



EFFECTIVENESS OF AN INFORMATION BOOKLET ON PREVENTION OF DIABETIC COMPLICATIONS IN TERMS OF KNOWLEDGE AMONG THE DIABETIC PATIENTS IN A SELECTED HOSPITAL OF KOLKATA IN WEST BENGAL

Nursing

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ABSTRACT

The investigator conducted a pre-experimental study to assess knowledge level and to increase the awareness of prevention of diabetic complications with an information booklet among the diabetic patients in a selected hospital of Kolkata. She adopted one group pretest posttest design for this study. She selected 30 diabetic patients by purposive sampling technique and used structured interview schedule to collect data. Results show that mean difference of pretest and posttest knowledge scores is significant from calculated 't' value [$t(29)13.10, p < 0.05$] which indicates the effectiveness of the information booklet developed for the purpose. χ^2 values show that there are no association between posttest knowledge scores and selected variables. The findings of the study have implications on nursing education, nursing administration, nursing practice and nursing research.

KEYWORDS

Diabetes Mellitus, Information booklet, Life style modification

INTRODUCTION

India has faced a grave health care burden due to the high prevalence of type-2 diabetes.¹ India being called, "the diabetic capital of the world" is presently estimated to have over 30 million individuals affected by this disease. In the national study, onset of diabetes has occurred before the age of 50 years in 54.1% of cases and have a greater chance of developing the chronic complications of diabetes². People with diabetes have an increased risk of developing ischemic heart disease, cerebral vascular disease, peripheral vascular disease with gangrene of lower limbs, chronic renal disease, reduce visual acuity and blindness, and autonomic and peripheral neuropathy. Advances in treatment that permitted tight glycemic control and control of co morbidities could greatly reduce the incidence of micro vascular and macro vascular complications. In a study of 3010 diabetic patients, by Ramachandran. the prevalence of micro vascular complications was retinopathy 23.7%, nephropathy 5.5%, neuropathy – 27.5% & prevalence of coronary artery disease 11.4% & peripheral vascular disease was 4%⁴. The need of the hour is prevention of this disease by early detection and modifications in lifestyle with the incorporation of a healthy diet, an increase in physical activity and weight reduction for those who are in the prediabetic stage and appropriate treatment by oral hypoglycemic agents and insulin therapy for diabetic individuals. Rapid urbanization and industrialization has produced advancement on the social and economic front which have resulted in dramatic lifestyle changes, giving rise to a number of life-style related diseases. The transition from a traditional to modern lifestyle, consumption of high calories and fatty foods, a high level of mental stress have given an impact on health and in rise of diabetes. With the increasing prevalence of diabetes especially in the middle age group populations who are commonly affected in India, the chances of developing micro & macro vascular complications are very high and it is going to bring enormous burden on the family, society & the health care providers involved in the management of diabetes due to high morbidity and mortality. If diabetes has set in, within a few years, it may damage nerve and blood vessels and can lead to problems like heart diseases, stroke, kidney disease, blindness, gum & skin infections and even foot or leg amputation. If glucose levels are too low, it results in hypoglycemia causing confusion, nervousness, shakiness and fainting spells in a person. Diabetes can become a life-threatening condition if it is not managed properly.

In the study from North Delhi Diabetes Centre, comprising 720 type-2 diabetic patients, retinopathy was seen in 21.2%, microalbuminuria in 41%, peripheral neuropathy in 15.3%, coronary artery disease (CAD) in 7% & peripheral vascular disease (PVD) was in 7.4%⁴. The United Kingdom Prospective Diabetes Study (UKPDS), the largest perspective landmark trial had also demonstrated the increased risk of micro vascular complications with deteriorating glycemic control. There was 25% risk reduction for micro vascular end points, 21% risk reduction for cataract extraction & 33% risk reduction for microalbuminuria⁴. An impressive coronary artery disease (CAD) risk reduction in a diabetic patient come from reduction in blood pressure,

life style modification & most importantly by lipids lowering drugs like statins. It was demonstrated in the study that 30% CAD risk reduction was achieved by the United Kingdom Prospective Diabetes Study (UKPDS)⁴. The Diabetes Control Complications Trial (DCCT) study findings showed that intensive blood glucose control reduced the risk of eye disease by 76%, kidney disease by 50%, and nerve disease by 60%. Epidemiology of Diabetes Interventions and Complications (EDIC) study findings showed that intensive blood glucose control reduced risk of any cardiovascular disease by 42%, non-fatal heart attack, stroke or death from cardiovascular causes by 57%¹. Primary prevention is an attempt to prevent the onset of complications associated with diabetes mellitus. Secondary prevention aims at arresting or retarding the progression of preexisting complications and includes all measures designed to reduce the morbidity and mortality in patients with chronic diabetes mellitus. Hence, prevention is necessary for the occurrence of end point of particular complications e.g. end stage renal failure due to diabetic nephropathy or blindness due to diabetic retinopathy⁴.

