A Descriptive Study On Prevalence And Risk Factors Of Diabetes Mellitus Among Adults Residing In Selected Villages Of District Sirmour H.P.

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Abstract- *The worldwide prevalence of Diabetes Mellitus (DM) has risen dramatically in thedeveloping countries over the past two decades. Diabetes Mellitus is emerging as a major health-carechallenge for India .**Aim & Objectives:**The aim of the study was to find out the prevalence and associated risk factors of diabetes mellitus among the adult population ≥20 years of age. The objectives of the study were to assess the prevalence of diabetes mellitus among adults, to assess the risk factors of diabetes mellitus among adults, to find out the association between prevalence of diabetes mellitus with selected risk factors and to find out association between prevalence of diabetes mellitus with selected socio demographic variables.**Material & Methods:** This was a community based, descriptive survey study including 350 study subjects age ≥20 years living in rural areas of district Sirmour, Himachal Pradesh. Subjects were interviewed for the assessment of risk factors of diabetes mellitus. A Predesigned and pretested questionnaire was used to elicit the information onanthropometric measurements and individual socio-demographic variables. Height, weight, waist circumference, hip circumference, blood pressure and fasting and postprandial blood glucose levels were monitored. **Results:**The prevalence of DiabetesMellitus was 7.4% among the adults, 52.3% had impaired fasting glucose and 4.9% had impaired glucose tolerance and the remaining 35.4% were having normal blood glucose levels. Significant association was found between prevalence of Diabetes Mellitus and selected risk factors such as age, diet, waist circumference and hip ratio. **Conclusion:** The problem of Diabetes was prevalent among adults in district Sirmour. Regular health surveillance programmes need to be conducted in the community to improve the awareness of public regarding the prevention of diabetes mellitus and to avoid the complications associated with the disease.*

Keywords- Prevalence, Risk factors, Diabetes mellitus, Adults

I. INTRODUCTION

Diabetes mellitus is a global epidemic in this millennium. The highest increase in diabetes mellitus prevalence is amongst low and middle-income countries, pre dominantly with in the 40-59 years age group, although a tendency is seen for onset at a younger age. According to WHO,80% of diabetes deaths occur in low and middle income countries.[1] Diabetes mellitus is a group of metabolic diseases characterized by chronic elevation of glucose in the blood. Symptoms of high blood sugar include frequent urination, increased thirst and increased hunger. If left untreated, Diabetes can cause many complications. Acute complication include diabetic ketoacidosis and Non ketonic hyperosmolar coma whereas Heart disease, stroke, chronic kidney failure, foot ulcers etcare the serious long term complications.[2]

Worldwide the trend of diabetes mellitus observes that by 2025, its prevalence is projected to be 6.3%, which is a 24 % increase compared with that in the year 2003. By 2030, among adults in the age group 20 to 79 years, approximately 333 million (72.0% increase) are projected to be having diabetes. In 2003, the developing world accounted for 141 million people (72.5%) with diabetes. Environmental factors like obesity (central or general), physical inactivity, and diet (saturated fats and trans fatty acids) and socioeconomic factors lead to the development of DM. Also, it is observed that a diet rich in polyunsaturated fats and long chain omega-3 fatty acids can reduce the risk for DM .Along with the rising trend of DM, rapid urbanization has been observed as from2008 to 2030. The global urban population will increase by 1.6 billion people (from 3.3 billion to 4.9 billion). While during the same period the rural population is going to reduce by 28million.This demographic transition will largely take place in developing countries (particularly in Asia and Africa), as by 2030, the developing world population will constitute more than 80%of the world's urban population . United Nations revealed the health implications in terms of changing epidemiology of communicable and non-communicable

diseases under urbanization includes respiratory conditions, heart disease, DM, cancers.[3]

A community based study conducted by the Indian Council of Medical research, revealed that the prevalence of Diabetes was comparatively lower in the Northern states of Chandigarh (0.12 million) and Jharkhand (0.96 million) as compared to the southern states of Maharashtra (9.2 million) and Tamil Nadu (4.8 million). The National Urban Survey conducted across the metropolitan cities of India also had reported similar trend: 11.7 per cent in Kolkata (Eastern India), 6.1 per cent in Kashmir Valley (Northern India),11.6 per cent in New Delhi (Northern India), and 9.3 per cent in West India (Mumbai) compared with (13.5 per cent in Chennai (South India), 16.6 per cent in Hyderabad (south India), and 12.4 per cent Bangalore (South India).But further studies are required to explain these disparities.[4]

The early identification of at risk individuals and appropriate intervention to increase physical activity and changes in dietary habits could to a great extent help in preventing diabetes mellitus and thus reduce the burden due to its associated complications. There is also a need to improve knowledge and awareness about diabetes mellitus in rural as well as urban areas through various IEC activities.

