Research Article

A Study to Assess the Impact of Structured Teaching Programme on Knowledge and Skill Regarding Self-monitoring of Blood Glucose Level for Prevention of Hypoglycemia among Type 2 Diabetes Mellitus Patients in Endocrinology Ward of Skims Soura

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Abstract

Aim: The aim of the study was to assess the impact of structured teaching programme on knowledge and skill regarding self-monitoring of blood glucose (SMBG) level for prevention of hypoglycemia among Type-2 diabetes mellitus patient.

Materials and Methods: Quantitative research approach with pre-experimental one group pre-test post-test design was used to assess the knowledge and skill regarding SMBG level for prevention of hypoglycemia among 50 Type 2 diabetes mellitus patients in endocrinology ward of Sher - i - Kashmir Institute of Medical Sciences, Soura. Purposive sampling technique was used. Data were collected using structured interview schedule and observational checklist.

Results: The study revealed that mean pre-test knowledge and skill scores were 25.8 and 4.72, respectively, and mean post-test knowledge and skill scores were 37.21 and 14.68, respectively. The mean difference between pre- and post-test knowledge and skill score was 11.41 and 9.96, respectively, with $P = 0.001$ and 0.000, respectively. The results also revealed that there was a significant association between the gender, educational status, family monthly income of the study subjects with the pre-test knowledge, whereas no significant association was found between age and duration of illness. The results also revealed that there was a significant association between the educational statuses of the study subjects with the pre-test skill, whereas no significant association was found between age, gender, family monthly income, and duration of illness.

Conclusion: The findings of the study concluded that structured teaching programme was effective in improving the knowledge and skill scores of study subjects.

Key words: Impact, knowledge, skill, structured teaching programme, Type-2 diabetes mellitus

Introduction

The term diabetes was probably coined by Apollonius of Memphis around 250 BC. Diabetes was first recorded in English, in the form diabetes, in a medical text written around 1425. In 1675, Thomas Willis added the word mellitus, from the Latin meaning "honey," a reference to the sweet taste of urine in patients with diabetes. This sweet taste had been noticed in the urine of diabetic patients by the ancient Greeks, Chinese, Egyptians, Indians, and Persians. In 1776, Mathew Dobson confirmed that the sweet taste was due to an excess of a kind of sugar in the urine and blood of people with diabetes. The ancient Indians tested a person for diabetes by observing whether ants were attracted to a person's urine and called the ailment "sweet urine disease."[1]

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According to the World Health Organization (WHO), approximately 180 million people worldwide suffer from diabetes. Its incidence is increasing rapidly, and it is estimated that by the year 2030, this number will almost double.[2]

Hypoglycemia is an acute complication of diabetes mellitus. It occurs when the blood glucose falls to <70 mg/dl. It can be caused by too much insulin intake or oral hypoglycemic agents, too little food or excessive physical activity. Hypoglycemia is also a term in popular culture and alternative medicine used for a common, often self-diagnosed, condition characterized by sweating, tremor, tachycardia, palpitation, nervousness, hunger, confusion, slurred speech, emotional changes, double vision, drowsiness, and sleeplessness. The individual fails to become aware of hypoglycemia and can result in prolonged hypoglycemia with consequent brain injury, seizure, and loss of consciousness. It is treated by changing eating patterns.[3]

Hypoglycemia is an abnormally low plasma glucose concentration that may expose the individuals to potential harm. It is associated with the treatment of Type 1 and Type 2 diabetes mellitus. Recognizing hypoglycemia and its risk factors and identifying the high-risk patients can assist with prevention and management. Education of patients and health-care practitioners is also a key factor in hypoglycemia prevention.[4]

Self-monitoring of blood glucose (SMBG) is a part of the regular management plan for patients with diabetes mellitus. SMBG provides information regarding an individual's dynamic blood glucose profile. Lack of regular SMBG predicts hospitalization for diabetes-related complications. SMBG is an essential tool for people with diabetes who are taking insulin or for those who experience fluctuations in their blood glucose levels, especially hypoglycemia.[5]

Need for the study

Diabetes mellitus is one of the most common diseases with which humankind throughout the world is affected today. It is primarily due to the luxurious lifestyle and unhealthy food habits. Hence, as many people are suffering from diabetes mellitus and are taking intensive treatment. The major adverse effect of intensive therapy is an increased incidence of hypoglycemia.