Any strategy is likely to be more effective in primary than in secondary prevention. Secondary prevention can only yield good results if emphasis is on picking up complications early by regular screening for complications in all diabetic patients periodically e.g. fundoscopy for diabetic retinopathy, microalbuminuria for diabetic nephropathy, monofilament & biothesiometry for peripheral neuropathy & lipid estimation for coronary artery disease⁴. Diabetes awareness programme is an integral and essential part of diabetes care for both health professionals and diabetic individuals. Pre-diagnosis diabetes awareness might result in earlier diagnosis of the disorder, which had been demonstrated in various Indian studies. Early screening and monitoring of diabetes mellitus are a great initiative. Continuous monitoring and screening are necessary to prevent diabetic complications. Patients have needs to become more involved in their own care. Improving their knowledge ultimately increases awareness of the importance of diabetes management¹. Diabetes and its complexity – both physically and psychologically require nurses to be competent in guiding and supporting patients to prevent complications¹.

Early detection and appropriate treatment are the cornerstones for delaying the onset and progression of the diabetic complications e.g. retinopathy, nephropathy, neuropathy, stroke, peripheral vascular disease and ischemic heart disease. Meta-analyses and review of diabetes literature showed that diabetes education, awareness programme and improving motivation for self-care management, reduced complications and thus reduced overall economic costs of diabetes mellitus.

So, from the above discussion, it became clear that an information booklet on prevention of diabetic complications might be helpful for the diabetic patients to increase their knowledge and to create awareness regarding prevention of diabetic complications.

Aims and Objective:

- To assess the knowledge of diabetic patients before and after administration of the information booklet on prevention of diabetic complications.
- To determine the effectiveness of the information booklet on prevention of diabetic complications in terms of participants' post-test knowledge score.
- To determine the association between the post-test knowledge scores on prevention of diabetic complications of diabetic patient and selected variables.

METHODOLOGY

In this study, research approach was pre-experimental research approach, and the research design was group pretest and posttest design.

The schematic presentation of the research design was represented in Figure-1

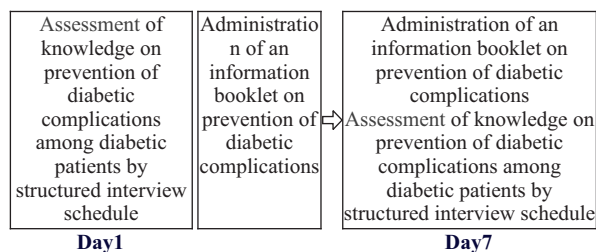


Figure 1: Showing the schematic representation of the research design

Variables

- In the present study,
- Independent variable- Information booklet on prevention of diabetic complications
 - Dependent variable- Knowledge scores of diabetic patients on prevention of diabetic complications
 - Selected variables - Age, education, occupation, family income and duration of illness

The study was done at the Endocrinology OPD at SSKM Hospital, Kolkata, West Bengal from 22nd November 2010 to 12th December 2010. The conceptual framework of the present study was based on Irwin Rosen Stocks (1974) "Health Belief Model (HBM)". Non-probability purposive sampling technique was adopted and total 30 patients were studied.

INCLUSION CRITERIA

- All male and female diabetic patients.
- Age more than 12 years
- New and old cases diagnosed as diabetes mellitus type-I or type-2 without any complication in O.P.D. ticket.

Exclusion Criteria

- Gestational diabetes (Pregnant mother with diabetes)
- Juvenile diabetes (Less than 12 years)

Table 1 Data Collection Tool, Variable and Technique

Tool	Variables	Technique
Structured interview schedule on prevention of diabetic complications consisting of Section I and section II	Section I Demographic variables and data related to illness Section-II knowledge on prevention of diabetic complications	Interviewing

Development of the Tool

On the basis of the framework developed for the purpose of the study, a structured interview schedule was prepared by-

- An extensive review of research and non-research literature in the area related to prevention of diabetic complications
- Opinions and suggestions sought from experts, helping in determining the information areas to be included.
- The investigator's personal knowledge and own clinical experience to clinical field.

