

# Effectiveness of teaching program regarding foot care management on the knowledge and practice of clients with type 2 diabetes mellitus in selected community of Dehradun

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## ABSTRACT

**Background:** Diabetes mellitus is an illness in which the body does not produce adequate insulin or it does not utilize it in helping cells to take in glucose to use for energy and this leads to increase in blood glucose level. It is also called as “silent disease.” **Objectives:** The objectives of the study were to determine the effectiveness of teaching program on the knowledge and practice of foot care management of clients with type 2 diabetes mellitus and to find the association between pre-test knowledge and practice scores with selected demographic variables. **Materials and Methods:** Quantitative research approach with one group pre-test-post-test design was selected to carry out the study. A total of 60 clients with type 2 diabetes mellitus were selected by non-probability purposive sampling technique. Pre-test data were collected by conducting structured interview and using structured knowledge questionnaire and self-reported practice checklist on foot care management. Teaching program consisting of instructions as well as demonstration on foot care management was given to the participants on the same day and after 7 days the post-test was done. **Results:** The pre-test mean knowledge score of participants was  $9.8 \pm 2.2$  which was increased to  $13.5 \pm 1.94$  in the post-test. The pre-test mean knowledge score of clients with type 2 diabetes mellitus was significantly associated with sociodemographic variables such as occupation, family history, and gender. The pre-test mean practice score of participants regarding foot care was  $8.7 \pm 2.12$  which was increased to  $12.5 \pm 2.09$  in the post-test. The pre-test practice score of clients with type 2 diabetes mellitus was not significantly associated with any of the sociodemographic variables. **Conclusion:** The teaching program on foot care management was useful in enhancing the knowledge and practice of clients with types 2 diabetes mellitus.

**KEY WORDS:** Effectiveness; Structured Teaching Program; Knowledge; Practice; Foot Care Management; Clients with Type 2 Diabetes Mellitus


## INTRODUCTION

*“Wounds that don’t heal, nerves that don’t feel  
No food I can at ease, what a disease I have diabetes.”*

“Diabetes mellitus is a group of disease characterized by increased levels of glucose in the blood (hyperglycemia) resulting from defects in insulin secretion, insulin action, or both.”<sup>[1]</sup>

It is also called as “silent disease” and almost in all countries of the world is recognized as the fastest growing threat in the public because of that it is also called “disease of prosperity.”<sup>[2]</sup>

Mathers and Loncar stated that the digit of individuals with diabetes mellitus has increased to 422 million in 2014 from

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108 million in 1980. The occurrence of diabetes mellitus in adults worldwide has increased to 8.5% in 2014 from 4.7% in 1980.<sup>[3]</sup>

Diabetes has come up as most important health-related condition in India. According to International Diabetes Federation in 2007, there were approximately 40 million people with diabetes in India. It is anticipated that this number will increase to about 70 million by the year 2025 (Gupta, 2008).<sup>[3]</sup>

The causes of diabetes mellitus in Indian adults are many such as family history, obesity, urbanization increase in living standards, and changes in lifestyle.<sup>[4]</sup>

Jha *et al.* conducted a study to estimate the incidence of hypertension and diabetes mellitus among adults in villages located in hills of Uttarakhand. 401 adults in areas of Nainital and Almora districts were selected randomly. The overall prevalence of hypertension and diabetes mellitus was 31.4% and 4.7%, respectively. Around 2.5% of the adults were having hypertension and diabetes mellitus both.<sup>[5]</sup>

Worldwide, the incidences of type 2 diabetes mellitus are rising rapidly. It is increasing more in developing nations because of shift of people from rural areas to the urban areas. The price for the treatment of diabetes has increased. Therefore, it is necessary that preventive measures should be taken to save peoples' lives and prevent wastage of money. Many research studies have reported that health education is helpful method in reducing the complications of diabetes and its treatment.<sup>[4]</sup>

Foot ulcer is the most common complication of uncontrolled diabetes, which requires patients to be admitted in the hospital and also causes physical impairment. Foot ulcer causes additional load to family members and system of health care.<sup>[5]</sup>

The foot-related complications can be prevented and identified early in diabetics by performing foot care every day which includes inspecting feet daily and wearing proper footwear. The prevalence of diabetic foot ulcer is more in people who have less knowledge of foot care and also who do not practice foot care.<sup>[6]</sup>

The most common microvascular complication in diabetic patients is neuropathy which means damage of nerves, especially in lower extremities because of this they do not feel any pain, injury which occur in lower extremities. There is also less blood supply in lower extremities, this leads to poor healing of wounds. This may require the patient to have surgical treatment such as removal of toes, feet, or lower extremities. Therefore, to prevent these problems, people having diabetes must examine their feet every day for any

injury, swelling, and problem in toenails. They should also take care of their feet by cleaning with warm water and drying them special care must be given to place between toes (American College of Foot and Ankle Surgeons, 2009).<sup>[9]</sup>