The WHO predicted as of 2015; an estimated 415 million people had diabetes worldwide,[6] with type 2 diabetes mellitus making up about 90% of the cases.[7,8] This represents 8.3% of adult population,[8] with equal rates in both men and women.[9] As of 2014, trends suggested that rate would continue to rise.[6] Diabetes at least doubles a person's risk of early death. From 2012 to 2015, approximately 1.5–5 million deaths each year resulted from diabetes.[6] The WHO predicted net loss in national income from diabetes mellitus and cardiovascular disease of 5572 billion US dollars in China, 3032 billion US dollars in Russian Federation and 2366 billion US dollars in India.[10]

The researcher had a personal experience with some of the relatives who were diagnosed with type 2 diabetes mellitus and who had frequent hypoglycemia due to fear of disease. Also it is evident from the above studies that the number of diabetes mellitus patients is increasing and the disease is now prevalent in all age groups. It is seen that patients with diabetes mellitus lack knowledge about the disease condition, its complications (mostly hypoglycemia) and management. Hence, the researcher felt that it is necessary to design a structured teaching program on knowledge on prevention of hypoglycemia among Type 2 diabetes mellitus patients.

Statement of the problem

"A study to assess the impact of Structured Teaching Programme on Knowledge and Skill regarding SMBG Level for Prevention of Hypoglycemia among Type 2 Diabetes Mellitus Patients in endocrinology ward of Sher-i-Kashmir Institute of Medical Sciences (SKIMS), Soura."

Objectives of the study

The objectives are as follows:

- To assess the pre-test knowledge score regarding SMBG level for prevention of hypoglycemia among Type 2 diabetes mellitus patients.
- To assess the post-test knowledge score regarding SMBG level for prevention of hypoglycemia among Type 2 diabetes mellitus patients.
- To evaluate the impact of structured teaching programme on knowledge regarding SMBG level for prevention of hypoglycemia among Type 2 diabetes mellitus patients by comparing pre-test and post-test knowledge scores.
- To associate the pre-test knowledge score with demographic variables (age, gender, education, family monthly income, and duration of illness).
- To assess the pre-test skill score regarding SMBG level for prevention of hypoglycemia among Type 2 diabetes mellitus patients.
- To assess the post-test skill score regarding SMBG level for prevention of hypoglycemia among Type 2 diabetes mellitus patients.
- To evaluate the impact of structured teaching programme on knowledge regarding SMBG level for prevention of hypoglycemia among Type 2 diabetes mellitus patients by comparing pre-test and post-test skill score.
- To associate the pre-test skill score with demographic variables (age, gender, education, family monthly income, and duration of illness).

Hypotheses

- H_1: There is a significant increase in mean post-test knowledge score as compared to the mean pre-test knowledge score regarding SMBG level for prevention of hypoglycemia among Type 2 diabetes mellitus patients in endocrinology ward of SKIMS at 0.05 level of significance.
- H_2: There is a significant association of mean pre-test knowledge score regarding SMBG level for prevention of hypoglycemia among type 2 diabetes mellitus patients with demographic variables (age, gender, education,

family monthly income, and duration of illness) at 0.05 level of significance.

- H_3: There is a significant increase in mean post-test skill score as compared to the mean pre-test skill score regarding SMBG level for prevention of hypoglycemia among Type 2 diabetes mellitus patients in endocrinology ward of SKIMS at 0.05 level of significance.
- H_4: There is a significant association of pre-test skill score regarding SMBG level for prevention of hypoglycemia among Type 2 diabetes mellitus patients with demographic variables (age, gender, education, family monthly income, and duration of illness) at 0.05 level of significance.

Materials and Methods

Quantitative research approach with pre-experimental one group pre-test post-test design was used to assess the knowledge and skill of 50 types 2 diabetes mellitus patients regarding SMBG level for prevention of hypoglycemia in endocrinology ward of SKIMS Soura. Purposive sampling technique was used to collect data from the study subjects and tool used for the study was structured interview schedule and observational checklist.