The investigator developed the tools for the study by the following steps:

- Planning for the structured interview schedule on knowledge
- Development of the first draft of structured interview schedule on knowledge
- Establishment of content validity
- Pretesting
- Establishment of reliability
- Development of the final draft of structured interview schedule on knowledge

Planning for the structured interview schedule on knowledge

Specific contents were outlined in planning of the structured interview schedule on knowledge. A blue print was prepared on prevention of diabetic complications specifying the content area, domain of objectives, the total number of questions and the maximum possible scores for each category of response. A blue print of structured interview schedule was developed to assess knowledge of the diabetic patients.

Development of the first draft of the structured interview schedule on knowledge

The structured interview schedule on knowledge was developed based on the blue print. It measured the knowledge of the diabetic patients. The structured interview schedule on knowledge had two sections. Section-I consisted of background information including (11) items and section-II consisted of thirty (30) items to collect the information regarding knowledge on prevention of diabetic complications.

Content validity of the tool

To ensure validity of the tool, it was given to nine experts in the field of Medical-Surgical Nursing and Endocrinology. Among them, two were from the department of Endocrinology, IPGME&R and SSKM & Hospital, Kolkata, an associate Professor of Endocrinology and Medical officer. The seven others were nursing experts with specialization in Medical-Surgical nursing. They were requested to judge the items of the questionnaire for clarity, relatedness and meaningfulness. Experts were chosen on the basis of their clinical expertise, experience and interest in the problem area. Most of Experts were agreed with all items. There was 100% agreement in most of the areas of tools.

According to experts' opinion, some suggestions were implemented to reconstruct certain statements so as to bring about clarity of response, to recognize certain statements to bring clarity in items.

Translation of the tool: The tool was prepared in English but was translated in Bengali language as because of the majority of participants would understand easily. Language validity was established by retranslating it to English with the help of language experts *Pretesting of the tool*

Pretesting was done on five (5) diabetic patients of diabetic clinic in N.R.S.M.C. & Hospital. Average time taken for interviewing the patient was 30 minutes. Pretesting of the tool was done to find out:

- Clarity of language
- Ambiguity of statements
- Difficulty in any items
- Feasibility of the study

The pre-testing indicated that the study should be feasible and the tools were practicable. However, improvement should be made in framing of some questions. Then the tools would be finalized for data collection. *Reliability of the tool*

For reliability, structured interview schedule on knowledge was administered to 5 diabetic patients and the reliability was established by test retest methods with six days interval. Reliability co-efficient was calculated by Pearson's product moment. The value of correlation co-efficient (r) was found to be 0.95 which signified that the tool was highly reliable.

Development of the final draft of structured interview schedule on knowledge

The final draft of the structured interview schedule on knowledge was prepared after incorporating the suggestions and opinions of the experts. Few modifications were made and few items were deleted.

Description of Structured Interview Schedule on Knowledge

The structured interview schedule on knowledge had two sections: **Section - I:** Consisted of eleven (11) questions pertaining to

demographic variable regarding age, sex, education, occupation, family income and data related to illness i.e. duration of illness, treatment modality received by the patient, exposure to mass media and life style modification.

Section - II: This part of questionnaire consisted of thirty (30) major items which were designed to elicit the knowledge of diabetic patient in relation to diabetes mellitus and prevention of diabetic complications. These thirty major items consisted of two areas - diabetes mellitus and diabetic complications.

Area-I is consisted of following items

- Concept of diabetes mellitus
- Signs and symptoms
- Risk factors
- Investigations

Area-II is consisted of following items of diabetic complications

- Hypoglycemia
- Hyperglycemia
- Coronary artery disease
- Diabetic retinopathy
- Diabetic nephropathy
- Diabetic neuropathy
- Diabetic foot
- Diabetic skin complication

Development and Description of Information Booklet: Investigator designed and developed an information booklet on "prevention of diabetic complications" based on reviewing an extensive research and non-research literature. The steps followed for the development of the information booklet were as follows:

- Preparation of the criteria checklist
- Preparation of the first draft of information booklet
- Preparation of the content of the booklet
- Content validation
- Pretest of the booklet
- Preparation of the final draft of the booklet

Preparation of the criteria checklist

A criteria checklist was developed for the information booklet on prevention of diabetic complications. Nine experts gave their opinions according to the appropriateness of the criteria rating scale. There was 100 percent agreement among all the experts on the criteria listed. The criteria checklist included items on selection of contents, organization of the content, language, practicability, feasibility and overall organization.

Preparation of the first draft of information booklet

The first draft of the information booklet was developed on the basis of the objectives and domains of objectives. The draft was prepared in simple language with appropriate illustration and content covering all items in the interview schedule. *Preparation of the content of the booklet*

The content of the information booklet was divided into two areas:

Area-I: Concept of diabetes mellitus (types, sign and symptoms of diabetes mellitus, risk factors, investigations.)

