

A Study to assess the effectiveness of foot care instruction on the knowledge among diabetic patients in a selected community

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Abstract- Global burden of diabetes mellitus is increasing every day.

In India diabetes mellitus has become an epidemic with more than 67 million diabetic individuals currently diagnosed with the disease. Patients are losing their savings because of the complications of diabetes like ischemic heart disease, myocardial infarction, chronic kidney disease, diabetic retinopathy and diabetic foot ulcer. Among these, foot ulcer being a complication is also a social stigma. At any given moment, between 4-10% of diabetics have a foot ulcer. In 3-5% of cases, ulcer leads to amputation. Hence resulting in lifelong disability and dependency.

This study was done to emphasize the importance of education in preventing foot ulcer among the diabetic patients. A sensitized patient towards the complications will have less chances of landing up in amputation. Hence, video demonstration was used as a medium of instruction and pre-test and post test were conducted on the study population with control sample. The difference in gain of knowledge was proven by the improved scores in post-test in the experiment group.

AIM: To assess the effectiveness of foot care instruction on knowledge among the patients with diabetes mellitus in a selected community at kanyakumari district.

RESULTS: In the experimental group significant mean score difference was seen between pre-intervention and post-intervention knowledge status. Significant difference is seen in all the areas of knowledge like basic diabetic knowledge ($t= 15^{\text{th}}$ day- 8.76, 30^{th} day- 10.44 $df=58$ $P < 0.05$), diabetic management ($t= 15^{\text{th}}$ day- 9.55, 30^{th} day- 11.77 $df=58$ $P < 0.05$), foot care ($t= 15^{\text{th}}$ day- 10.68, 30^{th} day- 10.99 $df=58$ $P < 0.05$), and foot risk assessment ($t= 15^{\text{th}}$ day- 12.24, 30^{th} day- 13.99 $df=58$ $P < 0.05$).

CONCLUSION: The study concluded that teaching with video demonstration had an effect on diabetic patients. It improved their knowledge regarding diabetic foot care and ensuring the safety of the patients and minimizing the risk of diabetic foot ulcer and amputation.

Index Terms- diabetes, diabetic foot care, education, knowledge, prevention.

I. INTRODUCTION

In 2011 diabetes resulted in 1.4 million deaths worldwide, making it the 8th leading cause of death. The number of people with diabetes is expected to rise to 592 million by 2035. Untreated, diabetes can cause many complications. Serious long-term complications include heart disease, kidney failure, and damage to the eyes and diabetic foot ulcer. The term "Diabetic Foot" is used to refer to a variety of pathologic conditions that may affect the feet of people with diabetes. All Diabetes mellitus patients require effective education regarding prevention of foot injuries, foot care because diabetes initially causes poor circulation and nerve damage and leads to injury. Nerve damage caused by the high levels of glucose in blood can lead to loss of circulation, pain, tingling and burning sensation in the feet. Diabetes patient feet become cold due to less blood circulation. In diabetic patients, foot ulcer occurs because of default treatment and not giving proper attention and care of feet. Diabetic patients may not feel pebbles, nails, small stones inside the shoes which may lead to small injuries. A sore or even blister may form with wearing of new shoes. Such injuries can cause ulcers, which do not properly heal and may get infected; therefore a little care everyday can prevent such foot problems.

Patients who have had a previous foot ulcer are more likely to have future foot complications. Nerve damage, poor circulation, and chronically high blood sugar levels also increase the likelihood of foot complications. It is important to wear shoes that fit well. Shoes that are too tight can cause pressure ulcers. Going barefoot, even in the home, should be avoided as this increases the risk of injury to the foot.

Diabetes can lead to many different types of foot complications, including athlete's foot (a fungal infection), calluses, bunions and other foot deformities, or ulcers that can range from a surface wound to a deep infection. Poor circulation — longstanding high blood sugar can damage blood vessels, decreasing blood flow to

the foot. This poor circulation can weaken the skin, contribute to the formation of ulcers, and impair wound healing. Some bacteria and fungi thrive on high levels of sugar in the bloodstream, and bacterial and fungal infections can break down the skin and complicate ulcers.

More serious complications include deep skin and bone infections. Gangrene (death and decay of tissue) is a very serious complication that may include infection; widespread gangrene may require foot amputation. Approximately 5 percent of men and women with diabetes eventually require amputation of a toe or foot. This tragic consequence can be prevented in most patients by managing blood sugar levels and daily foot care.