The data collection tool was divided into the following parts:

- Part 1: Structured interview schedule for assessing the knowledge regarding prevention of hypoglycemia among Type 2 diabetes mellitus patients containing 44 questions.
- Part 2: Observational checklist for assessing skill regarding SMBG level among Type 2 diabetes mellitus patients containing 20 items of observation.

Part 1: Part 1 has two sections:

- Section1: Demographic data related to Type 2 diabetes mellitus patients that is age, gender, educational status, family monthly income, and duration of illness.
- Section 2: Structured interview schedule regarding prevention of hypoglycemia among Type 2 diabetes mellitus patients.

Ethical consideration

The researcher had taken permission from the parent institution to conduct a research study. Permission was taken from Institutional Ethical Committee SKIMS for approval of Research Proposals. Permission was also taken from the Medical Superintendent and Nursing Superintendent of SKIMS Soura to conduct the study. Consent was taken from Head of Endocrinology Department SKIMS, Srinagar. Consent was taken from patients before data collection.

Results

The data are collected and analyzed from 50 study subjects on knowledge and skill regarding SMBG level for prevention of hypoglycemia among Type-2 diabetes mellitus patients. The data collected were fed to a computer and analyzed using the statistical package for the social sciences (SPSS), version 20.0. Qualitative data were described using the number and percent. Quantitative data were described using mean, standard deviation (SD), and range. Paired *t*-test was used.

Section 1: Distribution of Study Subjects According To The Demographic Variables

Section 2.1: Pre-test and Post-test Knowledge Score of Study Subjects Regarding SMBG for Prevention of Hypoglycemia

Section 2.2: Comparison of Pre-test and Post-test Knowledge Score of Study Subjects Regarding SMBG for Prevention of Hypoglycemia

To test the significance, following null hypothesis was formulated.

H_{01}: There is no significant increase in mean post-test knowledge score as compared to mean pre-test knowledge score regarding SMBG for prevention of hypoglycemia among Type-2 diabetes mellitus patients at 0.05 level of significance.

The difference between pre-test mean score and post-test mean score was 12.03 with *t*-value (13.01) which was found to be statistically significant ($P = 0.001$) at $P < 0.05$ level of significance. This supports the research hypothesis (H1) which states that there is significant increase in mean post-test knowledge score as compared to the mean pre-test knowledge score at 0.05 level of significance. Hence, null hypothesis (H01) was rejected which states that there is no significant increase in mean post-test knowledge score as compared to mean pre-test knowledge score at 0.05 level of significance.

Section 2.3: Association Between Pre-test Knowledge Score of Study Subjects Regarding SMBG Level for Prevention of Hypoglycemia with Demographic Variables (Age, Gender, Educational Status, Family Monthly Income, and Duration of Illness)

Chi-square test was used to find out the association of pre-test knowledge score of Type-2 diabetes mellitus patients with their demographic variables (age, gender, educational status, family monthly income, and duration of illness).

To find out the association, following null hypothesis was formulated:

H_{02}: There is no significant association of pre-test knowledge scores of Type-2 diabetes mellitus patients regarding SMBG level for prevention of hypoglycemia with demographic variables (Age, gender, educational status, family monthly income, and duration of illness) at 0.05 level of significance.

Hence, the researcher rejected the null hypothesis ($H0_2$) which states that there is no significant association of pre-test knowledge scores of Type-2 diabetes mellitus patients regarding SMBG for prevention of hypoglycemia with demographic variables (gender, educational status, and family monthly income) and accepted the research hypothesis (H_2) which states

that there is a significant association of pre-test knowledge scores of Type-2 diabetes mellitus patients regarding SMBG for prevention of hypoglycemia with demographic variables (gender, educational status, and family monthly income). Furthermore, the researcher accepted the null hypothesis ($H0_2$) which states that there is no significant association of pre-test knowledge scores of Type-2 diabetes mellitus patients regarding SMBG for prevention of hypoglycemia with demographic variables (age and duration of illness).