Nurses play a major role in educating diabetic patients about care of feet which include checking feet daily, cleaning, drying, and massaging with lubricating lotion, buying and wearing proper shoes, and getting feet examined by health-care professional for any deformity and neuropathy (Lottenberg).<sup>[10]</sup>

During clinical posting investigator observed that many type 2 diabetes mellitus patients had undergone amputation, because they did not take care of their feet properly had developed diabetic foot ulcer. Investigator also observed that many type 2 diabetes mellitus patients did not have knowledge about foot care. Therefore, after identifying the great need, investigator had undertaken this study.

The hypothesis stated by researcher was that teaching on foot care management will significantly increase the mean knowledge and practice scores of type 2 diabetes mellitus clients. There would be significant association between pre-test knowledge and practice scores and sociodemographic variables of sample.

## MATERIALS AND METHODS

The quantitative research approach with one group pre-test and post-test design was selected to carry out the study. The present study was conducted at Kurkawala and Prem Nagar villages of Doiwala block, Dehradun. The setting was selected randomly of 10 villages of Doiwala block. Investigator went door to door in these two villages to identify clients with type 2 diabetes mellitus and selected 60 samples using non-probability, purposive sampling technique method. The inclusion criteria were adults diagnosed with type 2 diabetes mellitus, willing to participate in the study, understands Hindi language, and were in the age group of 20–70 years. The exclusion criteria were clients having complications of type 2 diabetes mellitus, having any feet problem, i.e. infection, and not willing to participants in the study. Data were collected using structured knowledge questionnaire and self-reported practice checklist on foot care management. Informed written consent was obtained from all the study participants. Ethical permission was taken from ethical committee of concerned university.

The data were analyzed using SPSS software version 20.

## RESULTS

### Demographic Characteristics of Study Participants

Table 1 shows that of 60 samples, 51.7% were female, < 38.3% were between the age group of 41 and 50 years.

**Table 1:** Frequency and percentage distribution of demographic characteristics the study subjects, n=60

Demographic characteristics	Frequency (%)
Gender	
Male	29 (48.3)
Female	31 (51.7)
Age (years)	
20–30	7 (11.7)
31–40	15 (25)
41–50	23 (38.3)
51–60	8 (13.3)
61–70	7 (11.7)
Marital status	
Married	47 (78.3)
Unmarried	6 (10)
Widow	7 (11.7)
Education status	
No formal education	9 (15)
Primary education	9 (10)
High school	13 (21.7)
Intermediate	17 (28.3)
Graduate/above	15 (25)
Occupation	
Shopkeeper	12 (20)
Farmer	18 (30)
Private job	8 (13.3)
Government job	12 (20)
Retire (on pension)	10 (16.7)
Monthly income (Rupees)	
5000 less	4 (6.7)
5001–10,000	6 (10)
10,001–15,000	12 (20)
15,001–20,000	16 (26)
20,000 above	22 (36.7)
Duration of disease (years)	
<1	18 (30)
1–5	24 (40)
6–10	10 (16.7)
10 above	8 (13.3)
Family history of diabetes mellitus	
Yes	23 (38.3)
No	37 (61.7)
Type of medicine taking for treatment	
Oral tablets	34 (56.7)
Injection insulin injection	4 (6.7)
Not taking medicine	22 (36.7)
Type of alternative treatment for diabetes	
Karela juice	5 (8.3)
Jamun juice	5 (8.3)
Avoid sweets	12 (20)

(Contd...)

**Table 1:** (Continued)

Demographic characteristics	Frequency (%)
Smoking habit	
Yes	23 (38.3)
No	37 (61.7)
Knowledge about disease	
Yes	37 (61.7)
No	23 (38.3)
Source of information	
Health-care personnel	22 (36.7)
Friends/relatives	15 (25)

Majority (78.3%) were married. <math>\frac{1}{2}</math> (28.3%) of the subjects were educated up to intermediate. <math>\frac{1}{2}</math> (30%) were farmers. One-third (36.7%) of the subjects had monthly income of more than Rs. 20,000, only (40%) had diabetes for 1–5 years. One-third (38.3%) of the subjects had family history of diabetes. More than half (56.7%) of the subjects were taking oral medicines for treatment. 20% of the subjects were avoiding sweets to control diabetes. Most of them (61.7%) had no smoking habits, 61.7% had knowledge about diabetes mellitus. One-third (36.7%) of the subjects had heard about diabetes mellitus from health-care personnel.

