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A Study to Assess the Knowledge Regarding Prevention of Micro and Macrovascular Complications of Type II Diabetes Mellitus among the Patients Attending the Diabetic Club of BVVS HSK Hospital and Research Center, Bagalkot with a View to Prepare an Information Guide Sheet

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Abstract **Original Research Article**

***Background of the Study*:** Type II Diabetes is an impairment in the way the body regulates and uses sugar (glucose) as a fuel. This long-term (chronic) condition results in too much sugar circulating in the bloodstream. Eventually, high blood sugar levels can lead to disorders of the circulatory, nervous and immune systems. ***Aim*:** The aim of the study was a study to assess the knowledge regarding prevention of micro and macrovascular complications of Type II Diabetes mellitus among the patients attending the diabetic club of BVVS HSK Hospital and research center, Bagalkot with a view to prepare an information guide sheet. ***Methodology*:** This was non experimental descriptive research design. The population involved in this study was the Type II Diabetes mellitus patients who are attending the diabetic club of BVVS HSK Hospital and Research Center, Navanagar, Bagalkot and 80 subjects were selected using convenient sampling technique for the study. Data was collected from internet, review of literature, journals, articles and discussing with guide and subject experts. Data were analyzed by using descriptive and inferential statistics. ***Results*:** The research hypothesis H_2 "There will be significant association between the level of knowledge and selected socio-demographic variables" as stated by the investigator earlier was rejected in the case of demographic variable religion and accepted in the case of other socio-demographic variables such as age, gender, educational status, type of family, residential background, diet and habit. ***Conclusion*:** The knowledge scores of the study shows that maximum of type II diabetes mellitus patients had in-adequate knowledge level, moderate type II diabetes mellitus had satisfactory knowledge and minimum type II diabetes mellitus patients were had adequate knowledge out of the selected sample of Type II Diabetes Mellitus patients. There was a significant association between the level of knowledge and almost all the selected socio-demographic variables. The association between the demographic variables and the knowledge was find using the χ 2 test.

Keywords: Diabetic Patients, Type II Diabetes mellitus, and Socio-demographic variables.

INTRODUCTION

Diabetes is a group of metabolic diseases characterized by hyperglycemia resulting from defects insulin secretion, insulin action, or both. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of different organs, especially the eyes, kidneys, nerves, heart, and blood vessels [1].

Type 1 diabetes mellitus (T1DM) is an autoimmune disease that leads to the destruction of insulin-producing pancreatic beta cells. Insulin is an essential anabolic hormone that exerts multiple effects on glucose, lipid, protein, and mineral metabolism, as well as growth. Importantly, insulin allows glucose to enter muscle and adipose cells, stimulates the liver to store glucose as glycogen and synthesize fatty acids, stimulates the uptake of amino acids, inhibits the

breakdown of fat in adipose tissue, and stimulates the uptake of potassium into cells. Individuals with type 1 diabetes mellitus require life-long insulin replacement therapy. Without insulin, diabetic ketoacidosis (DKA) develops and is life-threatening. This activity reviews the evaluation and management of type 1 diabetes mellitus. It highlights the role of interprofessional team members in collaborating to provide well-coordinated care and enhance outcomes for affected patients [2].

Type 2 Diabetes mellitus (T2DM) accounts for around 90% of all cases of diabetes. In T2DM, the response to insulin is diminished, and this is defined as insulin resistance. During this state, insulin is ineffective and is initially countered by an increase in insulin production to maintain glucose homeostasis, but over time, insulin production decreases, resulting in T2DM. T2DM is most commonly seen in persons older than 45 years. Still, it is increasingly seen in children, adolescents, and younger adults due to rising levels of obesity, physical inactivity, and energy-dense diets2 T2DM is an insulin-resistance condition with associated beta-cell dysfunction. Initially, there is a compensatory increase in insulin secretion, which maintains glucose levels in the normal range. As the disease progresses, beta cells change, and insulin secretion is unable to maintain glucose homeostasis, producing hyperglycemia. Most of the patients with T2DM are obese or have a higher body fat percentage, distributed predominantly in the abdominal revascular complications. The signs and symptoms of diabetes are disregarded by many because of the chronic progression of the disease. People do not consider this as a serious problem because unlike many other diseases the consequences of hyperglycemia are not manifested immegion [3].