Table 1: Distribution of study subjects according to age, gender, educational status, family monthly income, duration of illness ($n=50$)

Age	Frequency	Percent
30-40	11	22.0
41-50	12	24.0
51-60	27	54.0
Total	50	100.0
Mean age	44.0	
Gender	**Frequency**	**Percent**
Male	24	48.0
Female	26	52.0
Total	50	100.0
Education status	**Frequency**	**Percent**
Illiterate	22	44.0
Middle school	6	12.0
High-school	9	18.0
Secondary	5	10.0
Graduation or above	8	16.0
Total	50	100.0
Family monthly income	**Frequency**	**Percent**
<10,000	1	2.0
10,000–20,000	22	44.0
21,000–30,000	13	26.0
31,000–40,000	7	14.0
>40,000	7	14.0
Total	50	100.0
Duration of illness	**Frequency**	**Percent**
0–5	29	58.0
6–10	12	24.0
11–15	7	14.0
16–20	2	4.0
Total	50	100.0

Section 3.1: Pre-test Skill Score of Study Subjects Regarding SMBG for Prevention of Hypoglycemia

Section 3.2: Comparison of Pre-test and Post-test Skill Score of Study Subjects SMBG

To test the significance, following null hypothesis was formulated.

H_{03}: There is no significant increase in mean post-test skill score as compared to mean pre-test skill score regarding SMBG for prevention of hypoglycemia among Type-2 diabetes mellitus patients at 0.05 level of significance.

The mean difference between pre-test mean score and post-test mean score was 9.96 with *t*-value (19.172) which was found to be statistically significant ($P=0.000$) at $P<0.05$ level of significance. This supports the research hypothesis (H3) which states that there is significant increase in mean post-test skill score as compared to the mean pre-test skill score at 0.05 level of significance. Hence, the null hypothesis (H03) was rejected which states that there is no significant increase in mean post-test skill score as compared to mean pre-test skill score at 0.05 level of significance.

Section 3.3: Association Between Pre-test Skill Score of Study Subjects Regarding SMBG Level for Prevention of Hypoglycemia with Demographic Variables (age, gender, Educational Status, Family Monthly Income, and Duration of Illness)

Chi-square test was used to find out the association of pre-test skill score of Type-2 diabetes mellitus patients with their demographic variables (Age, gender, educational status, family monthly income, and duration of illness).

To find out the association, following null hypothesis was formulated:

H_{04}: There is no significant association of pre-test skill scores of Type-2 diabetes mellitus patients regarding SMBG level for prevention of hypoglycemia with their demographic variables (Age, gender, educational status, family monthly income, and duration of illness) at 0.05 level of significance.

Table 2: Pre-test mean and post-test knowledge score, SD, median score, mode, range minimum score, maximum score, knowledge of study subjects regarding SMBG for prevention of hypoglycemia

Pretest and posttest knowledge scores	Mean±SD	Median	Mode	Range	Minimum	Maximum
Pre-test knowledge score	25.18±6.473	26.00	30	29	11	35
Post-test knowledge score	37.21±9.21	29.0	31	28	16	40

SD: Standard deviation, SMBG: Self-monitoring of blood glucose

Table 3: Frequency and percentage distribution of study subjects according to pre-test and post-test knowledge score regarding SMBG for prevention of hypoglycemia $n=50$

Pre-test and post-test knowledge level score	Number of subjects in pre-test	Number of subjects in post-test
	Frequency (%)	Frequency (%)
Inadequate (<15)	4 (8)	0 (0)
Moderate (15–30)	36 (72)	13 (26)
Adequate (>30)	10 (20)	37 (74)

SMBG: Self-monitoring of blood glucose

Hence, the researcher rejected the null hypothesis ($H0_4$) which states that there is no significant association of pre-test skill scores of Type-2 diabetes mellitus patients regarding SMBG for prevention of hypoglycemia with demographic variable (educational status) and accepted the research hypothesis (H_4) which states that there is a significant association of pre-test skill scores of Type-2 diabetes mellitus patients regarding SMBG for prevention of hypoglycemia with demographic variables (educational status). Furthermore, the researcher accepted the null hypothesis ($H0_4$) which states that there is no significant association of pre-test skill scores of Type-2 diabetes mellitus patients regarding SMBG for prevention of hypoglycemia with demographic variables (age, gender, family monthly income, and duration of illness).