Nerve damage (neuropathy) — Elevated blood glucose levels over time can damage the nerves of the foot, decreasing a person's ability to notice pain and pressure. Without these sensations, it is easy to develop callused pressure spots and accidentally injure the skin, soft tissue, bones, and joints. Over time, bone and joint damage can dramatically alter the shape of the foot. Nerve damage, also called neuropathy, can also weaken certain foot muscles, further contributing to foot deformities.

In order to prevent these complications of diabetic foot, we devised a strategy of video demonstration to improve their knowledge regarding foot care.

II. OBJECTIVES

- a) To describe the background of the diabetic patients who will be interviewed.
- b) To determine whether the foot care instruction makes any difference in the knowledge among diabetic patients

III. MATERIALS AND METHODOLOGY

Study population: The population included all the adults with Type 2 Diabetes Mellitus residing in the selected community at Kanyakumari.

Study period: December 2013-2015.

Sample size: 60

Sample selection : Systematic random sampling method was used.

INCLUSION CRITERIA

- Both males & females.
- Age above 35.
- Known case of diabetes above 2 years.
- Adults with Type 2 Diabetes Mellitus and those who are willing to participate in the study.
- Those who understood Tamil.

EXCLUSION CRITERIA

- Those who had training about diabetic foot care.
- Those who were critically ill.
- Those who are bedridden.
- Those with the history of diabetic foot ulcers.
- Those with the history of peripheral vascular disorders or any other co morbid conditions.
- Hearing problem
- Visual problem

PROCEDURE

Study was begun after approval from the institutional ethical board. A prior permission was obtained from the Municipal Council, primary health center, village health nurse, church committee, priest, clients and their family members.

The conceptual frame work used in this study was based on modified Orem's self care model (2004). A true experimental pre and post test control group design was used to determine the effect of individualized instruction on knowledge of diabetic foot ulcer among the adults with type 2 diabetes mellitus. The sample of 60 patients was selected who were on treatment for diabetes. Selection was done by systemic random sampling method. Samples were randomly assigned to control and the experimental group 30 in each. The data from the samples were collected by using a structured interview schedule and observational checklist. The data was analyzed using descriptive and inferential statistics. A pretest was given to both experimental and the control group. An individualized teaching with video demonstration on diabetic foot care was given to the experimental group after the pre-test. Post-test was conducted on 15th and 30th day. The knowledge was assessed in different areas like basic knowledge, management, foot care and foot risk assessment awareness for both the experimental and the study group.

Statistical analysis: By descriptive and inferential statistics.

Frequency and percentage distribution were used to analyze demographic variables and to assess the level of knowledge regarding diabetic foot care.

Mean and mean score percentages were used to determine the difference in the level of knowledge regarding diabetic foot care.

Unpaired 't' test was used to determine the significant difference in the level of knowledge in different areas on diabetic foot in experimental and the control group.

'Chi square test' was used to assess the association of selected demographic variables with the level of knowledge.

IV. RESULTS

A. Demographic characteristics of the sample

TABLE 1
FREQUENCY AND PERCENTAGE DISTRIBUTION OF
EXPERIMENTAL AND CONTROL GROUP ACCORDING TO
PERSONAL CHARACTERISTICS
N=60

S. No.	Demographic Characteristics	Experimental group (N=30)		Control group (N=30)	
		Frequency	Percentage	Frequency	Percentage
1.	Age				
	a) 36-45 Years	2	6.7	2	6.7
	b) 46-55 Years	9	30.0	7	23.3
	c) 56-65 Years	12	40.0	13	43.3
	d) >65 Years	7	23.3	8	26.7
2.	Sex				
	a) Male b) Female	13 17	43.3 56.7	15 15	50.0 50.0
3.	Education				
	a) Illiterate	5	16.7	2	6.7
	b) Primary	10	33.3	7	23.3
	c) Secondary	8	26.7	9	30.0
	d) Collegiate	7	23.3	12	40.0
4.	Marital status				
	a) Married	25	83.3	17	56.67
	b) Unmarried	2	6.7	4	13.33
	c) Widow	3	10.0	5	16.67
	d) Separated	-	-	4	13.33
5.	Occupation				
	a) Farmer	1	3.3	-	-
	b) Laborer	6	20.0	13	43.3
	c) Private employee	4	13.3	4	13.3
	d) Government employee	3	10.0	3	10.0
	e) Unemployed	16	53.3	10	33.3
6.	Religion				
	a) Hindu	2	6.7	1	3.3
	b) Christian c) Muslim	28 -	93.3 -	29 -	96.7 -