Area-II: Diabetic complication (Hypoglycemia, hyperglycemia, coronary artery disease diabetic retinopathy, nephropathy, neuropathy, diabetic foot complication and skin complications)

- Definition
- Warning sign and symptoms
- Prevention
- Treatment

Content validity of information booklet

The content of information booklet was given to nine experts who were from the field of Medical surgical nursing and specialized in endocrinology. They were requested to judge the content, its organization, language, feasibility, practicability. Some experts gave suggestion regarding language and organization of the content to reconstruct.

Pretesting of information booklet

Pretesting was done on five (5) diabetic patients of diabetic clinic in N.R.S.M.C. & Hospital to check-

- Clarity of language
- Understanding of the content of information booklet

The pre-testing indicated that the study should be feasible and the information booklet was practicable.

Preparation of the final draft of the booklet

The final draft of the information booklet was prepared after incorporating the suggestions and opinions of the experts. Few modifications were made. The information booklet was prepared in English but translated in Bengali language. Language validity was established by retranslating it to English with the help of language experts.

Pilot Study

The investigator conducted the pilot study in order to find out the feasibility of the study and to plan for analysis of the data. Pilot study was done in diabetic clinic of S.S.K.M & Hospital, Kolkata-20 among 10 diabetic patients from 20th October, 2010 to 28th October, 2010.

Results of the pilot study

- The study was found to be feasible.
- Time taken per participant was between 30 minutes to 40 minutes.
- The investigator administered the tool and treatment effectively.
- No problem was faced by the investigator during the data collection period.

During data collection period, following steps were done by the investigator.

On day-I

- Collection of demographic variable and data related to illness of the participants by structured interview schedule.
- Assessment of knowledge on prevention of diabetic complications of the participants by structured interview schedule.
- Administration of an information booklet on prevention of diabetic complications to the participants.

On day-VII

- Assessment of knowledge on prevention of diabetic complications of the participants by structured interview schedule.
- The data analysis was planned with the help of descriptive statistics and inferential statistics based on the objectives and hypotheses of the study.
- Frequency and percentage distribution to describe the demographic variables of the participants.
- Mean, median and standard deviation of pretest and post test knowledge score.
- Frequency polygon to compare the pretest knowledge score and post test knowledge score.
- Ogive to compare the pretest knowledge score and post test knowledge score.
- 't' value to determine the significance of difference between the pre-test and post-test knowledge score.
- Chi-square value to determine the association of post-test knowledge score and selected variables i.e. age, education, occupation, family income, duration of illness.

Data Analysis and Interpretation

Data obtained from a sample of thirty (30) diabetic patients attending in diabetic clinic at S.S.K.M & Hospital, Kolkata-20. A structured interview schedule was constructed to collect data. Analyzed and interpreted data helped to assess the effectiveness of the information booklet on prevention of diabetic complications among diabetic patients

Data collected through tool for the participants before and after the intervention were analyzed and interpreted with the help of both descriptive and inferential statistics.

Data was analyzed in the perspective of achieving objective, testing hypotheses and facilitating interpretations of the answer in relation to the research problem

The demographic variables were presented in Table 2 and Table 3.

Table 2 Frequency and Percentage Distribution of Participants according to their Age, Sex and Marital Status

N=30

Sl. No.	Demographic variables	Frequency	Percentage
1.	Age (Years)		
	i. 12-18	2	7
	ii. 19-40	3	10
	iii. 41-60	13	43
	iv. Above 60	12	40
2.	Sex		
	i. Male	14	47
	ii. Female	16	53
3.	Marital Status		
	i. Married	17	57
	ii. Unmarried	10	33
	iii. Widow	2	7
	iv. Divorced	1	3

Data presented in Table 2 showed that out of thirty (30) participant about 13 (43%) participants belonged to the age group of 41-60 years and only two (7%) participants were in the age group of 12-18 yrs. Female and male participants were 16 (53%) and 14 (47%) respectively 17(57%) were married and only 1(3%) was divorced.