II. METHODOLOGY

The study adopted a quantitative approach with a descriptive survey design. The research settings were in selected areas of district Sirmour H.P. The study sample comprised of **a**dults above 20 years of age,residing inKheri, Macher, Bagroti, Dimber,Kolan, and Miyog areas of district sirmour H.P who fulfilled the inclusion criteria.The sample size for study was 350 adults. The sample size estimation was done on the basis of pilot study, considering the prevalence rate of 30% and samples were selected by convenience sampling technique.

The study included those adults residing in district Sirmour who were above the age of 20 years, were willing to participate in the study and who could understand Hindi/English. Those who were already diagnosed with gestational diabetes were excluded from this study. A structured interview schedule was used for the study which consisted of **Section A:** Socio demographic data of adults.**Section B:** Assessment of risk factors of diabetes mellitus such as physical activity, smoking, alcoholism, family history of diabetes, hypertension, BMI, waist circumference.**Section C:** Bio-physiological assessment-Included the assessment of anthropometric measurement of adults including the height, weight, BMI, waist circumference. A measuring tape was used to check waist circumference and height and weighing machine used to record weight. Glucometer to assess the blood glucose levels of adults following the WHO CRITERIA.

The content validity of the tool was established after consultation with the experts of nursing and medical fields. The reliability of the risk factors interview schedule was assessed by test retest method and the r value was 0.07,which showed that the tool was reliable for the study.Prior to data collection, permission was taken from Research committee of Eternal University, Akal college of Nursing, Baru sahib (H.P.) and Pradhans of selected villages. Informed consent was taken from the study participants and purpose of the study was explained to them. And participants were given freedom to withdraw from the study at any point of time. Pilot study was conducted to check the feasibility of the study at Redigussan village, district sirmour. After obtaining formal permission from the concerned authorities, pilot study was conducted among 20 participants using convenience sampling technique. The samples that were included in the pilot study were not the part of main study. The investigator has given self-introduction, explained the purpose of the study and a written consent obtained from the samples. The data were collected from the sample by using structured interview schedule.

A formal permission was obtained from the Principal- Akal college of Nursing and Pradhans of the selected areas of district sirmour for conducting the main study. Adults were selected by using convenience sampling technique, from the selected rural areas of district sirmour,(H.P) and were informed about the purposes and objectives of the study. Written consent was obtained from each adult. Full autonomy was given to the study participant to participate in research and withdraw at any time. Data was collected regarding socio demographic data and risk factors of diabetes mellitus .Whole procedure was explained to the clients and advised to remain fasting for at least 8hr after meal till next morning for fasting plasma glucose. Fasting blood sugar level was measured and then instructed the subjects to have their breakfast containing carbohydrate and to avoid smoking, drinking alcohol/exercising in the 2 hour period. Blood glucose level(PPBS) tested after two hours of having food. The glucose readings were analyzed based on the WHO criteria for diabetes and categorized as normal, impaired fasting glucose, impaired glucose tolerance /diabetic.

III. RESULTS

The collected data was organized, analysed and interpreted by using descriptive and inferential statistics with the help of statistical package for social sciences

(SPSS).Analysis and interpretation was done based on objective of the study. In the current study, data analysis was described in following sections**:**

Section A: Prevalence of diabetes mellitus among adults
Section B: Frequency and percentage distribution of socio demographic data of adults.
Section C: Frequency and percentage distribution of risk factors of diabetes mellitus among adults
Section D: Association of prevalence of diabetes mellitus with selected socio demographic variables and risk factors
Section E: Correlation of Blood Glucose values (FBS and PPBS) of adults with selected risk factors

