rs.5000	19	63.33	25	83.33
Rs.5000 - 10000	11	36.67	5	16.67
>Rs.10000	0	0.00	0	0.00
Dietary pattern				
Vegetarian	7	23.33	6	20.00
Non-Vegetarian	23	76.67	24	80.00
Any ongoing/previous treatment				
OHA	17	56.67	21	70.00
Insulin	7	23.33	3	10.00
Alternate system of medicine	0	0.00	0	0.00
Combination a & b	6	20.00	6	20.00
Any previous knowledge on foot care?				
Yes	6	20.00	9	30.00
No	24	80.00	21	70.00
If yes, through				
Mass media	0	0.00	0	0.00
Books	0	0.00	0	0.00
Health care professionals	6	30.00	3	10.00
From the affected person	0	0.00	6	20.00

Table 4(b) depicts frequency and percentage distribution of family income, dietary pattern, treatment modality, previous information on foot care.

In Group A majority 19(63.33%) had monthly income of less than 5000 rupees, 23(76.67%) were non-vegetarian and 24(80%) had no previous knowledge on foot care and 17(56.67%) consumed OHA. In Group B majority 25(83.33%) had monthly income of less than 5000 rupees, 24 (80%) were non-vegetarian and 21(70%) had no previous knowledge on foot care, and 21(70%) consumed OHA.

Table 4(c):   **Frequency and percentage distribution of demographic variables in Group A and Group B with respect to personal habits.**

N=60

Demographic Variables	GROUP A		GROUP B	
	No.	%	No.	%
Do you have any personal habits?				
Smoking	4	13.33	5	16.67
Drinking alcohol	3	10.00	3	10.00
Tobacco chewing	0	0.00	0	0.00
Nil	23	76.67	22	73.33
If yes, duration of smoking?				
Less than 10 yrs	3	10.00	4	13.33
10 - 20 yrs	1	3.33	0	0.00
More than 20 yrs	0	0.00	1	3.33
How many packets of cigarettes/day?				
Less than 1 pack / day	4	13.33	4	13.33
More than 1 pack / day	0	0.00	1	3.33
Frequency of taking alcohol				
Every day	0	0.00	0	0.00
Weekly twice	3	10.00	1	3.33
Weekly once	0	0.00	2	6.67
Occasionally	0	0.00	0	0.00
Duration of alcoholism				
<2 yrs	0	0.00	0	0.00
2 - 5 yrs	0	0.00	0	0.00
5 yrs and above	3	10.00	3	10.00

Table 4(c) depicts   the frequency & percentage distribution of personal habits.

With regard to Group A, majority 23(76.67%) had no personal habits, 4(13.33%) had habits of smoking and 3(10%) had habits of drinking alcohol. In Group B majority 22(73.33%) had no personal habits, 5(16.67%) had habits of smoking and 2(6.67%) had habits of drinking alcohol, both the group had clients with similar duration of alcohol consumption, both the group had no habits of tobacco chewing.

Table 4 (d): Frequency and percentage distribution of demographic variables in Group A and Group B with respect to chronicity of illness, family history of diabetes, co-morbid illness, type of foot wear.

N=60

Demographic Variables	GROUP A		GROUP B	
	No.	%	No.	%
Chronicity of illness				
Less than 2 years	0	0.00	0	0.00
2 - 5 years	6	20.00	6	20.00
More than 5 years	24	80.00	24	80.00
Family history of diabetes				
Siblings	6	20.00	6	20.00
Parents	10	33.33	6	20.00
None	14	46.67	18	60.00
Do you visit hospital regularly?				
Yes	30	100.00	30	100.00
No	0	0.00	0	0.00
Are you suffering any co morbid illness?				
Hypertension	9	30.00	9	30.00
Hyperlipedemia	2	6.67	2	6.67
Deep vein thrombosis	0	0.00	0	0.00
Nil	19	63.33	19	63.33
Do you wear foot wear?				
Yes	30	100.00	30	100.00
No	0	0.00	0	0.00
If yes				
Regular	24	80.00	26	86.67
Medically recommended foot wear	6	20.00	4	13.33

Tables 4(d) depict the frequency and percentage distribution of chronicity of illness, family history of diabetes, co-morbid illness, and type of foot wear.

In group A, majority 14(46.67%) had no family history of diabetes, in Group B 18(60%) had no family history of diabetes. Investigator did pair matching in both the group with regards to demographic variables like chronicity of illness, type of foot wear.

SECTION B: ASSESSMENT OF PRE AND POST TEST LEVEL OF KNOWLEDGE REGARDING FOOT CARE AMONG DIABETIC CLIENTS OF GROUP A AND GROUP B.

Table 5   :   Frequency and percentage distribution of pretest and post test level of knowledge on foot care among Group A.

n= 30

Group A	Knowledge Aspects	Inadequate (<50%)		Moderately Adequate (51– 75%)		Adequate (>75%)	
		No.	%	No.	%	No.	%
Pre test score	General information On foot ulcer	27	90%	3	10	0	0
	Prevention of foot ulcer	26	86.67	4	13.3	0	0
	Foot care measures	29	96.67	1	3.33	0	0
	Overall score	**30**	**100.0**	**0**	**0**	**0**	**0**
Post test score	General information On foot ulcer	2	6.67	5	16.67	23	76.67
	Prevention	2	6.67	9	30.0	19	63.33
	Foot care measures	3	10.0	12	40.0	15	50.0
	Overall score	**0**	**0**	**10**	**33.33**	**20**	**66.67**

Table 5 reveals Frequency and percentage distribution of pretest & post test level of knowledge on foot care among Group A.

In pretest, majority 27(90%) had inadequate knowledge in general information on foot ulcer and 26(86.67%) had inadequate knowledge on foot care measures, 29 (986.67%) had inadequate knowledge on prevention of foot ulcer. Over all score reveals none of them had moderately adequate and adequate knowledge. In post test majority of the client 23 (76.67%) had adequate knowledge on general information on foot ulcer, 17 (63.33%) prevention of foot ulcer, 15 (50%) had adequate knowledge on foot care measure

Table 6: **Frequency and percentage distribution of pretest and post test level of knowledge on foot care among Group B.**

n = 30

Group B	knowledge Aspects	Inadequate (<50%)		Moderately Adequate (51 – 75%)		Adequate (>76%)	
		No.	%	No.	%	No.	%
Pre test score	General information On foot ulcer	29	96.67	1	3.33	0	0
	Prevention	29	96.67	1	3.33	0	0
	Foot care measures	28	93.33	2	6.67	0	0
Post test score	General information On foot ulcer	24	80.0	6	20.0	0	0
	Prevention	24	80.0	6	20.0	0	0
	Foot care measures	27	90.0	3	10.0	0	0

Table 6 reveals the frequency and percentage distribution of pretest and post test level of knowledge on foot care among diabetic clients in Group B.