Table-1 Presents frequency and percentage distribution of experimental and control group samples according to personal characteristics

TABLE - 2
FREQUENCY AND PERCENTAGE DISTRIBUTION OF
EXPERIMENTAL AND CONTROL GROUP ACCORDING
TO DISEASE CHARACTERISTICS
N=30

SL No	Disease characteristics	Experimental group (N=30)		Control group (N=30)	
		Frequency	Percentage	Frequency	Percentage
1	History of Diabetes Mellitus	10	33.3	12	40.0
	a. 2-4Year	8	26.7	5	16.7
	b. 5-7 Years	4	13.3	8	26.7
	c. 8-10years d. >10years	8	26.7	5	16.7
2	Treatment measures followed	22	73.3	23	76.7
	a. Oral hypoglycemic Agents b. Insulin	4 4	13.3 13.3	1 6	3.3 20.0
3	Presence of comorbid illness	17	56.7	14	46.7
	a. No b. Yes	13	43.3	16	53.3
4	Smoking habit	28	3.3	26	86.7
	a. No b. Yes	2	6.7	4	13.3
5	Blood sugar	10	33.3	15	50.0
	a. 100-150mgs/dl	8	26.7	7	23.3
	b. 151-200 mgs/dl	6	20.0	3	10.0
	c. 201-250 mgs/dl	4	13.3	3	10.0
	d. 251-300 mgs/dl e. >301 mgs/dl	2	6.7	2	6.7
6	Results of latest urine test?	30	100.0	30	100.0
	a. Not Done b. Done	-	-	-	-
7	Results of latest HbA1C?	30	100.0	30	100.0
	a. Not Done b. Done	-	-	-	-

Table-2 shows the frequency and percentage distribution of experimental and control group according to disease condition and treatment information.

B. Comparison of the knowledge regarding Diabetic foot care in experimental and control group before and after intervention

TABLE – 3

FREQUENCY AND PERCENTAGE DISTRIBUTION OF EXPERIMENTAL AND CONTROL GROUP ACCORDING TO LEVEL OF OVERALL KNOWLEDGE BEFORE AND AFTER INTERVENTION

N = 60

Level of Knowledge	Experimental Group N=30						Control Group N=30					
	Before Interven		After Intervention				Base Line		Subsequent			
			15 th day		30 th day				15 th day		30 th day	
	F	%	F	%	F	%	F	%	F	%	F	%
Good	1	3.3	29	96.7	29	96.7	-	-	-	-	1	3.3
Fair	15	50.0	1	3.3	1	3.3	23	76.7	20	66.7	16	53.3
Poor	14	46.7	-	-	-	-	7	23.3	10	33.3	13	43.3

Graph 1

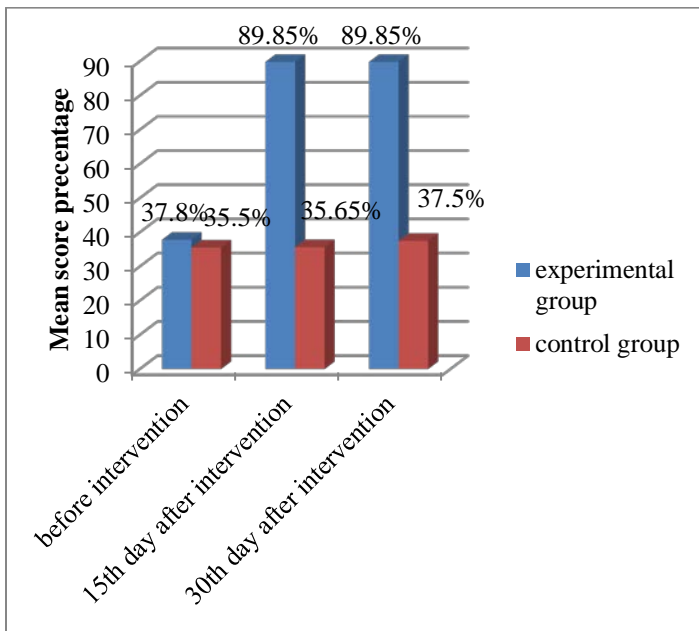


Figure 4.1 Overall mean knowledge score of experimental and control group regarding Diabetic foot care before and after intervention in percentage.