Table 3 Frequency and Percentage Distribution of Participants according to their Educational Status, Occupational Status and Monthly Income of the Family

N=30

Sl. No.	Demographic variables	Frequency	Percentage
1.	Educational Status		
	i. Below Madhyamik	9	30
	ii. Madhyamik	5	17
	iii. Higher Secondary	9	30
	iv. Graduate & above	7	23
2.	Occupational Status		
	i. Employed	6	20
	ii. Unemployed	11	37
	iii. Retired /retired with pension	9	30
	iv. Others	4	13
3.	Monthly Income of the Family		
	I. Below Rs. 2000/-	3	10
	ii. Rs. 2001/- to 5000/-	10	33
	iii. Rs. 5001/- to 10000/-	8	27
	iv. Above Rs. 10000/-	9	30

Data presented in Table 3 showed that out of thirty (30) participants,

- Nine (30%) participants reported with their educational status was below Madhyamik and equal number with higher secondary and only five (17%) had the qualification of Madhyamik.
- 11 (37%) participants were unemployed and only four (13%) were in other categories.
- 10 (33%) participants reported that their per capita income was in the range of Rs.2001-5000 and only three (10%) participants were within the range of Rs. < 2000.

Description of data related to illness of the participants

Pie and bar diagram depicted the percentage and frequency distribution of data related to illness of the participants. Data related to the illness of participants included duration of illness, family history of diabetes mellitus, treatment modality received by the patient, information of disease receiving from mass media and health personnel and lifestyle modification to prevent diabetic complications.

Data were presented in the Figure-2,3,4,5,6 and Table-4.

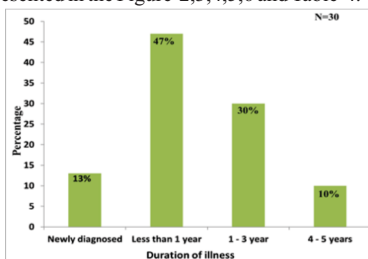


Figure 2 : Bar diagram showing the percentage distribution of participants in terms of duration of illness

Data presented in the Figure 2 showed that 47% participants had illness for less than 1 year duration, 30% and 13% had association with illness for 1-3 years and newly diagnosed cases respectively and least number i.e. 10% had illness for 4-5 years duration.

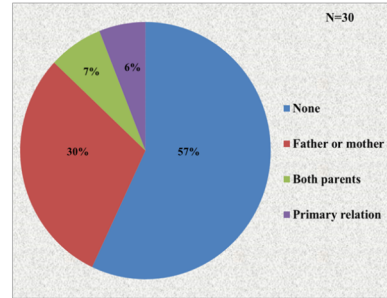


Figure 3: Pie diagram showing the percentage distribution of participants in terms of family history of diabetes mellitus

Data presented in the Figure 3 showed that majority i.e. 57% of participants having no family history of diabetes mellitus whereas rest participants had association with the familiar history of diabetes mellitus.

Table 4 Frequency and Percentage Distribution of Participants according to treatment modality Received by them

Treatment modality	Frequency	Percentage
i. Recommended diabetic diet and exercise	9	30
ii. Oral anti diabetic agent	3	10
iii. Insulin injection	6	20
iv. Combination therapy	12	40

Data presented in Table 4 showed that 40% participants used combination therapy whereas 30% and 20% of participants were habituated with the recommended diabetic diet with exercise and insulin injection respectively. The least number i.e. 10% of participants used oral anti diabetic agent only.

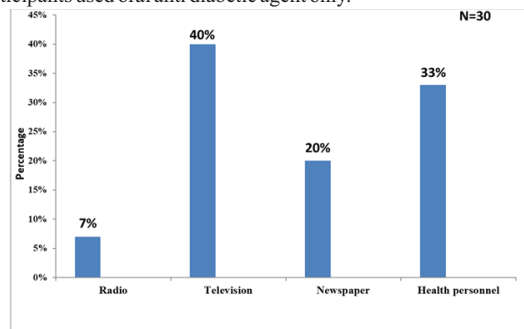


Figure 4 : Bar diagram showing the percentage distribution of participants in terms of receiving information from mass media and health personnel

Data presented in the Figure 4 showed that 40% participants received information about diabetes mellitus from television whereas 33% and 20% of participants got information from health personnel and newspaper respectively but the source of information for the least number of participants i.e. 7% was radio.

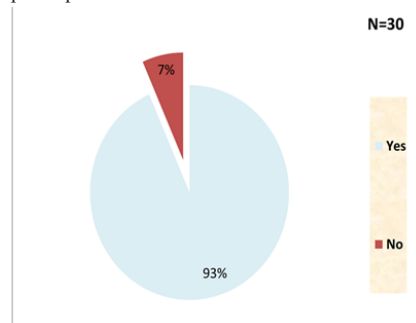


Figure 5: Pie diagram showing the percentage distribution of participants in terms of life style modification

Data presented in the Figure 5 showed that most of the participants i.e. 93% modified their life styles after being diagnosed as diabetes mellitus whereas rest did not do the same.

