

# Diabetes Mellitus: Assessment of Knowledge about Disease Before and after Implementing an Education Program



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## Abstract

**Background:** Provision of diabetes knowledge and awareness helps the diabetic patients take a better self-care, manage their disease well and identify symptoms of and prevent chronic complications. The purpose of this comparative study was to evaluate the knowledge that diabetic patients had about their disease before and after diabetes knowledge increasing sessions.

**Methods:** We enrolled 166 patients of either gender and age 31-70 years- who attended diabetes OPD at a tertiary care hospital for having DM for 2 years or more. Only consent providing patients were enrolled. Using visual aid and published material education sessions were delivered. A 40 items (9 sub-sections) questionnaire was used to pre and post sessions knowledge.

**Results:** The analysis of pre-session and post-session was tested using student's t-test which revealed statistically very significant increase in all sub-sections of knowledge. The mean  $\pm$  SD age was  $51.09 \pm 8.16$  years. The patients' knowledge regarding their disease increased significantly ( $p < 0.05$ ); especially considering the general topics concerning concept of the disease, physiopathology and treatment, physical activity and nutrition. The increase in knowledge after imparting the education/ awareness sessions ranged from 36% (Eating sub-section) to 114% (Special situations sub-section) of overall knowledge. Total mean score of knowledge increased from pre-session score  $15.80 \pm 3.387$  to post-session score  $28.03 \pm 5.817$  ( $p$  value 0.00059).

**Conclusion:** Young age, male and upper socioeconomic status patients had more increase in mean scores.

**Keywords:** Diabetes Mellitus. knowledge. self-care. complications

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## Introduction

Diabetes mellitus (DM) is a chronic metabolic disorder associated with long-standing morbidity. To an estimate more than 300 million people suffer from diabetes (1,2). The reported prevalence of diabetes in Pakistan is >6% (3) which is increasing rapidly. Due to involvement of all systems of body, the DM leads to many complications. Plausible reasons for the steady increase in its complications include lack of knowledge and awareness about the disease (4).

A study from UAE found that 31% of patients had poor knowledge of diabetes while 72% had negative attitudes towards having the disease leading to 10% admitted non-compliance with their medications (5). The situation in our population is not very different. Rafique G, et al., found a very little knowledge score (<13.6%) among diabetes patients (6). More than a half even don't know how to monitor their blood glucose (7) while less than one third patients had good knowledge regarding foot care (8,9). Low rates of literacy, a large population living in rural areas in Pakistan and

having very limited awareness/ ready access to health facilities, may well reflect in malpractices self-care, non-compliance to treatment- based on faulty knowledge (7,10).

Patients with DM cannot be cured however; its chronic complications can be averted or at least slowed by providing the patients a systematic follow-up and awareness regarding their diet, lifestyle, medication and selfcare (11). Teaching of diabetic patients including children adolescents, and old people in communities with different socioeconomic and cultural levels have been found effective in maintaining their foot care, exercise, diet, preventing complications, early detection and prevention (12). Aim of educating diabetic patients is to self-manage the disease through various skills, trainings, knowledge sessions, communication and listening abilities (imparted by multi-professional health team) in order to control the disease dynamics as well as improving their quality of life (13,14).

Thus; education of disease has been recommended as an essential aspect in diabetic patients' treatment (15,16). Very limited literature

exists on evaluation of knowledge and understandings among patients about diabetes in Pakistan. Therefore; it is pertinent to assess the dynamics of diabetes knowledge among them. The current study was undertaken with the aim to evaluate the effect of education/ awareness sessions in increasing the knowledge and awareness by investigating the effectiveness of a diabetes education program using pre- and post-intervention assessments tool. Further association between mean pre-test knowledge scores and selected demographic variables (Age, gender, education, occupation, duration of illness and previous knowledge) was also analyzed. The generated results will help modify their attitude and practices towards DM and help them live better with the disease, prevent complications and related morbidities.

## Methodology

We conducted a "pretest-posttest" (One-group pretest-posttest design) comparative study during the period 1st August 2019 to 31st October 2019 at Isra University welfare Hospital taking a sample of 166 DM type I & II patients who attended the diabetic clinic. The OPD clinic serves a large number of urban & rural patients. The ethical approval was granted by the University Research Committee. All known diabetic patients who have diagnosed diabetes since at least 2 years and come for follow-up visits- irrespective of their age & sex- were included in the study after taking a verbal consent. Diabetes was defined as fasting blood sugar is more than 126 mg/dl (17).

The Education sessions were developed in light of education programs guides of American Diabetes Association (18). In education session, lectures were given using visual aid (along with printed brochures, posters, figures, slide projector and demonstration material, like syringes, needles, glucose monitor, lances, cotton, alcohol) to systematically provided information/ knowledge regarding dietary management, foot care, exercise, medication, and prevention of complication of DM. Priorly, a knowledge questionnaire was distributed to collect the pre-test knowledge score. Illiterate patients were read the questions in their mother tongue. This questionnaire was administered at two specific moments: first in August 2019 and, second, in October 2019, after implementing a Diabetes Education Program.