Section A: Prevalence of diabetes mellitus among adults

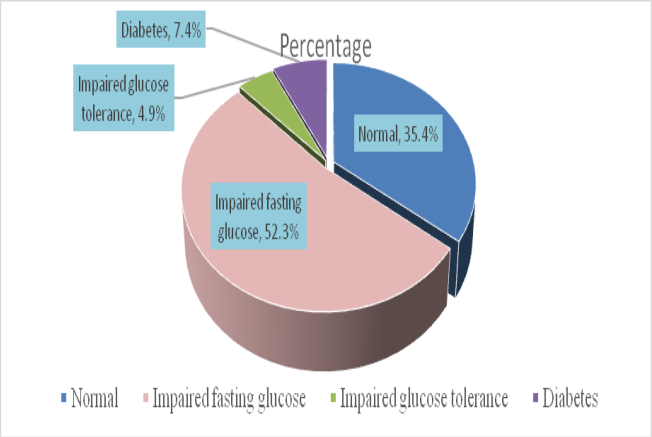

Figure 1: Pie diagram showing the prevalence of diabetes mellitus among adults

The above diagram depicts that the prevalence of diabetes mellitus was 7.4% among adults. Among the subjects, 52.3% had impaired fasting glucose levels,whereas,4.9% of adults had impaired glucose tolerance. This shows that the problem of diabetes was prevalent among the adults.

Section B: Frequency and percentage distribution of socio demographic variables

This section depict about the socio-demographic profile of the adults that included age, gender, family income, occupation, educational status, religion.

Table -1 Frequency & percentage distribution of adults according to socio demographic variables
N=350

S.No.	Variables	Categories	F	%
1	Age (Years)	20-30	103	29.4
		31-40	103	29.4
		41-50	79	22.6
		51-60	38	10.9
		Above 60	27	7.7
2	Gender	Male	193	55.1
		Female	157	44.9
3	Monthly Income (Rs)	<5000	211	60.3
		Rs.5001-10000	74	21.1
		Rs.10001-15000	24	6.9
		>Rs.15000	41	11.7
4	Educational Status	No formal education	52	14.9
		Primary	134	38.3
		Secondary	124	35.4
		Graduate & above	40	11.4
5	Occupation	Self employed	152	43.4
		Government Job	14	4.0
		Farming/agriculture	148	42.3
		Unemployed	36	10.3
6	Religion	Hindu	338	96.6
		Sikh	12	3.4
		Christian	0	0.0
		Any Others	0	0.0

The data presented in table 1 reveals that 58.8 % adults were in the age group 20-40 years and the majority of participants were males (55.1 %. More than half of the adults had monthly income of less than Rs.5000 (60.1%). Majority of them were having only primary education (38.3%). Most of the respondents (42.3%) agriculture as their occupation and majority of the subjects were Hindus (96.6%).

Section C: Frequency and percentage distribution of risk factors of diabetes mellitus among adults.

Table – 2 Frequency and percentage distribution of risk factors of diabetes mellitus among adults
N=226

			Cases n=(226)		Control n=(124)	
S.NO	Variables	Categories	f	%	F	%
1.	Frequency of physical activity	Daily	192	84.9%	110	88.7%
		2-3 times a week	23	10.2%	10	8.1%
		Once in a week	7	3.09 %	3	2.4%
		Rarely / Less often	4	1.76 %	1	0.8%
1.2	Type of physical activity	Exercises	10	4.4%	18	14.5%
		Walking	92	40.7%	49	39.5%
		Agriculture related	124	54.9%	57	46.0%
1.3	Duration of physical activity	<30 minutes	49	21.7%	37	29.8%
		30 minutes -2 hours	106	46.9%	63	50.8%
		2-5 hours	56	16.0%	18	14.5%
		>5 hours	15	6.6%	6	4.8%