The signs and symptoms of diabetes are disregarded by many because of the chronic progression of the disease. People do not consider this as a serious problem because unlike many other diseases the consequences of hyperglycemia are not manifested immediately. People are not aware that damage can start several years before symptoms become noticeable. This is unfortunate because recognition of early symptoms can help to get the disease under control immediately and to prevent vascular complications [4].

Diabetes and related complications are associated with long-term damage and failure of various organ systems. The line of demarcation between the pathogenic mechanisms of Microvascular and macrovascular complications of diabetes and differing responses to therapeutic interventions is blurred. Diabetes induces changes in the microvasculature, causing extracellular matrix protein synthesis, and capillary basement membrane thickening which are the pathognomic features of diabetic microangiopathy. These changes in conjunction with advanced glycation end products, oxidative stress, low grade inflammation, and neovascularization of vasa vasorum can lead to macrovascular complications. Hyperglycemia is the principal cause of microvasculopathy but also appears to play an important role in causation of macrovasculopathy. There is thought to be an intersection between micro and macro vascular complications, but the two disorders seem to be strongly interconnected, with micro vascular diseases promoting atherosclerosis through processes such as hypoxia and changes in vasa vasorum. It is thus imperative to understand whether Microvascular complications distinctly precede macrovascular complications or do both of them progress simultaneously as a continuum. This will allow re-focusing on the clinical issues with a unifying perspective which can improve type 2 diabetes mellitus outcomes [5].

Type 1 Diabetes (T1D) is caused by autoimmune destruction of the insulin-producing beta cells of the pancreas, type 2 diabetes (T2D) results from a combination of insulin resistance and beta cell insulin secretory defect. Clear definition and diagnosis of these two types of diabetes has been increasing more and more difficult, leading to the inclusion of a new category, namely double or hybrid diabetes (DD) that demonstrates symptoms of both T1D and T2D via the accelerator hypothesis. In this review, we discuss the worldwide prevalence of DD, its main physiological characteristics, including beta-cell autoimmunity, insulin resistance, and cardiovascular disease, the main risk factors of developing DD, mainly genetics, obesity and lifestyle choices, as well as potential treatments, such as insulin titration, metformin and behavioural modifications. Increasing awareness of DD among the general population and primary care practitioners is necessary for successfully treating this complex, hybrid disease in the future [6].

Type II Diabetes mellitus (T2DM) is considered as one of the most common diseases. The etiology of T2DM is complex and is associated with irreversible risk factors such as age, genetic, race, and ethnicity and reversible factors such as diet, physical activity and smoking. The objectives of this review are to examine various studies to explore relationship of T2DM with different dietary habits/patterns and practices and its complications. Dietary habits and sedentary lifestyle are the major factors for rapidly rising incidence of DM among developing countries. In type 2 diabetics, recently, elevated HbA1c level has also been considered as one of the leading risk factors for developing microvascular and macrovascular complications. Improvement in the elevated HbA1c level can be achieved through diet management; thus, the patients could be prevented from developing the diabetes complications. Awareness about diabetes complications and consequent improvement in dietary knowledge, attitude, and practices lead to better control of the

disease. The stakeholders (health-care providers, health facilities, agencies involved in diabetes care, etc. should encourage patients to understand the importance of diet which may help in disease management, appropriate self-care and better quality of life [7].