In pretest majority 29 (96.67 %) had inadequate knowledge on general information on foot ulcer and prevention of foot ulcer. 28 (93.33%) had inadequate knowledge on foot care measures. Overall, none of them had moderate and adequate knowledge. In post test level majority of the client, 24 (80.0%) had inadequate knowledge on general information on foot ulcer and prevention of foot ulcer and 27 (90%) had inadequate knowledge on foot care measures. Overall none of them had adequate level of knowledge on foot care.

SECTION C: ASSESSMENT OF PRE AND POST TEST LEVEL OF SKILL REGARDING FOOT CARE AMONG GROUP A AND GROUP B

n = 30
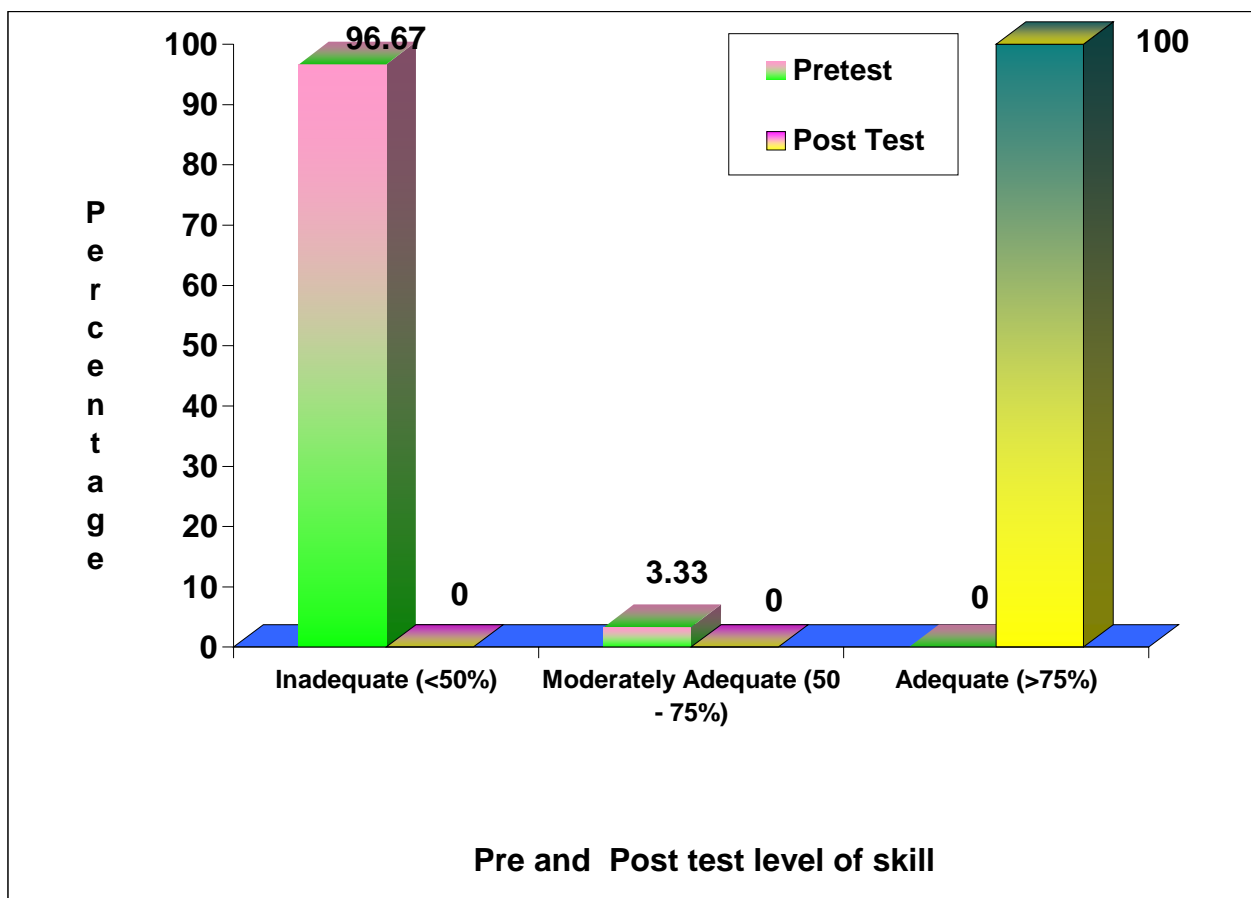
Fig 4: Percentage distribution of pretest and post test level of skill on foot care among Group A**.**

Figure 4 depicts the percentage distribution of pretest and post test level of skill on foot care among diabetic clients in Group A.

With regard to the pretest level of skill majority 29 (96.6%) had inadequate skill, 1(3.33%) had moderately adequate skill, none of them had adequate skill. In respect to the post test level of skill majority 30 (100%) had adequate level of skill, none of them had inadequate and adequate level of skill. It's clearly proved that administration of foot care package has increased the level of skill in Group A.

Fig 5:   Percentage distribution of pretest and post test level of skill on foot care among Group B.

n=30
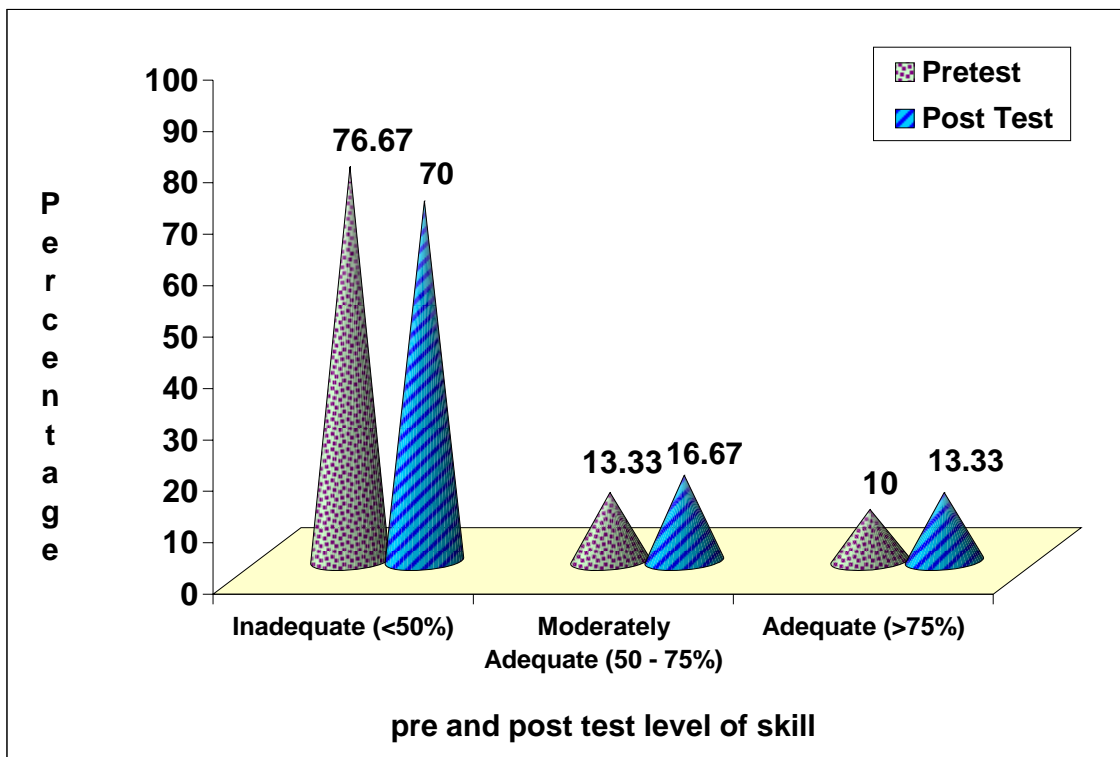
Fig 5:   Percentage distribution of pretest and post test level of skill on foot care among Group B.