2.	Type of dietary pattern	Vegetarian	76	33.6%	50	40.3%
		Non vegetarian	150	66.4%	74	59.7%
2.1	Frequency of intake of vegetables/ fruits	Daily	168	74.3%	93	75.0%
		2-3 times a week	46	20.3%	31	25.0%
		Once in a week	12	5.3%	0	0.0%
		Rarely / Less often	0	0.0%	0	0.0%
2.2	Frequency of Carbohydrate rich foods	Daily	190	84.1%	112	90.3%
		2-3 times a week	23	10.2%	10	8.1%
		Once in a week	10	4.4%	2	1.6%
		Rarely / Less often	3	1.3%	0	0.0%
2.3	Frequency of Fatty food intake	Daily	195	86.3%	111	89.5%
		2-3 times a week	20	8.8%	12	9.7%
		Once in a week	10	4.4%	1	0.8%
		Rarely / Less often	1	0.4%	0	0.0%
2.4	Frequency of intake of Mutton, pork /egg	Daily	11	4.9%	7	5.6%
		2-3 times a week	59	26.1%	28	22.6%
		Once in a week	70	31.0%	35	28.2%
		Rarely / Less often	4	1.8%	1	0.8%
2.5	Frequency of taking chicken meat	Daily	6	2.6%	1	0.8%
		2-3 times a week	31	13.7%	15	12.1%
		Once in a week	79	34.9%	38	30.6%
		Rarely / Less often	28	12.4%	17	13.7%
2.6	Frequency of consuming sweetened foods	Daily	8	3.5%	4	3.2%
		2-3 times a week	49	21.7%	28	22.6%
		Once in a week	133	58.8%	77	62.1%
		Rarely / Less often	36	15.9%	15	12.1%
2.7	Frequency of consuming artificially sweetened beverages	Daily	1	0.4%	0	0.0%
		2-3 times a week	15	6.6%	23	18.5%
		Once in a week	31	13.7%	24	19.4%
		Rarely / Less often	179	79.2%	77	62.1%
3.	Frequency of smoking / use of tobacco products	Daily	42	18.6%	24	19.4%
		2-3 times a week	5	2.2%	5	4.0%
		Occasionally	3	1.3%	0	0.0%
		Do not Smoke	176	77.9%	95	76.6%
3.1	Number of cigarettes/biddies smoked daily	1-6	10	4.4%	9	7.3%
		7-12	10	4.4%	3	2.4%
		13-19	3	1.3%	3	2.4%
		>20	27	11.9%	14	11.3%
3.2	Duration of smoking	1-5 years	4	1.8%	3	2.4%
		6-10 Years	2	0.9%	3	2.4%
		10-15 Years	12	5.3%	10	8.1%
		>15 Years	32	14.1%	13	10.5%
3.3	Type of tobacoo product used	Cigarette	14	6.2%	8	6.5%
		Biddi	35	15.5%	21	16.9%
		Gutka	1	0.4%	0	0.0%
		Others	0	0.0%	0	0.0%
4	Frequency of alcohol intake	Daily	8	3.5%	6	4.8%
		2-3 times a week	20	8.8%	6	4.8%
		Occasionally	10	4.4%	9	7.3%
		Do not Drink	188	83.1%	103	83.1%
4.1	Type of alcohol product consumed	Beer	4	1.8%	5	4.0%
		Wine	24	10.6%	12	9.7%
		Wisky,brandy ,Rum/Vodka	10	4.4%	4	3.2%
		Others	0	0.0%	0	0.0%
4.2	Duration of alcohol use	1-5 years	8	3.5%	5	4.0%
		6-10 years	1	0.4%	1	0.8%
		10-15 years	8	3.5%	6	4.8%
		Above 15 years	21	9.3%	9	7.3%
4.3	Average quantity of alcohol intake	<30 ml	4	1.8%	4	3.2%
		30-60 ml	4	1.8%	1	0.8%
		60-100 ml	16	7.1%	11	8.9%
		>100 ml	14	6.2%	5	4.0%
5	Diagnosed with high blood pressure	Yes	11	4.9%	4	3.2%
		No	215	95.1%	120	96.8%
5.1	Duration of diagnosis of hypertension	<1 year	0	0.0%	0	0.0%
		1-3 years	9	4.0%	2	1.6%
		4-10 years	2	0.9%	1	0.8%
		>10 years	0	0.0%	1	0.8%
5.2	Medications taken for high blood pressure	Yes	7	3.1%	3	2.4%
		No	4	1.8%	1	0.8%
6.	Diagnosed with diabetes	Yes	23	10.2%	0	0.0%
		No	203	89.8%	124	100.0%
6.1	Duration of diagnosis with diabetes	<1 year	6	2.7%	0	0.0%
		1-3 years	11	4.9%	0	0.0%
		4-10 years	2	0.9%	0	0.0%
		>10 years	4	1.8%	0	0.0%
6.2	Medications taken for diabetes	Yes	14	6.2%	0	0.0%
		No	9	4.0%	0	0.0%
7	Blood relatives diagnosed with diabetes	Yes	14	6.2%	5	4.0%
		No	212	93.8%	119	96.0%
8	Diagnosed with high cholesterol	Yes	19	8.4%	6	4.8%
		No	207	91.6%	118	95.2%
9	Medicines taken	No	226	100	124	100
10	BMI	Underweight <18.5)	7	3.1	9	7.2
		Normal (18.5-24.9)	151	66.8	90	72.6
		Overweight (25-30)	55	24.3	23	18.5
		Obese (>30)	13	5.8	2	1.6
11	Waist circumference	Normal	102	45.1%	65	52.4%
		Substantially increased	69	30.5%	28	22.6%
12	WHR	Normal	58	25.7%	44	35.5%
		Substantially increased	168	74.3%	80	64.5%