Type II Diabetes mellitus (DM) is associated with an increased risk for both micro-and macrovascular complications, and cardiovascular diseases (CVD) are the most common causes of death in these patients, accounting for almost 70% of the deaths. Given the high prevalence of the condition and the expected global increase in the prevalence of type 2 DsM, a case is made for prevention of these serious complications in order to reduce the individual morbidity and the economic burden on society. In this review we present the knowledge of how macrovascular disease in patients with type 2 DM may be prevented, and suggest possible strategies for doing so. A thorough search of the published literature was conducted and we first present relevant epidemiological studies demonstrating the impact of important risk factors for CVD in DM, such as dyslipidemia, hyperglycemia, hypertension, smoking, familial premature coronary heart disease and some non-classical risk factors such as hyperinsulinemia, insulin resistance, endothelial dysfunction and inflammation. Secondly, we review the results from published randomized controlled clinical trials and meta-analysis of these, evaluate the findings and suggest strategies for preventing CVD in patients with type 2 DM using non-pharmacological and pharmacological approaches. Present knowledge indicates that most patients with type 2 DM either have manifest CVD or have a high risk for future cardiovascular events, men with DM have a 2- to 4-fold; and women with DM a 3- to 5-fold increased risk for cardiovascular death compared with non-diabetic individuals. Care of patients with type 2 DM should include yearly risk assessment by the use of published risk equations or risk charts. On the background of this assessment, an individual risk reducing strategy should be tailored to each patient's need, including the treatment of hyperglycemia, hypertension and dyslipidemia together with the use of aspirin (acetylsalicylic acid) and ACE inhibitors. Such measures can reduce the risk of cardiovascular events in patients with type 2 DM [8].

Diabetes mellitus can damage the eyes, kidneys, nerves and heart. Microvascular and macrovascular disorders are the leading causes of morbidity and mortality in diabetic patients. Hyperglycemia can increase the indicators of lipid peroxidation and oxidative stress in which free radicals have the main role in the pathogenesis of these complications. Therefore, antioxidants which combat oxidative stress should be able to prevent and repair free radicals induced damages. Although free radicals contribute to kidney damage, atherosclerosis, diabetes, heart disease, nephrotoxicity and hepatotoxicity; however, clinical trials do not uniquely confirm a substantial impact on diabetic damage. It seems that antioxidants in vegetables, fruits and grains help preventing diabetes complications; however, there is little evidence that taking single antioxidants such as vitamin E or vitamin C protect these complications. The findings about combination antioxidants are also complicated and not entirely clear. In this review paper we tried to present the role of oxidative stress on micro-vascular complications of type 2 diabetes mellitus. Other objective of this paper is to review the new findings about the role of various antioxidants on prevention and treatment of diabetes mellitus as well as its complications including retinopathy, nephropathy and neuropathy [9].

Diabetes mellitus (DM) is a metabolic disorder that requires medical diagnosis and treatment. Type 2 DM is due to a combination of defective secretion of and responsiveness to insulin. In early stages, the predominant abnormality is reduced insulin sensitivity, and hyperglycemia can be reversed by a variety of measures and medications. In this stage, the cornerstone of glucose-lowering therapy is lifestyle modification, but when counseling does not adequately achieve the recommended glycemic targets, at least five classes of oral drugs are available. In general, alpha-glucosidase inhibitors delay carbohydrate absorption, metiglinides and sulfonylureas increase insulin supply, and biguanides and thiazolidinediones enhance insulin action. Given the high cardiovascular morbidity and mortality in type 2 DM patients, the attempt to reduce cardiovascular complications, beyond the glucose lowering itself, is an extremely relevant task. Indeed, the role of oral glucose-lowering agents concerning hyperglycemia reduction is defined; however, they have not clearly demonstrated to reduce micro- and macrovascular disease, and hitherto, no firm evidence favors one pharmacological treatment over another. The aim of this update is to describe the existing experiences with oral glucose-lowering agents for type 2 DM treatment with respect to cardiovascular prevention [10].

Type II Diabetes mellitus (T2DM) is considered as one of the most common diseases. The etiology of T2DM is complex and is associated with irreversible risk factors such as age, genetic, race, and ethnicity and reversible factors such as diet, physical activity and smoking. The objectives of this review are to examine various studies to explore relationship of T2DM with different dietary habits/patterns and practices and its complications. Dietary habits and sedentary lifestyle are the major factors for rapidly rising incidence of DM among developing countries. In type 2 diabetics, recently, elevated HbA1c level has also been considered as one of the leading risk factors for developing microvascular and macrovascular complications. Improvement in the elevated HbA1c level can be achieved through diet management; thus, the patients could be prevented from developing the diabetes complications. Awareness about diabetes complications

and consequent improvement in dietary knowledge, attitude, and practices lead to better control of the disease. The stakeholders (health-care providers, health facilities, agencies involved in diabetes care, etc. should encourage patients to understand the importance of diet which may help in disease management, appropriate self-care and better quality of life [11].