Figure 5 depicts the percentage distribution of pretest and post test level of skill on foot care among group B.

With regard to the pretest level of skill majority 23 (76.67%) had inadequate skill, 4(13.33%) had moderately adequate skill and 3 (10%) had adequate skill. In respect to post test level of skill majority 21 (70%) had inadequate skill. 5 (16.67%) had moderately adequate skill and 4(13.33%) had adequate skill. No significant difference in the pretest and post test level of skill among Group B.

SECTION D: COMPARISON OF PRE AND POST TEST LEVEL OF KNOWLEDGE AND SKILL REGARDING FOOT CARE AMONG GROUP A AND GROUP B.

Table 7   : Comparison of pre and post test level of knowledge among Group A and Group B.

N=60

Test	Pretest		Post test		't' value
	Mean	**S.D**	**Mean**	**S.D**	
Group A	4.43	1.57	16.03	1.79	t = 57.670***
Group B	4.93	1.55	6.00	2.59	t = -2.075

***p<0.001, S – Significant

The table 7 reveals the comparison of pretest and post test level of knowledge score among group A and group B.

In Group A the overall pretest mean score of knowledge was 4.43 with S.D of 1.57 With regard to post test the overall post test mean score was 16.03 with S.D of 1.79   the calculated 't' value 57.670 showed high significant at p<.001 level. It is well proven fact that administration of foot care package has increased the knowledge level among Group A.

In Group B the overall pretest mean score of knowledge was 4.93 with S.D of 1.55 With regard to post test the overall post test mean score was 6.00 with S.D of 2.59 the calculated 't' value -2.075   showed low level of significance at p<0.05 level. No significant difference in the level of knowledge was noted.

Table 8: Comparison of pre and post test level of skill among Group A and Group B.

<div align="right">N=60</div>

Group	Pretest		Post test		't' value
	Mean	**S.D**	**Mean**	**S.D**	
Group A	2.93	0.78	8.40	0.49	t = 30.767*** (S)
Group B	3.60	2.22	4.07	2.16	t = -0.975 (N.S)

***p<0.001, S – Significant

The table 8 reveals the comparison of pretest and post test level of skill score among group A and group B

In group A the overall pretest mean score of skill was 2.93 with S.D of 0.78 With regard to post test the overall post test mean score was 8.40 with S.D of 2.22 the calculated 't' value 30.767 showed high significant at p<.001 level. This significant result showed that intervention has improved the level of skill.

In group B the overall pretest mean score of skill was 3.60 with S.D of 2.22 With regard to post test the overall post test mean score was 4.07 with S.D of 2.16 the calculated 't' value -0.975 showed no significant at p<0.05 level.

SECTION E: COMPARISON OF PRE AND POST TEST LEVEL OF KNOWLEDGE AND SKILL REGARDING FOOT CARE BETWEEN GROUP A AND GROUP B.

Table 9 : Comparison of pre and post test level of knowledge regarding foot care between Group A and Group B.

N=60

Knowledge level	Group A		Group B.		Unpaired 't' Value
	Mean	S.D	Mean	S.D	
Pretest	4.43	1.57	4.93	1.55	t = -1.241 p=0.220 (N.S)
Post test	16.03	1.79	6.0	2.59	t = 17.470*** p = 0.000 (S)

***p<0.001, S – Significant

The table 9 reveals the comparison of pretest and post test level of knowledge score between Group A and Group B

In group A the overall pretest mean score of knowledge was 4.43 with S.D of 1.57 and in the Group B overall pretest mean score was 4.93 with S.D of 1.55 the calculated unpaired't' value showed there is no significant difference in the level of knowledge score. The overall post test mean score of knowledge was16.03 with S.D of 1.79. And in the Group B overall post test mean score was 6.0 with S.D of 2.59 the calculated unpaired 't' test revealed t=17.470.

It showed that after the administration of foot care package, there was a high significant improvement in the knowledge level among diabetic clients of group A with a't' value of 17.470 at p < 0.001.

Table 10: Comparison of pre & post test level of skill regarding foot care between Group A and Group B.

N=60

Skill level	Group A		Group B		Unpaired 't' Value
	Mean	S.D	Mean	S.D	
Pretest	2.93	0.78	3.60	2.22	t = -1.549 p = 0.130 (N.S)
Post test	8.40	0.49	4.07	2.16	t = 10.686*** p = 0.000 (S)

***p<0.001, S – Significant

The table 10 reveals the comparison of pretest and post test level of skill score between Group A and Group B.

In group A the overall pretest mean score of skill was 2.93 with S.D of .78 and in the control group mean skill score was 3.60 with S.D 2.22 the calculated t value of t=-1.549 showed no significant at p<0.05 level. with regard to post test level of skill score the overall mean score in group B was 8.40 with S.D 0 .49 and in the group B the mean skill score was 4.07with S.D of 2.16; it showed that after the administration of foot care package, there was a high significant improvement in the skill level of diabetic clients with a't' value of 10.686.

When the foot care package was given the diabetic clients who were keen to learn found it easier to enhance their skill on foot care regarding prevention of foot ulcer.

SECTION F: CORRELATION OF MEAN DIFFERED LEVEL OF KNOWLEDGE WITH MEAN DIFFERED LEVEL OF SKILL REGARDING FOOT CARE AMONG GROUP A AND GROUP B.

Table.11 : Correlation of mean differed level of knowledge with mean differed level of skill among Group A and Group B.

Group	Knowledge		skill		'r' Value
	Mean	S.D	Mean	S.D	
Group A	11.60	1.10	5.47	0.97	r=0.502*** p=0.005(s)
Group B	1.07	2.81	0.47	2.62	r =-0.065 p=0.733(N.S)

***P<0.001

Table.11. shows correlation of mean differed level of knowledge with mean differed level of skill among Group A and Group B.

In Group A with regards to the mean differed level of knowledge, the mean score was 11.60 with S.D of 1.10. In the mean differed level of skill, the mean score was 5.47 with S.D of .97. The calculated Karl Pearson 'r' value was 0.502 with moderate level of significance at P=0.005.

It showed that after the administration of foot care package, there was a moderate positive correlation between post test level of knowledge and skill.

In group B with regard to the mean differed level of knowledge, the mean score was 1.07 with S.D of 2.81. In the mean differed level of skill, the mean score was 0.47 with S.D of 2.62 the calculated Karl Pearson 'r' value was 0.065 with no significant at p<.05 level. It is a well proven fact that since the group B has no gain in knowledge any improvement in skill.