In table no.2,the frequency and percentage distribution of the risk factors of diabetes has been compared between those who were cases (either found diabetic or impaired fasting blood glucose or impaired glucose tolerance) with controls (with normal blood glucose values as per WHO criteria). From the data it was observed that, both in the case group (84.9%) and control group(88.7%),the majority of the adults were engaging in physical activities such as agricultural work, exercise or walking on a daily basis. Among the case group,66.4% were non-vegetarians, whereas in the control group,59.7% were non-vegetarians. In both the groups there was a daily intake of vegetables and fruits that is 74.3% in the case group and 75% in the control group. The intake of carbohydrate rich foods was 84.1% in case group and 90.3% in control group. Both the groups also showed a high fat intake with 86.3% in the case group and 89.5% in the control group.In the case group,22.1% were smokers,where as in control group it was 23.4%.In the case group,4.9% were diagnosed with high blood pressure where as in the control group it was only 3.2%.In the case group, 10.2% of the adults were known diabetics and among them,6.2% were on anti-diabetic medications. In the case group,6.2% of the adults had blood relatives who were diabetics were as in the control group it was only 4%.Among the case group,66.8% had normal BMI whereas in the control group,72.6% had a normal BMI range.

Section D: Association of prevalence of diabetes mellitus with socio demographic variable

Table no 3 Association of prevalence of diabetes mellitus with socio demographic variable
N=226

S. NO	Variables	Categories	IFG	IGT	DM	Chi Test	Df	P Value
1	Age (Years)	20-30	55	2	1	26.830	8	0.001*
		31-40	53	7	5			
		41-50	42	3	9			
		51-60	20	5	4			
		Above 60	13	0	7			
2	Gender	Male	100	11	15	0.683	2	0.711
		Female	83	6	11			
3	Monthly Income (Rs.)	Upto 5000	104	10	17	6.930	6	0.327
		Rs.5001-10000	40	6	2			
		Rs.10001-15000	13	0	3			
		Above Rs.15000	26	1	4			
4	Educational Status	No formal education	31	4	6	1.334	6	0.970
		Primary	70	6	9			
		Secondary	63	6	8			
		Graduate & above	19	1	3			
5	Occupation	Self employed	84	7	11	4.036	6	0.672
		Government Job	7	0	1			
		Farming/agriculture	82	10	11			
		Unemployed	10	0	3			
6	Religion	Hindu	174	17	25	0.913	2	0.634
		Sikh	9	0	1			
		No	183	17	26			

Table no 3, shows the association of prevalence of diabetes categories with socio demographic variables of adults such as age, gender, monthly income, education status , occupation , religion , history of gestational diabetes (in female) calculated by chi square. As per the findings, age groupof the adults had a significant association with diabetes prevalenceat $p<0.05$ level of significance. There was no significant association of prevalence of diabetes with the other variables.

Table no -4 Association of prevalence of diabetes mellitus with risk factors of diabetes mellitus among adults
N=226