Discussion

Most of the subjects, i.e., 27 (54%) were in the age group of 51–60 years, about 12 (24%) were in the age group of 41–50 and 11 (22%) were in the age group of 30–40 years. These findings were comparable to the findings of a study conducted on knowledge in early management of hypoglycemia among patients ($n = 100$) with diabetes patients attending the outpatient and inpatient services of a tertiary teaching hospital in Mangalore in 2015. About 55% fell between the age group of 40–60 years.[11]

In the present study, the distribution of male subjects was 24 (48%) and female subjects 26 (52%) in the study sample. This finding was comparable to the findings of the study conducted on knowledge in early management of hypoglycemia among patients ($n = 100$) with diabetes patients attending the outpatient and inpatient services of a tertiary teaching hospital in Mangalore in 2015, where 58% were males and 42% were females.[11]

Regarding the educational status, a maximum number of the study subjects, i.e, 22 (44%) were illiterate, about 6 (12%) were educated up to middle level, 9 (18%) up to high school level, 5 (10%) up to secondary level, and 8 (16%) of the study subjects were other qualification. These findings were comparable to

Table 4: Mean, SD, paired *t*-test between pre-test and post-test knowledge scores of study subjects *n*=50

Pre-test and post-test knowledge score	Mean±SD	Mean difference	*t*-value	*P* value
Pre-test score	25.18±6.47	12.03	13.01	0.001*
Post-test score	37.21±9.21			

SD: Standard deviation, P =0.001*

Table 5: Association between all demographic variables and pre-test knowledge

Variables	Category	Adequate	Moderate	Inadequate	Chi-test	*P* value	Results
Age	30–40	1	7	3	0.545	0.7615	NS
	41–50	2	5	5			
	51–60	7	14	6			
Gender	Male	3	16	5	7.348	0.032	S*
	Female	5	11	10			
Educational status	Illiterate	3	5	14	11.90	0.006	S*
	Middle pass	1	3	1			
	High-school	2	6	1			
	Secondary	1	3	1			
	Graduation or above	2	5	0			
Family monthly income	<10000	0	0	1	9.534	0.016	S*
	10,000–20,000	4	14	4			
	21,000–30,000	3	4	6			
	31,000–40,000	1	6	0			
	>40,000	2	4	1			
Duration of illness	0–5	5	14	7	4.809	0.183	NS
	6–10	2	9	1			
	11–15	1	6	0			
	16–20	0	1	1			

S*=Significant, NS=Nonsignificant

Table 6: Pre-test and post-test mean skill score, SD, median score, mode, range minimum score, maximum score of study subjects regarding SMBG for prevention of hypoglycemia *n*=50

Pretest and posttest skill scores	Mean±SD	Median	Mode	Range	Minimum	Maximum
Pre-test skill score	4.72±5.650	0	0	14	0	14
Pre-test skill score	14.68±1.021	11.00	21	18	8	20

SMBG: Self-monitoring of blood glucose, SD: Standard deviation

the findings of study conducted on knowledge, attitude, and practice of diabetic patients (n = 109) toward prevention of hypoglycemia in Kanpur 2015, where 37 (33.945%) had primary education, 32 (29.35%) were illiterate, 28 (25.68%) had secondary education, and 12 (11%) had graduate and postgraduate education.[12]

Regarding the family monthly income, highest number of study subjects 22 (44%) had 10,000–20,000 monthly income, 13 (26%) had 21,000–30,000, 7 (14%) had 31,000–40,000, 7 (145) had >40,000 monthly income, and only 1 (2%) had 10,000. These findings were comparable to the findings of study regarding self-care management in relation to prevention of complications among diabetics (n = 50) in Adesh Hospital and Research Centre and Ashirwaad Hospital, Muktsar, 2014.