SECTION G: **ASSOCIATION OF THE MEAN DIFFERED LEVEL OF KNOWLEDGE AND SKILL REGARDING FOOT CARE AMONG GROUP A AND GROUP B WITH THEIR SELECTED DEMOGRAPHIC VARIABLES.**

The association of mean differed level of knowledge and Skill with selected demographic variables of diabetic clients were analyzed using ANOVA unfolded that there was no statistically significant association between the mean differed level of knowledge & skill with selected demographic variables.

Practice usually as thought would be better with educational status is unproven in this study. It was the improvement in the knowledge which had influenced the post test level of skill rather than the chronicity of illness or educational qualification of diabetic clients. The study clearly reveals that only the administration foot care package has improved the knowledge and skill of the clients.

CHAPTER – V

DISCUSSION

This chapter discusses in detail the finding of the analysis in relation to the objectives of the study. The following were the objectives of the study and further discussion will exemplify how these objectives were satisfied by the study.

The findings of the study based on the objectives were:

The first objective was to assess the pretest and post test level of knowledge regarding foot care among Group A and Group B.

The analysis on pretest & post test level of knowledge among Group A group revealed that majority 30 (100%) had inadequate knowledge in the pretest. In the post test level of knowledge none of them had inadequate knowledge, 10 (33.33%) had moderately adequate knowledge and 20 (66.67%) of the clients gained adequate knowledge.

The analysis on pre & post test level of knowledge among group B revealed that 30 (100%) had inadequate knowledge in the pretest with regards to post test level of knowledge 27 (90%) had inadequate knowledge and 3 (10%) had moderately adequate knowledge.

It was a well proven fact that administration of foot care package has increased the knowledge on foot care among Group A Compare to Group B.

The second objective was to assess the pre & post test level of skill regarding foot care among Group A and Group B.

The analysis of pre and post test level of skill among group A showed that majority 29 (96.6%) had inadequate skill. In respect to the post test majority 30 (100%) had adequate level of skill. The administration of foot care package has increased the post test level of skill among study group. This is a well proven fact

from previous research evidences that proper teaching programme enhances skill on foot care among diabetic clients.

The analysis of pre and post test level of skill among group B revealed that with regard to the pretest level of skill majority 23 (16.67%) had inadequate skill,4(13.3%) had moderately adequate skill and 3(10%) had adequate skill. In respect to post test level of skill majority 21 (70%) had inadequate skill. 5 (16.67%) had moderately adequate skill. 4(13.33) had adequate skill.

The third objective was to compare the pre and post test level of knowledge and skill regarding foot care among Group A and Group B.

The comparison of pre and post test level of knowledge and skill regarding foot care among study group revealed that the pretest mean score of knowledge was 4.43 with S.D of 1.57, the post test mean score was 16.03 with S.D of 1.79 the calculated't' value was 57.670. Which was statistically high significant at p<0.001 level.

The pretest mean score of skill was 2.93 with S.D 0.78, the post test mean score was 8.40 with S.D 0.49 the calculated 't' value was 30.767 which revealed that there was high statistical significant difference between pre and post test level of skill at p<0.001 level.

Hence the null hypothesis **NH₁** stated earlier that "there is no significant difference in the pre and post test level of knowledge and skill regarding foot care in group A at p<.05 level was rejected

It was consistent with the cross sectional survey conducted by **Kumar (2005)[55]** in Chandigarh to assess the knowledge and practice regarding foot care. Foot care was done by 63.3 %, monitoring of blood sugar was poor 46.7% .client oriented foot care educational program was given to all 60 clients and reassessment

done after 3 months. Results showed that 83% of people perform regular foot care after educational program.

With regards to group B the pre test mean score of knowledge was 4.93 with S.D 1.55, post test mean score was 6.0 with S.D 2.59 the calculated 't' value was -2.075 it shows low level of significance at $p<.05$ level. When comparing pre and post test level of skill the pretest mean score of skill was 3.60 with S.D 2.22, post test mean score was 4.07 with S.D 2.16, the calculated't' value was -0.975 which had not shown any statistical significance at any level.

Hence the null hypothesis NH_1 stated earlier that "there is no significant difference in the pre and post test level of knowledge and skill regarding foot care group A and group B at $p<0.05$ level" was accepted for group B.

The fourth objective was to compare the pre and post test level of knowledge and skill regarding foot care between Group A and Group B.

The comparison of pretest level of knowledge between Group A and Group B showed that in group A the pretest mean score was 4.43 with S.D of 1.57, in group B the mean score was 4.93 with S.D of 1.55 and calculated unpaired't' value of -1.241 indicated that there was no statistical significant difference in the pre test level of knowledge between Group A and Group B, both the group had similar level of knowledge in the pretest.

The comparison of posttest level of knowledge between study and control group showed that in study group the post test mean score was 16.03 with S.D of 1.79, in control group the mean score was 6.0 with S.D of 2.59 and calculated unpaired't' value of 17.470 indicated that there was a statistical significant difference in the post test level of knowledge between Group A and Group B at $p<0.001$. It shows the effectiveness of foot care package in improving the level of knowledge among group A.

It was consistent with the study conducted by zohal, et al (2007) to evaluate the effect of educational program of foot care among diabetic clients of long term care facility. A significant improvement in level of knowledge was noted after administering foot care education program.

The comparison of pre test level of skill between Group A and Group B revealed that in study group the overall pretest mean score of skill was 2.93 with S.D of .78 and in the control group mean skill score was 3.60 with S.D 2.22 the calculated t value was -1.549 which was not statistically significant.

With regard to post test level of skill score the overall mean score in group A was 8.40 with S.D .49 and in group B the mean skill score was 4.07with S.D of 2.16.the calculated 't' value was t=10.686 and significant at p<0.001 level.

It showed that after the administration of foot care package, there was a high significant improvement in the skill level of diabetic clients.

Hence the null hypotheses **NH$_2$** stated in the present study that "There is no significant difference in the pretest and post test level of knowledge & skill regarding foot care between Group A and Group B at p<0.05 level is accepted for group B and rejected for group A".

The fifth objective was to correlate the mean differed level of knowledge with mean differed level of skill regarding foot care among Group A and Group B.

Table 11 showed that in the group A the mean differed level of knowledge score was 11.60 with S.D of 1.10 and the mean differed score of skill was 5.47 with S.D of 0.97. The calculated Karl Pearson 'r' value was 0.502 with a moderate level of significance at p<0.01. It signified that after the administration of foot care package to the diabetic clients, there was a positive correlation between post test level of knowledge and skill.

Previous research evidences proved that gain in the knowledge improves the skill on foot care.

Table11 showed that in the group B the mean differed level of knowledge score was 1.07 with S.D of 2.81 and the mean differed score of skill was 0.47 with S.D of 2.62 The calculated Karl Pearson 'r' value was 0.065 with no significance at p<0.01. It showed that there is no correlation between post test level of knowledge and practice.