			Prevalence			Association with Prevalence		
S. NO	Variables	Categories	IFG	IGT	DM	df	Chi Test	P Value
1.	Frequency of physical activity	Daily	158	16	18	6	10.030	0.123
		2-3 times a week	17	1	5			
		Once in a week	6	0	1			
		Rarely / Less often	2	0	2			
1.2	Type of physical activity	Exercises	8	0	2	4	2.359	0.670
		Walking	74	6	12			
		Agriculture related	101	11	12			
1.3	Duration of physical activity	<30 minutes	38	3	8	6	5.176	0.521
		30 minutes -2 hours	85	7	14			
		2-5 hours	47	5	4			
		>5 hours	13	2	0			
2.	Type of dietary pattern	Vegetarian	58	7	11	2	1.618	0.445
		Non vegetarian	125	10	15			
2.1	Frequency of intake of vegetables/ Fruits	Daily	136	14	18	4	1.585	0.812
		2-3 times a week	37	3	6			
		Once in a week	10	0	2			
2.2	Frequency of Carbohydrate rich foods	Daily	165	11	14	6	58.134	0.000**
		2-3 times a week	15	5	3			
		Once in a week	3	1	6			
		Rarely / Less often	0	0	3			
2.3	Frequency of Fatty food intake	Daily	165	11	19	6	25.825	0.000**
		2-3 times a week	13	5	2			
		Once in a week	4	1	5			
		Rarely / Less often	1	0	0			
2.4	Frequency of intake of Mutton, pork /egg	Daily	8	3	0	6	13.540	0.035*
		2-3 times a week	52	3	4			
		Once in a week	58	3	9			
		Rarely / Less often	2	1	1			
2.5	Frequency of taking chicken meat	Daily	6	0	0	6	4.165	0.654
		2-3 times a week	24	3	4			
		Once in a week	64	6	9			
		Rarely / Less often	26	1	1			
2.6	Frequency of consuming sweetened foods	Daily	7	1	0	6	27.300	0.000**
		2-3 times a week	43	4	2			
		Once in a week	113	9	11			
		Rarely / Less often	20	3	13			

2.7	Frequency of consuming artificially sweetened beverages	Daily	1	0	0	6	1.317	0.971
		2-3 times a week	12	1	2			
		Once in a week	27	2	2			
		Rarely / Less often	143	14	22			
3.	Frequency of smoking / use of tobacco products	Daily	32	4	6	6	5.864	0.439
		2-3 times a week	3	1	1			
		Occasionally	2	1	0			
		Do not Smoke	146	11	19			
3.1	Number of cigarettes/bidies smoked daily	1-6	9	0	1	6	4.152	0.656
		7-12	7	2	1			
		13-19	3	0	0			
		>20	18	4	5			
3.2	Duration of smoking	1-5 years	4	0	0	6	4.880	0.559
		6-10 Years	2	0	0			
		10-15 Years	8	3	1			
		>15 Years	23	3	6			
3.3	Type of tobacoo product used	Cigarette	11	2	1	4	1.210	0.876
		Biddi	25	4	6			
		Gutka	1	0	0			
		Others	0	0	0			
4	Frequency of alcohol intake	Daily	6	2	0	6	5.919	0.432
		2-3 times a week	15	2	3			
		Occasionally	7	1	2			
		Do not Drink	155	12	21			
4.1	Type of alcohol product consumed	Beer	3	0	1	4	9.052	0.060
		Wine	20	1	3			
		Wisky, brandy ,Rum/Vodka	5	4	1			
		Others	0	0	0			
4.2	Duration of alcohol use	1-5 years	8	0	0	6	5.584	0.471
		6-10 years	1	0	0			
		10-15 years	4	2	2			
		Above 15 years	15	3	3			
4.3	Average quantity of alcohol intake	<30 ml	4	0	0	6	6.883	0.332
		30-60 ml	4	0	0			
		60-100 ml	12	1	3			
		>100 ml	8	4	2			
5	Diagnosed with high blood pressure	Yes	6	1	4	2	7.246	0.027*
		No	177	16	22			
5.1	Duration of diagnosis of hypertension	<1 year	0	0	0	2	0.356	0.837
		1-3 years	5	1	3			
		4-10 years	1	0	1			
		>10 years	0	0	0			
5.2	Medications taken for high blood pressure	Yes	5	0	2	2	3.077	0.215
		No	1	1	2			
6.	Diagnosed with diabetes	Yes	0	3	20	2	148.484	0.000**
		No	183	14	6			
6.1	Duration of diagnosis with diabetes	<1 year	0	1	5	3	1.226	0.747
		1-3 years	0	2	9			
		4-10 years	0	0	2			
		>10 years	0	0	4			
6.2	Medications taken for diabetes	Yes	0	2	12	1	0.049	0.825
		No	0	1	8			
7	Blood relatives diagnosed with diabetes	Yes	9	2	3	2	2.699	0.259
		No	174	15	23			
8	Diagnosed with high cholesterol	Yes	16	1	2	2	0.185	0.912
		No	167	16	24			
9	BMI	Underweight	6	1	0	6	8.518	0.203*
		Normal Weight	124	13	14			
		Overweight	45	2	8			
		Obese	8	1	4			
10	Waist Circumference	Normal	82	13	7	4	16.533	0.002**
		Increased	49	2	4			
		Substantially increased	52	2	15			
11	WHR	Normal	49	4	5	2	0.723	0.697
		Substantially increased	134	13	21			