**Effectiveness of Teaching Program on the Knowledge of Clients with Type 2 Diabetes Mellitus**

Table 2 reveals that mean pre-test knowledge score was  $9.8 \pm 2.2$  and after giving teaching it was increased to  $13.5 \pm 1.94$  in post-test. To find the significant difference between pre-test and post-test mean scores, calculated paired sample *t*-test was 12.18, which was statistically significant revealing that teaching program on foot care management was effective in increasing the knowledge of clients with type 2 diabetes mellitus. Therefore, investigator rejected the null hypothesis and accepted the alternate hypothesis stating that teaching program would be effective in improving the knowledge of clients with type 2 diabetes mellitus.

**Comparison of Domains of Pre-test and Post-test Mean Knowledge Scores Regarding Foot Care Management in Clients with Type 2 Diabetes Mellitus**

Table 3 shows that mean scores of all five domains, i.e., meaning of diabetes, foot and leg problems, foot complication, taking care of feet had increased in post-test compared to pre-test, and steps of foot care. Significant increase was noted in all five domains.

**Association between Pre-test Knowledge Score and Demographic Variables of the Sample**

Table 4 shows that only occupation was having significant association with pre-test knowledge score and other variables

**Table 2:** Comparison of pre-test and post-test mean knowledge scores of clients with type 2 diabetes mellitus,  $n=60$

Knowledge	Range	Mean±SD	Mean diff., Std. error	<i>t</i>	<i>P</i> value
Pre-test	4–14	9.8±2.2	3.7±2.35	12.18	<0.001*
Post-test	9–19	13.5±1.94			

Minimum score=0, Maximum score=22,  $t=2.18$ ,  $Df=59$ ,  $P<0.05$

\*significant. SD: Standard deviation

**Table 3:** Comparison of pre-test and post-test mean knowledge scores of domains of foot care management of clients with type 2 diabetes mellitus,  $n=60$

Domains of foot care management	Max score	Knowledge score		<i>P</i> value
		Pre-test Mean±SD	Post-test Mean±SD	
Meaning of diabetes	1	0.716±0.454	0.966±0.181	<0.001*
Foot and leg problems	2	0.75±0.75	1.116±0.738	<0.005*
Foot complication	2	0.883±0.715	1.150±0.732	<0.038*
Taking care of foot	3	1.2±0.879	1.7±0.841	<0.001*
Steps of foot care	14	6.28±1.58	8.58±1.42	<0.001*

\*Significant

such as gender, age, family history, smoking habits, and knowledge about disease were not having any significant association. Therefore, null hypothesis was rejected and research hypothesis was accepted.

### The Difference in Pre-test Knowledge Score According to Demographic Variables of Sample

Table 5 reveals that males were having more knowledge as compared to females, skilled workers were having more knowledge than unskilled workers, sample who were having family history of diabetes had more knowledge than who did not have family history.

### Effectiveness of Teaching Program on the Practice of Clients with Type 2 Diabetes Mellitus

Table 6 shows that mean pre-test practice score was  $8.7 \pm 2.12$  and after giving teaching it was increased to  $12.5 \pm 2.09$  in post-test. To find the significant difference between pre-test and post-test mean practice scores, calculated paired sample *t*-test was 10.59, which was statistically significant revealing that teaching program on foot care management was effective in increasing the practice of clients with type 2 diabetes mellitus [Table 7]. Therefore, investigator rejected the null hypothesis and accepted the alternate hypothesis stating that teaching program would be effective in improving the practice of clients with type 2 diabetes mellitus.

## DISCUSSION

Findings of the present study showed that half (51.7%) of the subjects in the study were females. Less than half (38.3%) of the subjects were in the age group of 41–50 years. Majority (78.3%) of the participants were married. One-third (38.3%) of the subjects were having family history of diabetes. More than half (56.7%) of subjects were taking oral medicines for treatment. Moreover, only 20% of subjects were avoiding sweets to control their diabetes. Most of them (61.7%) had no smoking habits.

The findings were consistent with descriptive study conducted by Gholap and Mohite 84% of sample in their study were married, 38.3% had family history of type 2 diabetes mellitus.<sup>[2]</sup>

Findings of the study showed that mean pre-test knowledge score of type 2 diabetes mellitus clients was  $9.8 \pm 2.2$  which was increased to  $13.5 \pm 1.94$  with  $t = 12.18$  at  $P < 0.05$  of statistical significance, revealing that teaching program was effective in increasing the knowledge scores of type 2 diabetes mellitus clients.

Results were consistent with study conducted by Kumarrassamy, the knowledge of type 2 diabetes mellitus patients regarding foot care was increased after receiving structured teaching  $t = 12.29$  at  $P < 0.05$  level of statistical significance.

Finding revealed that average of pre-test practice score of foot care was  $8.7 \pm 2.12$  which was increased to  $12.5 \pm 2.09$  in post-test. Calculated paired *t*-test was 10.59 which was statistically significant at  $P < 0.05$ .