Hence the **NH₃** stated earlier that 'there is no significant relationship between the mean differed level of knowledge and mean differed level of skill regarding foot care at p<0.05' was **rejected** for study group A and accepted for group B.

The sixth objective is to associate the mean differed level of knowledge and skill regarding foot care among Group A and Group B with their selected demographic variable.

The analysis using ANOVA unfolded that there was no statistically significant association between the mean differed level of knowledge & skill with selected demographic variables.

Skill usually as thought would be better with gained knowledge is unproven in this study. It was the improvement in the knowledge which had influenced the mean differed level of skill rather than the chronicity of illness or educational qualification of diabetic clients. The study clearly reveals that only the administration foot care package has improved the knowledge and skill of the clients.

Hence the **NH₄** stated earlier that "there is no significant association between the mean differed level of knowledge and skill regarding foot care with the selected demographic variables among study and control group was accepted.

CHAPTER – VI

SUMMARY, CONCLUSION, IMPLICATIONS, RECOMMENDATIONS AND LIMITATIONS

This chapter presents the summary, conclusion, implications, recommendations and limitations of the study.

SUMMARY

Diabetic foot ulcers are the most common foot injuries leading to extremity amputation. Nurses have a pivotal role in prevention or early diagnosis of diabetic foot complication. A client of the diabetes mellitus requires a thorough knowledge of the main factors for ulcer formation, preventive measures. A strategy which includes prevention, patient and staff education, multi-disciplinary treatment of foot ulcers, and close monitoring can reduce amputation rates by 49-85%. Therefore, a careful examination of the foot by monofilament testing and non invasive testing of arterial insufficiency can identify patients at risk for foot ulcer and help them to avoid ulcer. Patient education regarding foot hygiene, nail care, proper foot wear is crucial to reduce the risk of injury that leads to ulcer formation.

Careful inspection of the diabetic client's foot on a regular basis is one of the inexpensive and most effective measures for prevention of foot ulcer if it is combined with regular foot care.

The purpose of the study was to assess the effectiveness of foot care package on knowledge and skill regarding foot care among diabetic clients.

The objectives of the study were
1. To assess the pretest and post test level of knowledge regarding foot care among Group A and Group B.

2. To assess the pretest and post test level of skill regarding foot care among Group A and Group B.

3. To compare the pretest and post test level of knowledge and skill regarding foot care among Group A and Group B.

4. To compare the pretest and post test level of knowledge and skill regarding foot care between Group A and Group B.

5. To correlate the mean differed level of knowledge with mean differed level of skill regarding foot care among Group A and Group B.

6. To associate the mean differed level of knowledge and skill regarding foot care with their selected demographic variable among Group A and Group B.

The study was based on the assumptions that

1. Diabetic clients are prone to develop foot ulcer due to improper foot care.

2. Diabetic clients may have some knowledge and skill on foot care.

3. Providing foot care package may enhance their knowledge and skill on foot care in prevention of foot ulcer.

The null hypotheses formulated were

NH$_1$: There is no significant difference in the pretest and post test level of knowledge regarding foot care among Group A and Group B at $p<0.05$ level.

NH$_2$: There is no significant difference in the pretest and post test level of skill regarding foot care among Group A and Group B at $p<0.05$ level.

NH$_3$: There is no significant difference in the pretest and post test level of knowledge and skill regarding foot care between Group A and Group B at $p<0.001$ level.

NH$_4$: There is no significant relationship between the mean differed levels of knowledge with mean improved level of skill regarding foot care among Group A and Group B at $p<.05$ level.

NH₅: There is no significant association between the mean differed level of knowledge and skill regarding foot care with the selected demographic variables among Group A and Group B at p<.05 level.

The review of literature, professional experience and expert's guidance from the field of medical and surgical nursing provided a strong foundation for the study. It also strengthened the ideas for conceptual framework, aided to design the methodology and develop the tool for the data collection.

In view of explaining various aspects of the study, the investigator had adopted an **Evelyn Adam** interpersonal relationship model (1991).

The researcher adopted a true experimental pre and post test design to assess the effectiveness of foot care package on knowledge and skill regarding foot care among diabetic client. 60 diabetic clients were selected using simple random sampling technique (Lottery Method).

The tool for data collection had 4 sections. **Section A: Personal data sheet** to collect information on 17 demographic variables to assess the background of the diabetic clients. Section **B**: **level of risk for foot ulcer was assessed using modified university of Texas foot risk assessment tool.**

Section B: Structured knowledge questionnaire comprising of 20 questions to assess the knowledge on foot care among diabetic clients. **Section C: skill** on foot care was assessed using observational checklist on diabetic clients.

Section D: Intervention protocol: Foot care package for diabetic clients. It comprises of 3 parts:

- **Brief discussion** on the definition, causes, development of foot ulcer, and its manifestation, complications and preventive measures.

- **Demonstration** of foot care technique to diabetic clients which includes daily inspection of feet, cleaning, creaming of feet and trimming of toe nails
- **Pamphlets** on foot care guidelines

The Medical and Nursing experts validated the tool. The pilot study was conducted at Sir Ivan Stedeford Hospital, Chennai and it was found practicable and feasible to precede with main the study.

The ethical aspect of research was maintained throughout the study by obtaining ethical committee clearance from the ICCR, formal permission from the authorities and written consent from the diabetic clients who participated in the study. Verbal explanation on the foot care package was given to the clients by the staff nurses prior to imparting foot care package.

The data collection was done among 60 diabetic clients. The investigator screened the diabetic client to check the level of risk for foot ulcer, assessed the knowledge of diabetic clients using structured knowledge questionnaire over a period of 7 days. After the pretest, foot care package was administered to the diabetic clients of Group A. The post test knowledge and skill on foot care was assessed using the same structured knowledge questionnaire, observational check list. After the post test foot care package was administered to the control group. The study was done over a period of 4 weeks.

Major findings of the study

The data was analyzed using descriptive and inferential statistics.

The overall pretest mean score of knowledge was 4.43 with S.D of 1.57 and the overall post test mean score of knowledge was 16.03 with S.D of 1.79 .The mean improvement knowledge score was 8.96. It showed that after the administration of foot care package there was a high significant improvement in the knowledge level of the diabetic clients with a 't' value of 57.670 at $p < 0.001$, the

over all pretest mean score of skill was 2.93 with S.D 0.78 and the overall post test level of skill score was 8.40 with S.D 0.49. it showed after the administration of foot care package there was a high significant improvement in the skill level of the diabetic clients with a 't' value of 30.767 at $p<.0.001$ level.

Hence the **NH₁** stated earlier was **rejected for Group A, accepted for Group B.**

When comparing the pre& post test level of knowledge and skill between the groups, post test mean score of knowledge in Group B was 16.03 with S.D of 1.79 and in control group mean sore was 6.00 with S.D 2.59 the calculated unpaired 't' test was 17.470 with $p<.001$ level.

Comparison of post test level of skill on foot care between the experimental and control group revealed that in Group B the mean score was 8.40 with S.D of 0.49 and in control group the mean score was 4.07 with S.D of 2.16 the calculated unpaired 't' test was 10.686 with $p<0.001$ level.