Table 7: Frequency and percentage distribution of study subjects according to the pre-test and post-test skill score regarding SMBG n=50

Pre-test and post-test skill scores	No. of subjects in pre-test	No. of subjects in post-test
	Frequency (%)	Frequency (%)
Inadequate (<7)	29 (58)	0 (0)
Moderate (7–14)	21 (42)	17 (34)
Adequate (>14)	0 (0)	33 (66)

SMBG: Self-monitoring of blood glucose

Table 8: Mean, SD, paired t-test between pre-test and post-test skill scores of study subjects n=50

Pre-test and post-test skill score	Mean±SD	Mean difference	t-value	P value
Pre-test score	4.72±5.65	9.96	19.172	0.000*
Post-test score	14.68±1.021			

SD: Standard deviation

According to the study, 1 (2%) had <5000 monthly income, 22 (44%) had 5000–10,000, 22 (44%) had 10,000–15,000, and 5 (10%) had >15,000.[13]

Most of the study subjects 29 (58%) had duration of illness in the range of 0–5 years, 12 (24%) of study subjects had duration of illness in the range of 6–10 years, 7 (14%) subjects had duration of illness in the range of 11–25 years, and 2 (4%) subjects had duration of illness in the range of 16–20 years. These findings were comparable to the findings of a study conducted on knowledge in early management of hypoglycemia among patients (n = 100) with diabetes patients attending the outpatient and inpatient services of a tertiary teaching hospital in Mangalore in 2015, where 57% had 5–10 years of diabetes.[11]

The pre-test (Mean ± SD) knowledge scores of the subjects were 25.8 ± 6.473. In the pre-test, most of the subjects, 36 (72%) had moderate knowledge,10 (20%) had adequate knowledge, and 4 (8%) had inadequate knowledge score. The findings of the study were consistent with findings of a study conducted on the effectiveness of structured teaching programme on level of knowledge regarding prevention of hypoglycemia among diabetes mellitus patients (n = 60) in General Hospital, Haryana, 2016. The pre-test level of knowledge was inadequate in 33 (55%) subjects, 20 (33%) had moderate, and 7 (12%) had adequate knowledge.[14]

The post-test knowledge scores reveal that most of the study subjects 37 (74%) had adequate knowledge, 13 (26%) of the subjects had moderate knowledge, while as none of the subjects had inadequate knowledge in the post-test. The post-test (Mean ± SD) knowledge score was 37.21 ± 9.21. These findings reveal that the subjects had developed good and average knowledge in the post-test and there is a higher post-test knowledge score. The findings of the study were consistent

Table 9: Association between all demographic variables and pre-test skill

Variables	Category	Adequate	Moderate	Inadequate	Chi-test	P value	Results
Age	30–40	0	0	4	1.446	0.485	NS
	41–50	0	3	8			
	51–60	0	1	5			
Gender	Male	0	1	04	0.835	0.835	NS
	Female	0	1	15			
Educational status	Illiterate	0	2	2	5.970	0.033	S*
	Middle pass	0	0	3			
	High-school	0	0	1			
	Secondary	0	2	7			
	Graduation or above	0	0	4			
Family monthly income	<10,000	0	1	6	1.575	0.813	NS
	10,000–20,000	0	2	6			
	21,000–30,000	0	0	3			
	31,000–40,000	0	0	1			
	>40,000	0	1	1			
Duration of illness	0–5	0	0	1	1.477	0.687	NS
	6–10	0	1	2			
	11–15	0	3	6			
	16–20	0	1	7			

S*=Significant, NS=Nonsignificant

with findings of a study conducted on the effectiveness of structured teaching programme on level of knowledge regarding prevention of hypoglycemia among diabetes mellitus patients (n = 60) in General Hospital, Haryana, 2016. The post-test level of knowledge was 4 (7%) inadequate, 11 (18%) moderate, and 45 (75%) adequate knowledge.[14]