Hence researcher has planned to undertake "A study to assess the knowledge regarding prevention of micro and macrovascular complications of Type II Diabetes mellitus among patients attending the diabetic club of B V V S HSK Hospital and Research center Bagalkot with a view to prepare an information guide sheet".

MATERIALS AND METHODS

Study Design and Participants:

In the present study non experimental descriptive research design is followed by researcher; where researcher describes the existing fact on assess knowledge regarding prevention of micro and macrovascular complications of type II diabetes mellitus patients. Convenient sampling technique was used to select 80 subjects for the study. Type II diabetes mellitus patients who are aged between 35 to 60. And who are able to read and write Kannada or English. And who are attending the diabetic club of BVVS HSK Hospital and Research center Bagalkot.

Instruments:

The tool or instrument is a written device, the researcher uses to collect the data based on the research problem. Researcher has collected adequate material regarding knowledge regarding Type II Diabetes mellitus patients from sources like internet, review of literature, journals, articles and discussing with guide and subject experts. Scoring for the present study is, each question has multiple choices of four different answers with one correct option and each correct answer considered one mark and the wrong answer carries zero mark. The total numbers of correct options were 42. Reliability of the tool was assessed by using test method, applying Karl's Pearson's formula. In this study the reliability coefficient for knowledge questionnaire was found to be r=0.8145 Hence the tool was considered to be reliable.

Data Collection Procedure

The data collection was carried out from 13-08-2022 to 28-08-2022. Permission was obtained from the Medical Superintendent B.V.V.S, HSK Hospital & Research Center Navanagar, Bagalkot. The investigator administered the tool to those who were willing to participate after introducing and explaining the purpose of the study. The investigator assessed their knowledge regarding prevention of micro and macro vascular complications of type II diabetes mellitus.

Data Analysis:

Data analysis is a systemic organization and synthesis of research data and testing of research hypothesis using those data. The data obtained is analyzed in terms of objectives of the study using descriptive and inferential statistics.

RESULTS

Table 1: Distribution of respondents according to socio-demographic variables

Variables	No of respondents	Percentage
Age in years		
30-40 years	22	27.50
41-50 years	41	51.25
51-60 years	8	10.00
61 years & above	9	11.25
Gender		
Male	48	60.00
Female	32	40.00
Religion		
Hindu	64	80.00
Christian	2	2.50
Muslim	14	17.50
Educational status		
No formal education	12	15.00
Primary education	46	57.50
Secondary education	18	22.50
PUC & above	4	5.00
Type of family		
Nuclear	53	66.25
Joint	27	33.75

Residential background		
Urban	12	15.00
Rural	44	55.00
Slum	24	30.00
Diet		
Vegetarian	51	63.75
Non Vegetarian	6	7.50
Mixed	23	28.75
Habits		
Smoking	16	20.00
Drinking alcohol	33	41.25
Chewing tobacco	31	38.75
Total	80	100.00

Description of socio-demographic data:

In Age group, Majority (51.25%) of the subjects were between 41-50 years, least (10%) between 51-60years and (11.25%) rest of the subjects were between 61years and In Gender, Majority (60%) of the subjects were males and the rest (40%) females. above and then (27.50%) subjects were in the age group of 30-40yeras respectively. In Religion Majority (80%) of the subjects were Hindu, least were (2.50%) Christian and rest of the subjects were belongs to Muslims (17.50%). In Educational status Majority **(**57.50%) of the subjects were belongs to primary, while (22.50%) secondary, (15%) were not, (5%) were of PUC and above. In Type, Majority (66.25%) of the samples were belongs to nuclear family, and least (33.75%) of the subjects were belongs to joint family. Residential Background Majority (55%) of the subjects were belongs to rural area, while (15%) were belongs to urban and (30%) belongs to slum area. In Diet, Majority of (63.75%) of the subjects had Vegetarian Diet, least were (7.50%) Non Vegetarian Diet and (28.75%) were mixed diet. In Habits Majority (41.25%) of the samples had habit of drinking alcohol, least were (20%) Smoking and (38.75%) were chewing tobacco respectively.