The calculated Karl Pearson 'r' value was 0.502 with a moderate level of significance at $p<0.05$. It showed that after the administration of foot care package to a diabetic client, there was a moderately positive correlation between mean differed level of knowledge and skill. Hence the **NH₃** stated earlier was **rejected**.

There was a no significant association of mean differed level of knowledge and skill with selected demographic variables of diabetic clients. Hence the **NH₄** earlier was **accepted**.

CONCLUSION

The present study assessed the effectiveness of foot care package in prevention of foot ulcer among diabetic clients at selected hospital, and thus it can

be utilized by the nurses to provide care to a diabetic client in prevention of foot ulcer.

IMPLICATIONS

Nursing Education

This package can be utilized in to the nursing curricula to formulate foot care protocols or guidelines, and thus can be used in all sphere of nursing so that nursing student can render effective care.

This simple package is cost effective, reliable and can be easily incorporated in to the field of community health nursing. Nursing education should emphasize on prevention of other foot complication.

Nursing Practice

Nurses play a vital role in prevention of foot complication among diabetic clients. The findings of the study can help the nursing professional working in the hospital and community to plan health education based on the knowledge and skill of diabetic clients.

Mass diabetic foot risk assessment program can be conducted periodically by the nurse at various places in rural setting where bare foot walk is a typical behavior. Future challenges to nurses are to have nurse run clinic for diabetic foot complications.

All nurses who practice in the field of medical surgical nursing should be familiar with utilization of monofilament test to identify risk for foot ulcer among diabetic clients.

Nursing Administration

Nurse administrators can organize continuing nursing education on preventive measures of diabetic foot complication. The Nurse administrators can

involve other agencies including Governmental and Non governmental agencies to implant the policies and protocols on diabetic foot care, diabetic foot ulcer at various levels of health care delivery system.

Nursing leaders in the Indian Nursing Council can implement new course on nurse podiatrist to make sure that nurses in India practice based on uniform syllabus.

Nurse Managers are in a position to prepare policies and enhance its use in the hospitals. They can facilitate the conduction of in-service education, periodic conferences, workshops and seminars on various aspects of diabetic foot complication and measure to prevent which will enable the staff nurses to update their knowledge on recent advancements in the field of wound care management.

Nursing Research

The findings of the study can be disseminated to nurse practitioners and student nurses through internet, journals, literature etc. The generalization of the study results can be made by further replication of the study in various settings and larger population.

Nursing research is a powerful means of answering questions about health care interventions and finding better ways of promoting health, prevention of illness and providing care and rehabilitation services to people of all ages and in different settings.

RECOMMENDATIONS

1. Foot care package for diabetic clients is strongly recommended in the hospital setting.
2. A study comparing the staff nurse's utilization and patient's perceptions of the foot care package can be done using mixed methodology.

3. The researcher has encouraged the use of foot care package for diabetic clients in Sir Ivan Stede ford hospital.

4. The researcher has encouraged the utilization of foot care package for diabetic clients by the students of OCN and its affiliated health units.

5. Government initiative should implement "national diabetic foot complication prevention plan" it includes:

- **Advocacy:** Supporting national association and non-governmental organization to conduct foot care education program.

- **Community support:** providing education and creating awareness in school, clubs, and social meeting area.

- **Fiscal and legislation:** enforcing laws on health clinic

- **Media communication:** Improving level of knowledge and motivation of the population.

6. Similar study can be replicated on a larger sample to increase validity and generalizability of findings.

7. A qualitative study can be done to explore the impact of nurse led foot care clinic for diabetic clients.

8. The effect of foot care package can be tested with biophysiological measure such as biothesiometry.

9. Similar study can be undertaken for large samples in inpatient setting.

LIMITATIONS

1. The researcher was not able to find extensive Indian reviews on foot care, foot ulcer prevention.

2. The long term effect of the foot care package was not assessed due to time limitation

BIBLIOGRAPHY

BOOKS:

1. Ashley M Ford. (2006) **Trends in Diabetes Research**. New York: Nova publication

2. Bare G Brenda., & Smeltzer C Suzanne. (2008). **Brunner and Suddharth's Textbook of Medical and Surgical Nursing**. Philadelphia: J.B.Lippincott Company.

3. Basavanthappa, B.T. (2007). **Medical Surgical Nursing**. New Delhi: Jaypee Brothers Medical Publishers.

4. Basavanthappa, B.T. (2007). **Nursing Research**. Bangalore: Jaypee Brothers.

5. Basavanthappa, B.T. (2008). **Nursing theories**. Bangalore: Jaypee Brothers.

6. Betty J Ackley., et al. (2008). **Evidence Based Nursing Care Guidelines. Medical Surgical Interventions**. USA: Evolve Elsevier publication.

7. Betty M Johnson., & Pamela B Webber. (2005). **An introduction to theory and reasoning in nursing.** USA: Lippincott Williams and Wilkins.

8. Black M Joyce. (2009). **Luckmann and Sorenson's Medical Surgical Nursing–psychophysiologic approach.** Philadelphia: W B Saunders Company.

9. Barnett H Anthony. (2006). Obesity and diabetes. London Elsevier publication

10. Braun Wald E., Fauci., Kasper., Hauser. (2007). **Harrison's Principles of Internal Medicine.** Vol 1. New York: McGraw Hill.

11. Christensen L Barbara., & Kockrow Elaine. (1995). **Foundation of Nursing**. St.Louis: Mosby Company.

12. Craven Ruth., & Hirnle Constance. (2003). **Fundamentals of Nursing: Human health and function**. Philadelphia: Lippincott Williams & Wilkins.

13. Dimario fridi., leoneti john.(2001). **Diabetes in the new millennium**. USA: wiley& sons limited.

14. Doris Smith Suddarth. (1991). **The Lippincott Manual of Nursing practice**. Philadelphia: J.B.Lippincott Company.

15. Edwards, R.W., Christopher., et al. (1991). **Davidson Principles and Practice of Medicine**. Hong Kong: ELBS edition.

16. Fawcett Jacqueline. (1984). **Analysis and Evaluation of Conceptual models of Nursing**. Philadelphia: T.A.Davis Company.

17. Geri Le Bindo Wood & Judith Haber. (1990). **Nursing research methods, critical appraisal and utilization.** Toronto: CV Mosby Company.

18. Gundu HR Rao. & Mohan (2007). **Type 2 Diabetes in South Asian.** New Delhi: Jaypee Brothers.

19. Gurumani, N. (2005). **An Introduction to Biostatistics**. Chennai: MJP Publishers.

20. Joyce J Fitz Patrick., et al.(1983). **Conceptual Models of nursing- Analysis and Application**. Mary land: Apprentice Hall Publisher.

21. John pickup & Gareth William. (2003) **Text Book of Diabetes**.UK: black well publication.

22. Kozier Barbara., et al. (2000). **Fundamentals of Nursing Concepts and Process**. New York: Addison Wesley.

23. Kumar & Clark. (2009) **Clinical Medicine**. New Delhi: Jay Pee Publication.

24. Lewis L. Sharon., et al. (2007). **Medical Surgical Nursing –Assessment and management of clinical problems**. St.Louis: Mosby Company.