The post-test (Mean ± SD) knowledge score of the study subjects was 37.21 ± 9.21 which is significantly higher than the mean pre-test knowledge (25.18 ± 6.47) score of study subjects with a mean difference of 12.03. The mean difference was statistically significant (P = 0.001). This indicates that the "Structured teaching programme" was effective in increasing the knowledge score of Type-2 diabetes mellitus patients regarding SMBG level for the prevention of hypoglycemia. The findings of the study were consistent with findings of a study conducted on the effectiveness of structured teaching programme on level of knowledge regarding prevention of hypoglycemia among diabetes mellitus patients (n = 60) in General Hospital, Haryana, 2016. The mean post-test level of knowledge was 23.52 ± 4.43 as compared to mean pre-test level of knowledge 12.93 ± 5.01 with $P < 0.05$ level.[14]

Findings of the present study revealed that there was a statistically significant association of the pre-test knowledge scores with the gender, educational status, and family monthly income of the study subjects (P = 0.032), (P = 0.006), and (P = 0.016) while as no association was found between the pre-test knowledge scores of the study subjects with other demographic variables such as age (P = 0.7614) and duration of illness (P = 0.183) at 0.05 level of significance. These findings were consistent with the findings of a study conducted on effectiveness of structured teaching programme regarding self-care management in relation to the prevention of complications especially hypoglycemia among diabetes patients (n = 50) in Adesh Hospital and Research Centre and Ashirwaad Hospital, Muktsar, in 2014**,** which showed that there was a significant relationship of knowledge with demographic variables (age, marital status, educational status, family income, gender, place of habitat, and life style).[13]

The mean pre-test (Mean ± SD) skill scores of the subjects were 4.72 ± 5.650. In the pre-test, most of the subjects 29 (58%) had the inadequate skill, 21 (42%) had moderate skill, and none of the subjects 0 (0%) had adequate skill. The findings of the present study were consistent with the findings of a study conducted on knowledge and practice of SMBG level among type 2 diabetes mellitus patients (n = 153), 2016. While assessing the knowledge and practice of study subjects, about 116 (75.8%) of the study subjects were devoid of adequate knowledge and did not practice SMBG.[15]

The post-test skill scores reveal that most of the study subjects 33 (66%) had adequate skill, 13 (34%) of the subjects had moderate skill, and none of the study subjects had inadequate skill in the post-test. The post-test (Mean ± SD) skill score was 14.68 ± 1.021. These findings reveal that the subjects had developed average and adequate skill in the post-test and there is a higher post-test skill score. The findings of the present study were consistent with the study conducted on effectiveness of structured teaching programme on knowledge and practice of SMBG level in diabetic patients (n = 50) at Government Hospital, Tumkur, 2012. The findings of the study revealed that mean practice score was 40.10 in pre-test regarding SMBG which increased to 67.15% in post-test.[16]

The mean post-test (Mean ± SD) skill score of the study subjects was 14.68 ± 1.021 which is significantly higher than the mean pre-test skill (4.72 ± 5.65) score of study subjects with a mean difference of 9.96. The mean difference was statistically significant (P = 0.000). This indicates that the "Structured teaching programme" was effective in increasing the skill score of Type-2 diabetes mellitus patients regarding SMBG level for prevention of hypoglycemia. The findings of the present study were consistent with the findings of study conducted on the effectiveness of structured teaching programme on knowledge and practice of SMBG level in diabetic patients (n = 50) at Government Hospital, Tumkur, 2012. The findings of the study revealed that mean practice score was 40.10 in pre-test regarding SMBG which increased to 67.15% in post-test [Tables 1-9].[16]

Findings of the present study revealed that there was a statistically significant association of the pre-test skill scores with the educational status of the study subjects (P = 0.033), while as no association was found between the pre-test skill scores of the study subjects with other demographic variables such as age (P = 0.485), gender (P = 0.835), family monthly income (P = 0.813), and duration of illness (P = 0.687) at 0.05 level of significance. These findings were consistent with the findings of a study conducted on SMBG level among Type 2 diabetes mellitus patients (n = 105) attending government health clinics, 2007. The level of education (P = 0.024), total family income (P = 0.041), duration of illness (P = 0.01), and treatment regime which includes $P < 0.001$ were significant predictors of SMBG.[17]

Conclusion

The study concluded that implementing a teaching program is effective in increasing the knowledge and skill of type-2 diabetes mellitus patients regarding control of blood sugar level.

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