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Diabetes & its Complications

Prevalence of Dyslipidemia and other Complications among the Type-2 Diabetic Patients in Bangladesh

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ABSTRACT

Dyslipidemia and other complications are very much common among the diabetic patients in Bangladesh. Sedentary lifestyle and uncontrolled dietary behavior play significant roles to cause these complications among the diabetic patients. Thus, this study intends to identify the prevalence of dyslipidemia and other complications among the type-2 diabetic patients in Bangladesh. This cross-sectional study was conducted among selected 138 admitted patients with type 2 diabetes in the medicine ward of a public medical college and hospital in Bangladesh. Their serum lipid profile and health checkup were conducted to assess the prevalence of dyslipidemia and other complications. Among all the respondents, 79.0% (109) had dyslipidemia and 43.0% (59) had different diabetes related complications. A total of 37.0% (51) respondents were having high serum cholesterol, 57.0% (79) respondents were having high serum triglyceride, 59.0% (81) respondents had raised LDL-C and 35.0% (48) respondents had raised HDL-C. Most of the respondents were found with dyslipidemia and nearly half of the respondents had diabetes related complications. Thus, the findings indicate the need of appropriate interventions to address the risk factors so that dyslipidemia and other complications can be managed and controlled timely and effectively.

Introduction

Diabetes is an endocrine disorder characterized by poor physical activity and poor and potent interactions that cause anxiety and critical death. Bangladesh is one of the fastest-growing agricultural nations with the most common type of diabetes in the world, which may be due to the increase in the number of governing cities associated with an inactive lifestyle that is a major factor in diabetes. In 2019, the International Diabetes Federation tested those 465 million people (9.3%) worldwide with diabetes, and by 2045, that number had risen to 700 million (10.9%) [1]. In type 2 diabetes, due to insulin resistance intracellular chemical touchy lipase is stimulated and increases the arrival of non-esterified unsaturated fats (NEFA) from fatty substances deposited in fatty tissue. NEFA's high concentration of fatty acids promotes the formation of fatty liver substances that promote the synthesis of fatty liver-binding compounds. The chemical lipoprotein lipase found in vascular endothelium determines the rate at which the fat is expelled from circulation. Instead of intracellular chemical delicate lipase this lipoprotein lipase may be targeted under conditions of insulin resistance or deficiency in addition to postprandial lipemia. Dyslipidemia in diabetes mellitus refers to raising low-density lipoprotein cholesterol (LDLC), lowering high-density lipoprotein cholesterol (HDLC), or raising Triglycerides (TG) [2]. Diabetes has become a major epidemic in Bangladesh. Bangladesh has a wide variety of lifestyles and ethnic groups; in these lines, the profile of diabetes mellitus can vary in different geographical

areas. Currently, people in big cities are ventured to have high predominance of coronary artery disease (CAD) hazard factors: survival, dementia, diabetes, high blood pressure, dyslipidemia in the light of cheap food consumption and a truly unhealthy lifestyle. There is not much information available on the onset of diabetes in Bangladesh [3]. This study was intended to identify the prevalence of dyslipidemia and other complications among type 2 diabetic patients in Bangladesh.

Methodology

A cross-sectional study was conducted among the admitted patients with type 2 diabetes in the medicine ward of a public medical college and hospital in Bangladesh. The study was conducted from August 2019 to November 2019. A total of 138 patients were selected by simple random sampling method for this study. The sample size was calculated by using the formula - $N=z^2pq/d^2$. Sample size was calculated in 95% confidence interval and the assumed proportion of the target population was 10%. Data was collected by using a pre-tested interviewer administered semi-structured questionnaire. All the patients were instructed for at least 12 hours overnight fasting before collecting their blood samples for laboratory analysis. To assess the dyslipidemia, the serum total cholesterol, triglycerides and HDL levels were measured using CHODPOD method, GOD-Pod method, CHOD POD methods respectively. Data entry and analysis were done by using SPSS. For ensuring the quality, data was checked regularly. The anonymity and confidentiality of the respondents were maintained strictly and the participants were informed that they can be able to leave the study at any stage of data collection. The study protocol was approved by the research ethics review committee of Faculty of Allied Health Sciences of Daffodil International University, Dhaka, Bangladesh.