25. Levin & O' Neal's. (2008) **The diabetic foot**. USA: Mosby Elsevier.

26. Mahajan, B.K. (2005). **Methods in Biostatistics**. New Delhi: Jaypee Brothers Publishers.

27. Nancy Burns. (2009). **The Practice of Nursing Research**. Missouri: Saunders publication.

28. Nick R Colledge. (2010). **Davidson Principles and Practice of Medicine**. USA: Mosby Elsevier.

29. Phipps. (2007). **Medical Surgical Nursing Concepts and Clinical Practice.** Baltimore: Mosby

30. Pollit, F. Denise., & Hungler, P. Bernadette. (2011). **Nursing Research Principles and Methods**. Philadelphia: J.B Lippincott Company.

31. Potter. A., & Perry. A. (2005). **Fundamental of Nursing**. New Delhi: Elsevier.

32. Priscilla Lemone.,& Karen Burke. (2005). **Medical Surgical Nursing.** USA: Pearson Education. Alaska

33. Sharon, B.(2000). **Nursing Procedures**. Philadelphia: Lippincott Publishers.

34. Stanley, G. korenman. (2000). **Diabetes**. Philadelphia: current medicine publisher.

35. Sundar Rao S., et al. (1999). **An Introduction to Biostatistics**. Vellore: Presto Graphic Printers.

36. Wattz, F C., & Bausell, B R. (1981). **Nursing Research Design, Statistics and Components Analysis**. Philadelphia: F.A Davis Company.

37. Wesley, L Ruby (1995). **Nursing theories and models**. Pennsylvania: Spring House Corporation.

JOURNALS :

38. Abbas zg., et al., (2011). The step by step diabetic foot project. **International Wound Journal**, 8(2), 169-75.

39. Al wahbi AM. (2010). Impact of diabetic foot care education program on lower limb amputation rate. **Vascular Health Risk Management**, 21(6), 923-34.

40. Argianna GV., et al., (2011). Screening for the high risk of foot for ulceration; tests of somatic and autonomic nerve function, 11 (4), 294-301.

41. Armstrong DG. (2007). Foot ulcers in the diabetic patients, prevention and treatment, vascular health risk management. **American academy of family physician**, 3(1), 65-76.

42. Bal A. (2002). Diabetic foot magnitude of the problem. **Journal of Indian medical association**, 100(3),155-7.

43. Bell RA.(2005).Diabetes foot self care practices in a rural triethnic population. **Diabetes education**, 31(7), 75-83.

44. Birrer RB. (1996), Prevention and care of diabetic foot ulcer. **American Journal family physician practice,** 53(2), 601-11.

45. Bolzoni O. (2004). Educational activities for the prevention of diabetic foot complications**. Assistant Inferm ric**, 23(1), 21-5.

46. Borges WJ. (2008). Improving foot self care behavior with pies sanos. **Western journal of nurse resident,** 30(3), 325-41.

47. Ficorelli CT, Edelman M.(2005). Patient education series Foot care for patients with diabetes. **Nursing Times**, 33(10), 43.

48. Flahr D.(2010).The effect of non weight bearing exercise and protocol adherence on diabetic foot ulcer healing, **Ostomy Wound Management**, 56(10), 40-50.

49. Fletcher J. (2006). Full nursing assessment of patients at risk of diabetic foot ulcers. **British Journal of nursing**, 15(15), s18-21.

50. Foster A. (2004). An evaluation of guidelines on foot care for patient with diabetes. **Nursing Times**, 100(22), 52-3.

51. Hollis D.(2006). Foot care seminars help patients with chronic conditions avoid amputation. **Ten medicine**, 99(10), 33.

52. Iversen MM., et al., (2008). Regularity of preventive foot care in client with diabetes. **Resident Nurse Health**, 31(3), 226-37.

53. Johnson MH., et al., (1994). Assessment of diabetes care by medical record review. **Diabetes Care**, 17(8), 918-23.

54. Kalish J, Hamadan, A. (2007). Management of diabetic foot problem. **Journal of vascular surgery**, 51(2), 476-86.

55. Kumar .(2005). Knowledge and self care practices of diabetes in resettlement colony of Chandigarh. **Indian journal of medical science,** 52(8), 341-7.

56. Lavery LA.,et al. (2010). The cost of diabetic foot. **Journal of Pediatric Medical Association**, 100(5), 335-41.

57. Lawrence A. (2004). Foot care education in renal patients with diabetes**. Edtna Erca Journal,** 30(3), 153-6**.**

58. Leung PC. (2007). Diabetic foot ulcer a comprehensive review, **Surgeon,** 5(4), 219-31.

59. Lewis C. (2007). Health care beliefs of Indian patients living with leg and foot ulcers. **British Journal of Nurse**, 16(11), 522-6.

60. Lincoln NB. (2008). Education for secondary prevention of foot ulcers in people with diabetes. 51 (11), 1954-61.

61. Maji D. (2004). Prevention of micro vascular and macro vascular complications in diabetes mellitus. **Journal of Indian Medical Association**, 102(8), 426, 428, 430.

62. May field JA. et al., (2007). Preventive care measures in diabetic foot. **Journal of Family Practice**, 22(3)98-101.

63. Mcinnes A.(2011). Foot care education with diabetics at low risk foot complications. **Diabetes   Medicine**, 28(2), 162-7.

64. Pataky Z. (2007). Diabetic foot disease in elderly. **Diabetes Metab**, 33, 556-65.

65. Plummer ES. (2001). Foot care assessment in patient with diabetes, a screening algorithm for education and referral. **Diabetes education**, 21(1), 47-51.

66. Pollock RD .(2004). Knowledge and practice of foot care in people with diabetes. **Diabetes resident clinical practice**, 64 (2), 117-22.

67. Ramachandran, Shobana., et al., (2007). Need for education on foot care in patients in India. Indian journal of medicine, 2(5),43-44

68. Ramkisoon S.(1996). Foot care education in patient with diabetes. **Professional nurse**, 11(8),510-2.

69. Rasli MH & Zacharin MR.(2008). Foot problems and effectiveness of foot care education in adolescents with diabetes mellitus. **Diabetes   education**, 9(6), 602-8.

70. Rerkasem, K. (2009). Multidisciplinary diabetic foot protocol. **International Journal of lower extremity wound**, 8 (3), 153-6.

71. Rodrigo., et al.,(2007). An evaluation of group education in recently diagnosed diabetes. **International Journal Of Extremity Wounds**, 6(1), 28-33.

72. Schellhase K., et al.,(2005). Glycemic control and multiple micro vascular diabetic complications. **Family medicine**, 37(2), 125-30.

73. Schmidt S., Mayer h., etal. (2008). Diabetes Foot Self Care Practices. **Journal of Clinical Nurse**, 17(21), 2920-6.

74. Singh N., Armstrong DG., (2005). Preventing Foot Ulcer in Patient with Diabetes. **Journal of the American Medical Association,** 293,217-238.