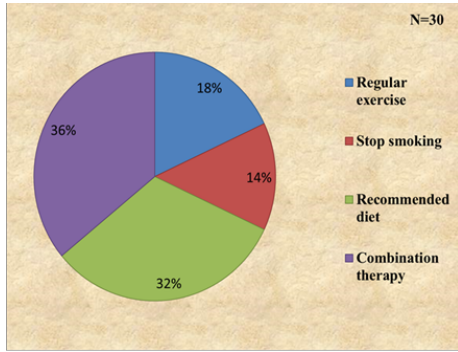


Figure 6:- Pie diagram showing the percentage distribution of participants in terms of measures taken by them to prevent diabetic complications

Data presented in the Figure 6 showed that 36% participants modified their life styles by taking combined management whereas 32% and 18% of participants modified their life styles with the maintainance of recommended diet and regular exercise respectively but the least number of participants i.e. 14% stopped their smoking.

Table 5 Distribution of Participants In Terms of area wise Modified Gain Score on Knowledge Level of Prevention of Diabetic Complications

Sl. No.	Specific Areas	Maximum possible score	Mean score %		Possible gain score %	Actual gain score%	Modified gain score
			Pre-test	Post-test			
1.	Concept of Diabetes	3	75.33	86.66	24.67	11.33	0.46
2.	Sign and Symptoms	1	56	76	44	20	0.45
3.	Risk factors	1	70	90	30	20	0.67
4.	Investigations	1	30	76	70	46	0.66
5.	Diabetic Complications	1	16	63	84	47	0.56
6.	Hypoglycemia	2	60	80	40	20	0.50
7.	Hyperglycemia	1	50	80	50	30	0.60
8.	Coronary artery disease	2	71.50	90	28.50	18.50	0.65
9.	Diabetic	3	56.66	80	43.34	23.34	0.54
10.	Diabetic Nephropathy	3	66.66	76.66	33.34	10	0.30
11.	Diabetic Neuropathy	5	36	74	64	38	0.59
12.	Diabetic foot Complications	4	54	80	46	26	0.57
13.	Diabetic skin Complications	3	48.66	70	51.34	21.34	0.42

Data presented in the Table-5 showed that the maximum knowledge gain of the participants happened in the area of "risk factors" as per modified gain score (0.67) and minimum knowledge gain happened in the area of "diabetic nephropathy" as per modified gain score (0.30). Findings related to the effectiveness of the information booklet on prevention of diabetic complications in terms of participants' post-test knowledge score.

H1: The mean post-test knowledge score of diabetic patients after administration of an information booklet on prevention of diabetic complications is significantly higher than their mean pre-test knowledge score at 0.05 level of significance. In order to test the hypotheses, the following null hypotheses was stated.

H01: There is no significant difference between the mean pre-test knowledge score of diabetic patient and mean post-test knowledge score after administration of an information booklet on prevention of diabetic complications at 0.05 level of significance

Table 6 Mean, Mean difference, SD and Paired 't' value of Pre-Test and Post-Test Knowledge Score of the Participants

Knowledge	Mean	Mean difference	SD	't'
Pre-test	16.2		3.38	13.10*
Post-test	23.9		7.7	1.85

$t'_{(29)} = 2.04, p < 0.05$

The data represented in Table-6 signified that the mean post-test knowledge score (23.9) was higher than the mean pre-test knowledge score (16.2) with the mean difference of 7.7 which was statistically significant as evident from the 't' value of 13.10 for df 29 at 0.05 level of significance. The data also represented that the SD of pre-test knowledge score of 3.38 was higher than the SD of the post-test knowledge score of 1.85. It indicated that the post-test knowledge score was more homogeneous in the participants. This suggested that the obtained mean difference in knowledge score was true not by chance. Hence the null hypotheses (H_{01}) was rejected and research hypotheses (H_1) was accepted. It implied that the information booklet on prevention of diabetic complications was effective in imparting knowledge on prevention of diabetic complications to the diabetic patients in a diabetic clinic of a selected hospital in Kolkata.

For further evaluation, pre-test and post-test knowledge scores were plotted in a frequency polygon (Figure- 7) and ogive (Figure 8).