Results

The study findings show that, more than half (52.0%) respondents were aged in between 45 to 60 years. Majority of the respondents (53.0%) were male. Nearly sixty percent (58.0%) respondents were urban residents, most of the respondents' physical activity level was moderate, about one-third (32.0%) of the respondents' daily working duration was 8 hours, almost one-fourth (24.0%) of the respondents used to consume fatty foods regularly and nearly one-fifth (18.0%) of the respondents used exercise regularly (Table 1).

Table 1: General information of the respondents.

Variables	No. of respondents	Percentage
Age group		
<45	22	16.0%
45-60	72	52.0%
>60	44	32.0%
Sex		
Female	65	47.0%
Male	73	53.0%
Residence		
Rural	58	42.0%
Urban	80	58.0%
Level of education		
Illiterate	10	7.0%
Primary	17	12.0%
SSC	40	29.0%
HSC	35	25.0%
Graduate	22	16.0%
Others	15	11.0%
Physical activity level		
Mild	32	23.0%
Moderate	57	41.0%
Severe	50	36.0%
Working duration per day		
<8 hours	57	41.0%
8 hours	44	32.0%
>8 hours	37	27.0%
Behavior of fatty food consumption		
Regular	33	24.0%
Occasional	62	45.0%
Never	43	31.0%
Exercise behavior		
Exercise regularly	25	18.0%
Do not exercise regularly	113	82.0%

Among all the 138 respondents, 9.0% (12) were obese & 12.0% (17) were overweight, more than eighty percent (83.0%) of the respondents were diagnosed with diabetes earlier, 43.0% (59) respondents had different diabetes related complications and nearly eighty percent (79.0%) respondents had dyslipidemia. Serum lipid levels of the respondents show that out of 138 respondents, 37% respondents were having high serum cholesterol, 57% respondents were having high serum triglyceride, 59% respondents had raised LDL-C and 35% respondents had raised HDL-C (Table 2).

Table 2: Health & nutrition profile of the respondents.

Variables	No. of respondents	Percentage
Nutritional status		
Obese (BMI 30.00-40.00)	12	9.0%
Overweight (BMI 25.00-29.99)	17	12.0%
Normal (BMI 18.50-24.99)	86	62.0%
Under weight (BMI <18.50)	23	17.0%
Diagnosis of diabetes		
Newly diagnosed	23	17.0%
Diagnosed earlier	115	83.0%
Associated illness among the respondents (Multiple response)		
Ischemic heart disease	22	16.0%
Hypertension	92	67.0%
Others	63	46.0%
Having complications		
Yes	59	43.0%
No	79	57.0%
Complications of diabetes among the respondents (n=59) (Multiple response)		
Diabetic foot	25	18.0%
Neuropathy	73	53.0%
Nephropathy	15	11.0%
Retina problem	21	15.0%
Others	6	4.0%
Serum lipid levels of the patient		

Serum Lipid (Abnormal value)	Mean ± SD	Patients with deranged lipids (%)
TC (>200 mg %)	187.6 ± 43.62	51 (37%)
TG (>150 mg %)	174.8 ± 68.32	79 (57%)
LDL-C (>100 mg %)	104.6 ± 33.27	81 (59%)
HDL-C (<40 mg %)	43.21 ± 14.78	48 (35%)
Having dyslipidemia		
Variables	**No. of respondents**	**Percentage**
Yes	109	79.0%
No	29	21.0%

Table 3 shows that the complications of diabetes are significantly associated with age, physical activity level, behavior of fatty food consumption and exercise (P<0.05). On the other hand, prevalence of dyslipidemia is significantly associated with physical activity level, working duration per day, behavior of fatty food consumption, exercise behavior and nutritional status (Table 4).

Table 3: Association of the respondent's socio-demographic characteristics and habit with the complications of diabetes.