75. Stuart, L. wiles, PG. (1997). A comparison of qualitative and quantitative research methods used to assess knowledge of foot care among people with diabetes, **Diabetes Medicine**, 14(9), 785-91.

76. Sun, PC. (2009). Improving preventive foot care for diabetic patients participating in group education. **Journal of American Podiatric Medical Association**, 99(4), 295-300.

77. Tan LS. (2010). The clinical use of the of the 10 g monofilament and its limitations. **Diabetes Resident Clinical Practice**, 90 (1), 1-7.

78. Torreguitart, MV. (2011). Diabetic Foot Care importance of education. **Revised enferm**. 34(5), 25-30.

79. Unnikrishnan AG. (2008). Approach to A Patient with A Diabetic Foot, **National Medical Journal of India.** 21(3), 134-7.

80. Valk GD., Kriegsman DM., (2002). Patient Education for Preventing Foot Ulceration. **Endocrinol Metab Clinical North America**, 31(3), 633-88.

81. Vatankhah N. (2009). Effectiveness of Foot Care Education on People with Type 2 Diabetes. **Prim Care Diabetes,** 3(2), 73-7.

82. Vedhara, K., Gale L., et al. (2008). Management of Diabetic Foot. **Journal of Health Service Policy,** 13(3), 82-91.

83. Ward A. (1999). Foot education improves knowledge and satisfaction among patients at high risk for diabetic foot ulcer. **Diabetes Education**, 25(4), 560-7.

84. White JC. (2004). Preventive foot care practice among adult with diabetes in North Carolina. **Journal of American podiatric medical association**, 94(5), 483-91.

85. Wood WA., et al. (2005). Testing for loss of protective sensation in patients with foot ulcer. **Journal of American Podiatric Medical Association**, 95(5), 469-74

86. Wunderlich RP., et al.(2005). Effectiveness of diabetic foot prevention program in a managed care organization. **Diabetes resident clinical practice**, 70(1), 31-7.

INTERNET RESOURCES:

87. Abu qamar MZ.(2006). Diabetic foot screening: why it is neglected? International wound journal, 3(13), 203-13, from **http://www.abuqamar@** student.adelaide.edu.au.

88. American diabetic association.com. **http://www.ada.com.**

89. Anichini., et al., (2007). Improvement of diabetic foot care.diabetes resident clinical practice,75(2),153-8, from **http://www.roberto.anichini@tin.it.**

90. Anselmo, MI., Nery, M., et al. (2010).The effectiveness of educational practice in diabetic foot. Diabetol metabolic syndrome, 29(2), 45 from **http://www. ncbi.nih.gov.pmc**.

91. Beklar HI, Ertav A. (2009). Preclinical symptoms of the diabetic foot. **American Journal of Podiatric Medical Association**, 99(2), 114-20, from **http://www.nbeklar@yahoo.com.**

92. Calle-pauscal AL. (2002). A preventative foot care program for patient with diabetes of different stages of neuropathy, Diabetes Resident Clinical Practice, 57(2)111-7, **From http:/www.acalle@hosc.insalud.es**.

93. **Cisneros, LL. (2010).** Evaluation of Neuropathic Ulcer Prevention Program**.** Revised Brasil Fisioter, 14(1), 31-7**, from http://www. ncbi.nih.gov.pmc**

94. Dabiri F., vahdatpour., et al. (2008). Preventing foot ulcer in diabetic patients. England Medical Society, 771-4, from **http://www.dabiri @cs.ucla.com.**

95. Frigg A.,et al. (2007). Recurrence and prevention of diabetic foot ulcer in client with casting. Foot ankle international, 28(1), 64-9, from **http://www.arnoffrig.com**.

96. Gabbay, RA**. (2011).** Motivational interview by podiatric internals**.** Journal of American podiatric medical association, 101(1), 78-84, from **http://www. gabbay@hotmail.psu.edu.**

97. Green T. (2000). Do foot examinations reduce the risk of diabetic amputation. Journal of Family Practice. 49(6), 499-504, from **http://www.jenmay @u.washington.edu**.

98. Hamonet,J., Daviet,J., et al. (2010). Evaluation of multidisciplinary consultation for diabetic foot. Annual physical rehabilitation medicine, 53(5), 306-8, from **http://www.juliahamonet@hotmail.com.**

99. Heikkinen M.,et al. (2007). Diabetes care for patients with peripheral arterial disease. European journal of vascular endovascular surgery,.33 (5), 583-91 **from http://www. ncbi.nih.gov.pmc.**

100. Heureux M., et al. (2009). what is the Management for Foot ulcers in Diabetic Patients. Revised Medicine Brux, 30(1)**,** 29-35, from **http://www.mheureux@ulb.ac.be.**

101. **http://www.who** (2010 May 5).int./mediacentre/factsheets/fs317/enindex. html.

102. Martini, J**. (2008).** Diabetic Foot Detection and Prevention**.** Revised Medical Intern, 29(2), 243-8**, from http://www. ncbi.nih.gov.pmc.**

103. Moreira, RC., Cruz Cf., (2008). Diabetic Foot Prevention. Revised Gaucha Enferm Journal of Portugesh, 29(2), 283-91, from **http://www.ricardo @ffalm.br.com.**

104. Morritt taub LF.(2006). Guidelines for foot care. Journal of American academic nurse practitioner, 18(3), 124-33, from **http://www.taublm umdnj.edu**.

105. Nair DG, Smson R. (2008). Which diabetics are at risk for foot complications and what preventive measures can be taken**.** Semin Vascular Surgery, 21(3), 154-9 from **http://www.dnairveinsand arteries.com**.

106. Neder S, Nadash P. (2003). Individualized education can improve foot care for patients with diabetes. Home Health Care Nurse, 21(12), 837-40, from **http://www.neder@vnsny.org**.

GUIDELINES/PROTOCOLS:

107. Rauner MS., et al. (2005). Evaluation of diabetic foot prevention strategies. Health care management sciences, 8(5), 253-65 from **http://www.rauner@ univie.ac.at**.

108. Vileikyte L., et al. (2006).patient interpretation of neuropathy questionnaire. Diabetes care, 29(12), 261117-24, from **http://www.iveleikyte @med.edu.**

109. Viswanathan V.(2007). The Diabetic Foot: Perspective from Chennai, South India. International journal of lower extremity wounds, 6(1), 34-6 from **http://www.vijay@vsnl.com.**

INFORMATION BOOKLET:

110. Pinzur M. (2002). Development of nurse provided health strategy for diabetic foot care**.** Foot ankle international, 22 (9), 744-6, From **http://www.mpinzul @lumc.edu.**

111. Trepman E., et al. (2005). Diabetic foot care: multilingual translation of a patient education leaflet. **American orthopedic foot and ankle society Journal**, 26(1), 64-107

UNPUBLISHED DISSERTATION:

112. Jasmine. (March 2008). **Structured teaching program on foot care among type 2 diabetes mellitus**. Unpublished dissertation. Dr.MGR University, Tamil Nadu.