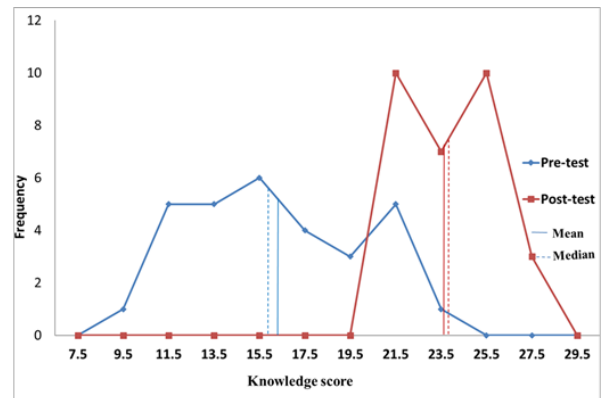


Figure 7 : Frequency polygon showing the comparison between pre-test and post-test knowledge score

In figure 7 frequency polygon showed that the distribution of pre-test and post-test knowledge score with the depiction of mean and median. The pre-test knowledge score was in ranges from 10 to 24 with the mean of 16.2 and median of 15.8. Maximum frequency lied in the class interval 15 to 16. The post-test knowledge score ranged from 21 to 28 with the mean of 23.9 and median of 23.93. Maximum frequency lied in the class interval of 21 to 22 and as well as in the class interval of 25 to 26. The figure depicted that in the pre-test knowledge score mean lied to the right side of the median. So the distribution was positively skewed and skewness was 0.36. In post-test knowledge score the mean lied to the left side of the median. So the distribution was negatively skewed and skewness was - 0.4, which was negligible indicating the scores were normally distributed.

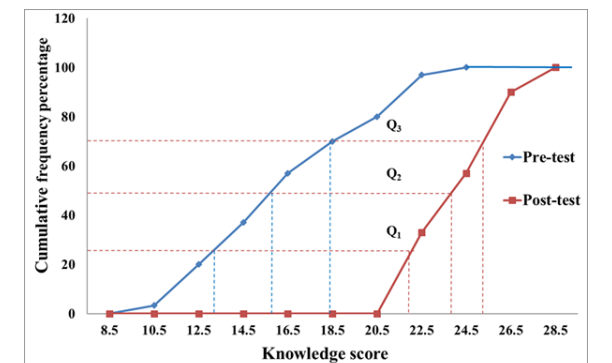


Figure 8 : Ogive showing the comparison between pre-test and post-test knowledge score

Cumulative frequency percentage curves of pre-test and post-test were

plotted in figure 9 in the same coordinate axis and showed that post-test ogive lied in the pre-test ogive over the entire range. It indicated that the post-test scores were consistently higher than the pre-test scores. The distance separating the two curves at various level revealed the gain in knowledge after administration of information booklet. Comparing certain percentile points could also show the gain in knowledge. The 25th percentile Q₁ of pre-test and post-test were 13.34, 21.79, 50th percentile Q₂ of pre-test and post-test were 15.8, 23.93 and 75th percentile Q₃ of pre-test and post-test were 18.33 and 26.07 respectively. So, it was seen that post-test Q₁, Q₂ and Q₃ were higher than pre-test Q₁, Q₂ and Q₃ which indicated a marked gain in knowledge among participants and effectiveness of an information booklet.

Findings related to the association between the post-test knowledge score of diabetic patient and selected variables (age, education, occupation family income, duration of illness).

Data were presented in the Table-7,8,9,10 and 11

H₁: There is a significant association between post-test knowledge score of diabetic patients on prevention of diabetic complications and selected variables at 0.05 level of significance.

H₀₂: There is no significant association between post-test knowledge score of diabetic patients on prevention of diabetic complications and selected variables at 0.05 level of significance.

Table 7 Association between Age of the Participants and Post-Test Knowledge Score

N=30

Age	Knowledge Score		Total	Chi Square value
	Below median	Above median		
12 – 40 years	3	2	5	0.24
Above 40 years	12	13	25	

$\chi^2_{(3)} = 3.814, P > 0.05$

The data presented in Table-7 showed that the association between age of the participants and post-test knowledge score on prevention of diabetic complications was not statistically significant at 0.05 level of significance as the obtained qui-square value of 0.24 was lower than the table value of 3.841. Hence the investigator failed to reject the null hypothesis and to accept research hypothesis i.e. there was no association between age of the participants and post-test knowledge score on prevention of diabetic complications and the null hypothesis was accepted.

Table 8 Association between Educational Status of the Participants and Post-Test Knowledge score

N=30

Education	Knowledge Score		Total	Chi Square Value
	Above median	Below median		
Below Madhyamik	4	5	9	1.704
Madhyamik	2	3	5	
Higher Secondary	4	5	9	
Graduate & above	5	2	7	

$\chi^2_{(3)} = 7.815, P > 0.05$

The data presented in Table-8 showed that the association between the educational status of the participants and post-test knowledge score on prevention of diabetic complications was not found to be statistically significant at 0.05 level of significance as the obtained qui-square value of 1.704 was lower than the table value of 7.815. Hence the investigator failed to reject the null hypothesis and to accept research hypothesis i.e. there was no association between the educational status of the participants and post-test knowledge score on prevention of diabetic complications and the null hypothesis was accepted.