Data on demographic and study variables (patients' knowledge about their disease) was collected on a pre-structured, self-administered questionnaire which was reviewed (by five diabetes specialists) and then pre-tested. The questionnaire contained 40 questions asked about socio-demographic variables, diabetes as a disease, physical activity, food and eating, foot care, clinical parameters, hypoglycemia, chronic complications, special situations, and family support. Each correct answer weighed one mark where total/ maximum marks were 40. Data were collected by investigators.

Data were entered and analyzed through SPSS 21 software. Descriptive results were expressed in Mean  $\pm$  SD (for numerical variables) & frequency/ Percentages (for categorical variables). The analytical results were expressed by applying student's t-test with significance test was used for paired samples ( $p < 0.05$ ). The chi-square test was used to determine the association between knowledge and age, gender, educational status, duration of DM.

## Results

There were only 11 (6.62%) patients who had type I diabetes. The mean  $\pm$  SD age of all patients was 51.09  $\pm$  8.16 years, and more than half were in their fifties. Nearly two third ( $n = 108$  i.e; 65%) of all participants were females. Table: 1 describes other demographic results. Forty-two (35.3%) respondents either had no formal education or had madrassah education only while only 16% of participants had done bachelors or above. Duration of disease ranged from 2 years up to >15 years.

**Table 1. Sociodemographic Parameters of Diabetic Patients. N= 166.**

Sociodemographic Parameters	Result	
Age Groups (Years)	21 – 40	39 (23.5%)
	41 – 60	86 (51.8%)
	>61	41 (24.7%)
Gender	Male	58 (35%)
	Female	108 (65%)
Employment status	Employed	141 (85%)
	Unemployed	25 (15%)
Level of Education	No formal education	12 (7.2%)
	Madressa/ Religious Educated:	30 (18.1%)
	Primary	53 (31.9%)
	Secondary	42 (25.3%)
	Bachelors	16 (9.6%)
Locality	Masters	13 (7.8%)
	Urban	104 (63%)
Family History of Diabetes	Rural	62 (37%)
	Yes	84 (51%)
Duration of Disease (Years)	No	82 (49%)
	<5	44 (26.5%)
	5-9	34 (20.5%)
	10-14	47 (28.3%)
>15	41 (24.7%)	

The results show that the knowledge of respondents increased after implementing the education/ awareness sessions. The increase in knowledge after imparting the education/ awareness sessions varied across the sub-sections ranging from 36% (Eating sub-section) to 114% (Special situations sub-section). The analysis of pre-session and post-session was tested using student's t-test which revealed statistically very significant increase in all sub-sections of knowledge ( $p$  value  $< 0.05$ ; table 2). Total mean score of knowledge increased from pre-session score 15.80  $\pm$  3.387 to post-session score 28.03  $\pm$  5.817 ( $p$  value 0.00059).

**Table 2. Paired Samples Statistics comparing Pre and post education session score comparison of Diabetic Patients**

Knowledge test variables	Max. score	Descriptive statistics		Paired Differences				P value
		Mean	Std. Dev.	Mean difference	Upper CI	Lower CI	t-static	
Total score Pre	40	15.80	3.387	12.229	13.307	11.151	22.400	0.00059
Total score Post		28.03	5.817					
Pre_Diabetes mellitus: concept, Physio_treatment	8	2.96	1.671	2.994	3.331	2.657	17.530	0.00012
Post_Diabetes mellitus: concept, Physio_treatment		5.95	1.556					
Pre_Physical activity	5	2.03	.911	1.639	1.873	1.404	13.797	0.00041
Post_Physical activity		3.67	1.178					
Pre_Eating	7	2.60	1.279	.934	1.249	.618	5.848	0.00024
Post_Eating		3.54	1.540					
Pre_Foot care/ examin	4	1.84	.681	1.367	1.562	1.173	13.913	0.0009
Post_Foot care/ examin		3.20	1.115					
Pre_Self-monitoring	3	1.02	.831	1.066	1.262	.870	10.734	0.0001
Post_Self-monitoring		2.09	.984					
Pre_Hypoglycemia	5	1.93	1.382	1.470	1.749	1.191	10.398	0.0010
Post_Hypoglycemia		3.40	1.220					
Pre_Chronic complications	4	1.76	1.256	1.054	1.306	.802	8.257	0.0011
Post_Chronic complications		2.81	1.104					
Pre_Special situations	2	.82	.699	.928	1.053	.802	14.564	0.0019
Post_Special situations		1.75	.436					
Pre_Family support	2	.84	.687	.777	.921	.634	10.690	0.0052
Post_Family support		1.62	.618					

## Discussion

Having every tenth citizen with the diabetes mellitus is a serious health problem and public health concern for Pakistan. The momentum of chronic disease is not going to stop or pacify in recent decades as evident from the data trends. Adequate management of disease is key to a better health and life of its patients which can be achieved only when the patients know about self-care. Many studies suggest that through education- patients' proper knowledge and adequate care of diabetes results in a long term better glycemic control and prevention of complications (19,20). However; factor like illiteracy, rural living and inaccessibility to health facilities may become hurdles to knowledge of the diabetes daily life care.