TABLE-4

MEAN KNOWLEDGE SCORE AND STANDARD DEVIATION OF EXPERIMENTAL AND CONTROL GROUP IN DIFFERENT ASPECTS OF DIABETIC FOOT CARE ON THE 30TH DAY AFTER INTERVENTION AND LEVEL OF SIGNIFICANCE

Aspects of Knowledge	Max Score	Experimental Group N = 30			Control Group N = 30			Un paired 't' value P<0.05 df=58	
		Mean score	Mean score %	SD	Mean score	Mean score %	SD		
Diabetes knowledge	4	3.77	94.15	0.51	1.87	46.65	0.86	1.90	10.44*
Diabetic management	5	3.90	78	0.55	1.50	30.00	0.97	2.40	11.77*
Foot care	6	5.53	92.22	0.73	2.17	36.10	1.51	3.37	10.99*
Foot risk assessment	5	4.77	95.32	0.43	1.60	32.00	1.16	1.17	13.99*

*- Significant, NS- Not Significant.

Table 4 shows mean knowledge score and standard deviation of experimental and control group in different aspects of diabetic foot care on 30th day after intervention and level of significance.

TABLE-5

ASSOCIATION OF SELECTED DEMOGRAPHIC VARIABLES WITH OVERALL LEVEL OF KNOWLEDGE ON DIABETIC FOOT CARE BEFORE THE INTERVENTION

N=59

Sl. No	Characteristics	Level of Knowledge				χ ² value	χ ² table value p < 0.05
		Average		Poor			
		F	%	F	%		
1.	Age in years > 55	12	20.38	7	11.86	0.07 NS	Df=1 3.84
		26	44.08	14	23.72		
2.	Gender Male	18	30.51	10	16.94	0.01 NS	Df=1 3.84
		20	33.90	11	18.64		
3.	Educational Status Primary	9	15.25	14	23.72	3.21 NS	Df=1 3.84
		9	15.25	08	13.56		
		12	20.38	07	11.86		
4.	Occupation Employed	25	42.37	9	15.25	1.11 NS	Df=2 5.0
		13	22.03	12	20.38		

5.	Duration of Diabetes Mellitus				28.81	2.17	Df=1
	<7years	18	30.51	17	22.03	NS	3.84
	>7 years	12	20.34	13			
6.	Co morbid illness					0.81 NS	Df=1
	No	22	37.29	8	13.56		3.84
	Yes	16	27.12	13	22.03		

*-Significant. NS- Not Significant

Table 5 shows the association between the demographic variables and knowledge of diabetic foot care before intervention.

The table shows that there was no significant association between the age, gender, educational status, occupation, duration of diabetes, co morbid illness and the knowledge before intervention.

DISCUSSION

Nearly half i.e. 14(46.7%) of the samples in the experimental group had a poor level of knowledge and the remaining 15(50%) had fair knowledge, only one had good knowledge before intervention. After intervention on the 15th day and 30th day some improvement in the level of knowledge, with good level for 29 samples(96.7%) and to fair level for 1 sample(3.3%) fair level for 1 sample (3.3%).

In the control group, 23 samples (76.7%) had an average level of knowledge and the rest had a poor level of knowledge in the baseline observation.

On the 15th day in the control group, 20 samples (66.7%) had fair knowledge and the rest 10(33.3%) had poor level of knowledge in the subsequent observation.

On the 30th day, in the control group, 16 samples(53.3%) had a fair level of knowledge and the rest 13(43.3%) had poor level of knowledge, only one(3.3%) had good level of knowledge.

On the 30th day after intervention, the percentage mean knowledge score on various aspects of knowledge showed a variation from 78% to 95.32% in the experimental group, the highest score was observed in the aspect of foot risk assessment 95.32%, the second score in the aspect of diabetes knowledge 94.15%, the third score in the aspect of foot care 92.22% and the least score was in the aspect of diabetic management.

On the 30th day in the control group, all the four aspects of mean knowledge score ranged from 30 to 46.65 percentage, the highest score was observed in the aspect of diabetic knowledge 46.65%, the second score in the aspect of foot care 36.1%, third score in the aspect of foot risk assessment 32%, and the least score was in the aspect of diabetic management 30%.