Table 9 Association between Occupational Status of the Participants and Post-Test Knowledge Score

N=30

Occupation	Knowledge Score		Total	Chi Square Value
	Above median	Below median		
Employed	5	1	6	6.02
Unemployed	3	8	11	
Retired/retired with pension	4	5	9	
Others	3	1	4	

$\chi^2_{(3)} = 7.815, P > 0.05$

The data represented in Table-9 showed that the association between the occupational status of the participants and post-test knowledge score on prevention of diabetic complications was not found to be statistically significant at 0.05 level of significance as the obtained qui-square value of 6.02 was lower than the table value of 7.815. Hence the investigator failed to reject the null hypothesis and to accept research hypothesis i.e. there was no association between the occupational status of the participants and post-test knowledge score on prevention of diabetic complications

Table 10 Association between Income of the Family of the Participants and Post-Test Knowledge Score

N=30

Income of the family (Rupees)	Knowledge score		Total	Chi-square Value
	Above median	Below median		
<2000	1	2	3	2.232
2001 -5000	4	6	10	
5001 -10,000	4	4	8	
>10,000	6	3	9	

$\chi^2_{(3)} = 7.815, P > 0.05$

The data presented in Table 10 showed that the association between per capita income of the family of the participants and post-test knowledge score on prevention of diabetic complications was not found to be statistically significant at 0.05 level of significance as the obtained qui-square value of 2.232 was lower than the table value of 7.815. Hence the investigator failed to reject the null hypotheses and to accept research hypothesis. i.e. There was no association between per capita income of the family of the participants and post-test knowledge score on prevention of diabetic complications and the null hypothesis was accepted.

Table 11 Association between Duration of Illness of the Participants and Post-Test Knowledge Score

N=30

Duration of illness (Years)	Knowledge score		Total	Chi Square Value
	Above median	Below median		
Newly diagnosed	1	3	4	6.992
< 1	9	5	14	
1 – 3	4	5	9	
4 – 5	1	2	3	

$\chi^2_{(3)} = 7.815, P > 0.05$

The data presented in Table-11 showed that the association between duration of illness of the participants and post-test knowledge score on prevention of diabetic complications was not found to be statistically significant at 0.05 level of significance as the obtained qui-square value of 6.992 was lower than the table value of 7.815. Hence the investigator failed to reject the null hypothesis and to accept research hypothesis i.e. there was no association between the duration of illness of the participants and post-test knowledge score on prevention of diabetic complications and the null hypothesis was accepted.

Conclusions

On the basis of the findings of the study the following conclusion is drawn –

The information booklet can be developed easily by nursing personnel. It is effective to enhance knowledge of the diabetic patient and is also easily accessible to them. This information booklet is a first-hand reference to develop understanding of the diabetic patient on prevention of diabetic complications. It is permanent which helps the diabetic patient to retain memory for learning easily. The diabetic patient will accept the information booklet highly as they are suffering from diabetes mellitus and likely to develop complications in near future.

Implications

The findings of the study have implications to nursing education, nursing administration, nursing practice and nursing research.

Nursing education: With changing health care trends, nursing education must emphasize primary health care approach focusing on prevention rather than cure. In the existing nursing curriculum experience in health teaching and methods of teaching to be emphasized. The students need to have knowledge of different

techniques and skills in assessing the learning needs to plan for teaching the diabetic patients. Health education programme should be meaningful and attractive by using various methods and AV Aids. *Nursing administration:* Nursing personnel working in various health care settings should be given in-service education to update their abilities in identifying learning needs of patients and in planning, conducting, evaluating teaching for different categories of patients. The protocol for prevention of diabetic complications may be developed in the existing health care settings. The standards of nursing practice, manual should be prepared regarding prevention of diabetic complications for in-service training and for guiding the nursing personnel in caring of diabetic patients. Provision for distributing the information booklet on prevention of diabetic complications could be initiated in clinics, OPD and in wards There should be provision for nurses also to work in diabetic clinic as a nurse diabetic educator.

Nursing practice: Since the incidence of diabetic complications is increasing in India, the majority of the cases can be prevented by appropriate measures. The nursing personnel must be made aware of the importance of prevention of diabetic complications and they assume the responsibility of detecting the diabetic complications and increasing the knowledge and awareness among them.

Nursing research: Lastly, there is need for extended and intensive nursing research in the area of diabetic patient's education to develop better method of teaching, better practice in nursing care and effective teaching material. The study emphasizes the need for developing more of similar teaching materials for other areas of diabetes and for other categories of patients with chronic illness

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