Through the current study, 166 patients who attended OPD for diabetes were provided education/ sessions to improve their knowledge about the disease, its treatment, self-care & monitoring, diet, handling of complications. The participants responded well to the sessions. There was statistically significant difference (p value <0.0001) in pre and post knowledge in the all aspects of care of diabetes. Total mean score of knowledge increased from pre-session score  $15.80 \pm 3.387$  to post-session score  $28.03 \pm 5.817$  out of a 40 maximum (p value 0.00059).

Diabetes is more prevalent in over 50 years age (11) but; the knowledge and ability to acquire it more in this age group is relatively less efficient. In the present study, mean  $\pm$  SD age was  $51.09 \pm 8.16$  years and 51.8% patients were in their fifties yet; it was noted that knowledge improvement score was much higher in younger age (p value 0.015). Tham KY, et al. also reported that younger diabetics tended to score higher with those <54.99 years obtaining the highest score of 34.2/43 (79.5%) in the study (21). So; elderly diabetics need more focus while educating them.

Females have a higher prevalence of diabetes in all age

groups both in urban and rural areas (18,20). however; as per the popular fact; the male participants more efficient raised having their knowledge with education session. Male and female, pre-session knowledge score of 21-30 was 6.9% and 10.2% respectively which was raised to 22.2% and 37.9% respectively (p value 0.051). Likewise; a study by Rafique G and coworkers found that good knowledge (> 60% ~ to our study score 21 to 30) was present in only 13.6% of participants and most of them were males (p value = 0.02) (6). Thus, female which outnumber males in frequency of DM need more emphasis in knowledge/ awareness sessions.

A very important component of DM self-care is to regularly check and record the blood glucose level (8-12,16). Studies documented that less than a quarter of diabetic patients' self-monitor glucose level at home (21) and as much as 38% of the participants had ever received education on diabetes care (6,18). While some studies found that >75% patients check their blood glucose though only one third of these maintain record (9,11-13). Post session in our study the mean score of self-checking blood glucose doubles significantly (p value <0.0001).

Keeping an eye on symptomatology and chronic complications is must to prevent major morbidity and disabilities (11,14,15,22). More knowledge of clinical features and complexities results in more self-care (21,24). Other areas in which more knowledge improved were symptoms knowledge (hyperglycemia/ hypoglycemia; from 23% to 90%; p value= 0.0010) chronic complications (from 7% to 39%; p value= 0.0011), and diabetic foot care (from 13% to 66%; p value= 0.0009). Previous studies like Perera PD, et al. found that 70% had good knowledge to identify the symptoms of poor control and importance of regular follow-up.22 Some studies suggest longer the duration of disease higher was the knowledge score; however, lacking disease care (15,23).

Other sections of diabetes knowledge like basic info on disease, prevention/ care its treatment modalities, diet, and physical exercise also had shown significant difference after the session of awareness imparted ( $p$  values = 0.00012, 0.00041 and 0.00024 respectively). Rafique G, Perera PD, et al. and other studies noted well that upon imparting through knowledge awareness session; there was sufficient increase in patients' understanding about the disease as well as their vows for compliance to the physician's directions (6,12,16,22). The prevalence of DM is now increasing in rural areas too (5) however; with a little of practical knowledge about disease (4,11,18). These new patients desperately need such knowledge increasing education sessions. In present study there was a positive effect in getting family support after session was found ( $p$  value = 0.0052).

Incidence of type I diabetes in Pakistan was very low which could be highlighted in our study to some extent as there were only 11 (6.62%) patients of type I DM (10). These patients were young and had much increase in knowledge score post session. The study participants also showed much interest and significantly good results in session components of facing and dealing with special situations like carbuncle or chronic wound ( $p$  value = 0.0019).

Diabetes is a major global health problem and one of the leading causes of disability and death throughout the world. Providing the diabetic patients with the necessary knowledge and self-care skills so as to better manage the disease has been repeatedly endorsed by ADA (17,18). We found that there is a good capacity among our diabetic population to understand and manage their disease much better way than what they are currently doing. Small groups of patients in OPD with use of education material and visual aid can do a lot of big difference in their lives and prevent a huge burden of morbidity and mortality.

## Conclusion

A positive change in the attitude, awareness and practices of diabetic patients noted after imparting sufficient and timely knowledge/ awareness about diabetes mellitus, its symptomatology, dietary, and physical care, foot care, complications and management. Elderly age, females, and low-socioeconomic patients need higher focus in this regard. The study was limited to a single center with a smaller sample size however; it has generated strong evidence regarding effectiveness of education program / awareness session.

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