Results were similar to the study conducted by Saurabh *et al.*, the mean of practice of foot care was increased from  $5.90 \pm 1.82$  to  $8 \pm 1.30$  after 14 days of health teaching.<sup>[8]</sup>

Results revealed that that only type of occupation was having significant association with pre-test knowledge score and other variables such as gender, age, family history, smoking habits, and knowledge about disease were not having any significant association.

### Limitations

The study has following limitations:

- The sample size was small.
- Random selection was of sample could not be done.
- Investigator could not assess daily performance of foot care by type 2 diabetic clients.

### Recommendations

- Same study can be replicated on larger sample size in larger study setting.

**Table 4:** Association between pre-test knowledge score and selected demographic variables, *n*=60

Demographic variable	<At		Chi-square	Df	P value
	Below median	At and above median			
Gender					
Male	14	15	3.214	1	0.07
Female	22	9			
Age (years)					
20–45	19	11	0.278	1	0.5
45–70	17	13			
Occupation					
Skilled	7	17	15.84	1	0.001*
Unskilled	29	7			
Family history					
Yes	11	12	2.303	1	0.12
No	25	12			
Smoking history					
Yes	12	11	0.952	1	0.32
No	24	13			
Knowledge about disease					
Yes	19	18	0.583	1	0.44
No	17	6			
Source of information					
Health-care personnel	13	9	1.301	1	0.253
Fiends/relatives	6	9			

\*Significant

**Table 5:** Difference in mean pre-test knowledge score according to demographic variables, *n*=60

Demographic variable	<i>n</i>	Pre-test mean±SD	Mean diff.	<i>t</i> value	P value
Gender					
Male	29	10.4±1.9	1.2	2.192	0.032*
Female	31	9.2±2.3			
Age (years)					
20–45	30	9.83±2.32	0.172	0.289	0.773
46–70	30	9.83±2.32			
Occupation					
Skilled worker	24	10.8±2.09	1.63	2.96	0.004*
Unskilled worker	36	9.1±2.09			
Family history of diabetes mellitus					
Yes	23	10.6±1.8	1.230	2.139	0.037*
No	37	9.37±2.3			
Smoking history					
Yes	23	9.9±2.28	0.172	0.289	0.773
No	37	9.37±2.3			
Knowledge about disease					
Yes	37	10.2±2.11	1.025	1.762	0.083
No	23	9.2±2.3			
Source of information					
Health-care personnel	22	9.8±2.2	0.93	1.401	0.190
Friends/relatives	15	10.8±1.78			

Minimum score=0, Maximum score=20 *t*=1.67, Df=59 *P*<0.05 \*significant

**Table 6:** Comparison of mean pre-test and post-test practice scores of study subjects,  $n=60$ 

Practice score	Range	Mean±SD	Mean diff. Std. error	t value	P value
Pre-test	5–14	8.7±2.12	3.9±2.77	10.59	<0.001*
Post-test	8–18	12.5±2.09			

Minimum score=0, Maximum score=20  $t=2.23$ ,  $Df=59$   $P<0.05$  \*significant

**Table 7:** To determine the difference in pre-test practice score with selected demographic variables  $n=60$ 

Demographic variable	n	Pre-test mean±SD	Mean diff.	t value	P value
Gender					
Male	29	8.89±1.9	0.315	0.573	0.569
Female	31	8.85±2.29			
Occupation					
Skilled worker	24	9.2±1.7	0.93	1.690	0.096
Unskilled worker	36	8.3±2.3			
Age (years)					
20–45	30	8.6±2.26	0.266	0.483	0.631
46–70	30	8.8±1.99			
Knowledge about disease					
Yes	37	9.1±2.14	1.18	2.176	0.034
No	23	8±1.90			
Family history of diabetes mellitus					
Yes	23	9±1.6	0.432	0.765	0.448
No	37	8.5±2.3			
Smoking habits					
Yes	23	8.6±1.91	0.069	0.108	0.915
No	37	8.7±2.26			
Source of information					
Health-care personnel	22	8.9±2.2	0.69	0.983	0.33
Friends/relatives	15	9.6±1.9			

Independent test, \*Significant,  $t=1.671$  and  $df=59$

- Another study can be conducted with control group.
- Diabetic mellitus foot care teaching program can be mandatory in diabetic clinic.
- Comparative study can be done between rural and urban regarding clients with type 2 diabetes mellitus foot care management.
- A survey can be conducted to find out the prevalence of foot ulcer among diabetes mellitus patients.
- The study can be done using random sampling in selection of samples from a large population.

## CONCLUSION

The present study concluded that teaching program on foot care management was helpful in increasing the awareness and performance of type 2 diabetes mellitus clients.

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