Statistically, there was a significant difference in the mean knowledge score between the experimental and the control group in the aspect of diabetic knowledge [‘t’ value of 10.44(p<0.05, df=58)], in the aspect of diabetic management [‘t’ value of 11.77(p<0.05, df=58)], in the aspect of foot care [‘t’ value of 10.99(p<0.05, df=58)] and in the aspect of diabetic management [‘t’ value of 13.99(p<0.05, df=58)]. The experiment group had a

higher mean knowledge score with regard to control group on 30th day after intervention.

There was a significant difference in the aspects of diabetes knowledge, diabetes management, foot care and foot risk assessment between experimental and control group.

CONCLUSION

In conclusion, since diabetic foot ulcers leading to foot amputation and below knee amputation have become a burden on health care system, we must act to increase the knowledge of foot care among diabetic patients.

If interventions like video display regarding foot care can cause a significant difference in knowledge (which in turn can decrease the incidence of foot ulcers and resulting amputations) among the diabetic patients as shown in this study, then we should adopt a nationwide policy on the same so that even the poorest of the patients is benefitted.

India’s economy will improve with less expenditure on these preventable complications.

This again emphasizes the fact that prevention is better than cure.

Appendix

A. Scoring and interpretation of scoring

Structured interview question schedule on knowledge was designed and minimum obtainable score was 0 and maximum 20.

Score	Grading
14 to 20	Good
7 to 13	Average
0 to 6	Poor

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REFERENCES

- Joshi SR, Parikh RM, India – diabetes capital of the world: now heading towards hypertension. J Assoc Physician India. 2007;55:323-4.[Pub Med]
- Kumar A, God MK, Jain RB, Khanna P, Chaudhary V. India towards diabetes control: key issues. Australas Med J 2013;6(10):524-31[PMC free article] [Pub Med]
- Bethaasela. Putting feet first to prevent amputation is the focus of world diabetes day 2005; APMA and NDEP join forces to promote foot care and prevent amputation among people with diabetes. Solomon star News paper 2004 November 9; Section A: 1 (col 4)
- Park K. Text Book of Preventive and Social Medicine, 17th edition,

- Bhanot Jabalpur; Banarsidas; 2002.
5. Joan Luck man, Saunders manual of nursing Philadelphia: Saunders company; 1987
 6. Dr. Neelam Makol, Demystifying Diabetes. Health Action 2005; June.
 7. Dr. Palouse, Kp a source of health care professionals. The diabetic foot care 2005; 1 of 3.
 8. Dr. Leafasia, Diabetic foot ulcers, Amputation is preventable: Early actions fight diabetes, knight rider new papers 2005 November 15: section B (Col 6).
 9. Joan E, Halpin – Kandry, Feet first diabetes care, people with diabetes mellitus consuming more than \$1 billion in health care annually 1999 February: 99(2) 26-27.
 10. Lalitha Sridhar, A major health problem: with study establishing the overall prevalence of diabetes in India at 12.1 percent in adults. The Hindu Business line 2003 August 04: Section A: 1 (Col 2) 1-4.
 11. Neelam Makol, Demystifying Diabetes. Health Action 2005; June
 12. Michael S, Pinzur, Diabetic Foot; diabetic foot ulcer (DFUS) precede 85% of non-traumatic Lower extremity amputation (LEAS) 2004 June 2Section2of 91-16. <http://www.emedicine.com/orthoped/topic387htm>
 13. Vinaya A S, diabetic foot: the next great Indian epidemic, Deccan Herald 2005 November 14; Section A: 3 (Col 1) III.
 14. Cullet on John L. Preventing Diabetic foot complications. The Asian journal of diabetology 2003 March 5; (3) 6-7
 15. Statistics about men and diabetes. Report. American diabetes association; 2004. PollackRD.Management of diabetic foot disease: epidemiology of risk factors.2002: (guidelines 55) section. 7: (col.1) 1 of 7.
 16. Pullock R D, Management diabetic foot disease: Epidemiology of risk factors. 2002: (guidelines 55) journal of Indian Medical Association, 2002.
 17. Cynthia frits chi. Preventive care of the diabetic foot. Nursing clinics of North America 2001 june.36 (2) 302-303.

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