Variables	Complications of diabetes		P value
	Yes (59)	No (79)	
Age group			
<45 (22)	8	14	0.013
45-60 (72)	29	43	
>60 (44)	22	22	
Sex			
Female (65)	24	41	0.053
Male (73)	35	38	
Physical activity level			
Mild (32)	19	13	0.032
Moderate (57)	30	27	
Severe (50)	10	40	
Working duration per day			
<8 hours (57)	32	25	0.063
8 hours (44)	17	27	
>8 hours (37)	10	27	
Behavior of fatty food consumption			
Regular (33)	23	10	0.0043
Occasional (62)	28	34	
Never (43)	8	35	
Exercise behavior			
Exercise regularly (25)	4	21	0.0015
Do not exercise regularly (113)	55	58	

Table 4: Association of the respondent's socio-demographic characteristics and habit with the prevalence of dyslipidemia.

Variables	Status of dyslipidemia		P value
	Yes (109)	No (29)	
Residence			
Rural (58)	41	17	0.064
Urban (80)	68	12	
Age group			
<45 (22)	13	9	0.051
45-60 (72)	63	9	
>60 (44)	33	11	
Sex			
Female (65)	50	15	0.055
Male (73)	59	14	
Physical activity level			
Mild (32)	28	4	0.026
Moderate (57)	46	10	
Severe (50)	35	15	
Working duration per day			
<8 hours (57)	52	5	0.017
8 hours (44)	36	8	
>8 hours (37)	21	16	
Behavior of fatty food consumption			
Regular (33)	28	5	0.011
Occasional (62)	51	11	
Never (43)	30	13	
Exercise behavior			
Exercise regularly (25)	6	19	0.048
Do not exercise regularly (113)	103	10	
Nutritional status			
Obese (12)	11	1	0.010
Overweight (17)	14	3	
Normal (86)	76	10	
Under weight (23)	8	15	

Discussion

Prevalence of dyslipidemia is increasing very rapidly worldwide and it is becoming a public health problem globally. The prevalence is varied according to the socio-demographic characteristics and their health & nutrition profile. In our study, it is reported that among 138 respondents, 79.0% (109) respondents had some sort of dyslipidemia. The prevalence is reported much higher than a previous study conducted in Bangladesh [4]. Comparing with other south Asian country, the prevalence is also higher than in India [5] and Sri Lanka [6]. The findings of this study indicate that people are consuming high amount of simple carbohydrate and fatty diet. Unbalanced metabolism due to diabetes may be another important factor for the increment of the prevalence of dyslipidemia. In this study, dyslipidemia and other complications are higher among the people who were aged more than 45 years. This finding is similar to another previous study [7] which stated that age plays a major role to develop diabetes and diabetes related other complications. In this study, prevalence of dyslipidemia among the diabetic patients was 76.92% in females and 80.82% in males where as in a study of India, it was 86.75% in females and 95.40% in males.

Modern lifestyle and urbanization can be another important cause of high prevalence of dyslipidemia. Due to adopting modern lifestyle, physical activities of the people have been decreased and consumption of high fatty foods have been increased which is also influencing the nutritional status of the respondents. In our study, more than 50% of the respondents had high serum triglyceride and raised LDL-C which is very high compared to similar type of study conducted in Pakistan [8]. Different studies indicate that diabetes mellitus is responsible for different complications that may lead to death by any means [9]. This study shows that about 43.0% (59) respondents had different diabetes related complications such as

diabetic foot, neuropathy, nephropathy, retina problem etc. This type of complications and dyslipidemia may be reduced by proper management of diabetes and healthy lifestyle. For this, adequate knowledge on complications and its management process is very necessary.

Conclusion

According to the findings of this study, it can be concluded that dyslipidemia is becoming a life-threatening disease and a major public health concern in Bangladesh. This study also shows high prevalence of dyslipidemia and other complications among the diabetic patients which may result other types of maladies such as cardiovascular disease and other obstacles. The results recommend the need of appropriate interventions targeting awareness raising and reducing the risk factors. To ensure effective care, regular checking of blood sugar and serum lipid profile should be included in the treatment of diabetic patients. Also, everyone should adopt healthy lifestyle and balanced dietary behavior to be safe from these ailments.

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