Table II: Distribution of knowledge scores regarding prevention of micro and macrovascular complications type II diabetes mellitus patients attending the diabetic club of BVVS HSK Hospital and Research center Bagalkot, n=80

Sl. No	Respondents	Scores range	Percentage
1	37	Inadequate (0-14)*****	46.25%
2	17	Satisfactory (15-28)*****	21.25%
3	26	Adequate (29-42) *****	32.50%
Total: 80			100%

Table-II show that Majority (46.25%) of Type II Diabetes mellitus Patients were having Inadequate Knowledge, least (21.25%) of them were having Satisfactory Knowledge, and Remaining (32.50%) of them were having Adequate Knowledge.

Table III: Association between levels of knowledge with selected demographic variables, N=80

Sl. No	Socio-demographic variables	DF	Chi-square	P value	Association
1	Age	6	48.7580	0.0000***	Significant
2	Gender	2	7.0130	0.0300*	Significant
3	Religion	4	8.9901	0.0613	Not Significant
4	Educational status	6	16.9500	0.0094**	Significant
5	Type of family	2	11.3800	0.0033**	Significant
6	Residential background	4	43.8520	0.0000***	Significant
7	Diet	4	10.6890	0.0303*	Significant
8	Habit	4	1.0940	0.8952*	Significant

*p<0.05**p<0.01, ***p<0.001

Therefore, the research hypothesis **H_2** "There will be significant association between the level of knowledge and selected socio-demographic variables" as stated by the investigator earlier was rejected in the case of demographic variable religion and accepted in the case of other socio-demographic variables such as age, gender, educational status, type of family, residential background, diet and habit.

DISCUSSION

This study was also supported by LEE JK 2014 where he conducted a study on the effects of a coaching program on comprehensive lifestyle modification for

women with diabetes mellitus. The research design for this study was a non-equivalent control group quasi-experimental study. Participants in this study were 34 for the control group and 34 for the experimental group. The experimental group participated in the coaching program on comprehensive lifestyle modification. The program consisted of education, small group coaching and telephone coaching over 4 weeks. Group 1(n = 43) and Group 2- standard care group (n = 32). There were significant improvements ($p< 0.05$) in self-care behavior, and decreases in 59 depression, fasting blood sugar and HbA1C in the experimental group compared to the control group. However, no significant differences were found between the two groups for knowledge of diabetes mellitus. The Coaching Program on Comprehensive Lifestyle Modification used in this study was found to be effective in improving self-care behavior and reducing depression, fasting blood sugar and HbA1C, and is recommended for use in clinical practice as an effective nursing intervention for women with diabetes.

RECOMMENDATION

The following studies can be undertaken to strengthen research:

- A similar study can be conducted with increase in sample size.
- A similar comparative study can be conducted among Type II Diabetes mellitus with the Hypertension patients.

CONCLUSION

Nursing personnel should develop and improve the knowledge about Type II Diabetes mellitus. Nurses should educate women and make them to aware about Prevention of micro and macro vascular complications of Type II Diabetes mellitus. Nurses who are working in Diabetic club BVVS HSK Hospital settings should provide information to public about Prevention of micro and macro vascular complications of Type II Diabetes mellitus and how to manage the condition.

ETHICAL CONSIDERATION

The present study was accepted from institutional ethical committee of B V V S Sajjalashree Institute of Nursing Sciences, Bagalkot. Clearance certificate was submitted with synopsis of this study to Rajiv Gandhi University of Health Sciences, Bangalore.

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Conflicts of Interest: There are no conflicts of interest
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