Table no 4shows the association of diabetes with selected risk factors of adults such as family history , physical inactivity ,BMI, smoking, alcoholism, hypertension, waist circumference, diet and stress which was calculated by chi square. Significant association was found between prevalence of diabetes and dietary factors such as consuming carbohydrate rich food , fatty foods, sweetened foods, consumption of mutton ,pork/egg, diagnosis of diabetes, high blood pressure BMI and waist circumference at $p<0.05$ level of significance.

Section E: Correlation of Blood Glucose values (FBS and PPBS) of adults with selected risk factors

Table no: 5 Correlation of Blood Glucose values (FBS and PPBS) of adults with selected risk factors
N=226

		FBS	PPBS
BMI	R	.284	.210
	P	0.000**	0.002**
Waist Circumference	R	.310	.198
	P	0.000**	0.003**
WHR	R	.170	0.124
	P	0.010*	0.063
Age	R	.309	.292
	P	0.000**	0.000**

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table no 5 depicts the correlation of diabetes mellitus with selected risk factors such as BMI, Waist circumference, waist hip ratio(WHR) and Age .the results reveal that there is a mild correlation between the glucose values(FBS & PPBS) of adults with selected risk factors.

IV. DISCUSSSION

Diabetes is one of the major chronic disease which affect millions of people worldwide.It is metabolic disorder characterized by glucose intolerance.The present descriptive study was done on 350 adults residing in selected areas of district Sirmour, Himachal Pradesh which showed that prevalence of Diabetes Mellitus was 7.4% among the adults, 52.3% had impaired fasting glucose and 4.9% had impaired glucose tolerance and the remaining 35.4% were having normal blood glucose levels. This is in comparison to a similar study which was carried out in a rural area of Nagpur district among 924 subjects aged ≥ 30 years . It showed that 3.67% subjects were diabetic, 5.96% had impaired glucose tolerance, 3.57% had impaired fasting glycaemia (IFG). A total of 122 (13.20%)were having abnormal glucose tolerance (AGT).[5]

In another national study conducted to determine the prevalence of diabetes and pre diabetes (impaired fasting glucose and/or impaired glucose tolerance) in in three Indian states (Tamilnadu, Maharashtra, Jharkhand),and in union territory of Chandigarh which used a stratified multistage sampling design to survey individuals aged ≥20 years. Of the 16607 individuals selected for the study, 14277 (86%) participated, of whom 13055 gave blood samples. The weighted prevalence of diabetes (both known and newly diagnosed) was 10.4% in Tamilnadu, 8.4% in Maharashtra, 5.3% in Jharkhand, and 13.6% in Chandigarh. The prevalence of pre diabetes (impaired fasting glucose and/or impaired glucose tolerance) were 8.3%, 12.8%, 8.1% and 14.6% respectively.Multiple logistic regression analysis showed that age, male sex, family history of diabetes, urban residence, abdominal obesity, generalized obesity, hypertension and income status were significantly associated with diabetes. Significant risk factors for pre diabetes were age, family history of diabetes, abdominal obesity, hypertension and income status[6]where as in the present study significant association was found between prevalence of diabetes and age of the adults, dietary factors such as consuming carbohydrate rich food, fatty foods, sweetened foods, consumption of mutton,pork/egg, diagnosis of diabetes, high blood pressure BMI and waist circumference at $p<0.05$ level of significance.Also, a slight correlation wasobserved between the glucose values(FBS & PPBS) of adults with selected risk factors.

V. RECOMMENDATIONS

- The current study can be replicated on large sample to generalize the findings.
- Interventional study can be carried out to improve knowledge and awareness of population regarding risk factor and prevention of diabetes mellitus
- Research can be done on the comparison of prevalence of diabetes among rural and urban settings.
- Further studies can be done regarding the prevalence of complications associated with diabetes mellitus.

VI. CONCLUSION

The current study shows that diabetes mellitus is prevalent among the adults in Sirmour district .Also, there is the presence of various risk factors of diabetes mellitus among the population. Identification of high risk subjects and early interventions in the form of health education can help in prevention of diabetes mellitus. More aggressive surveillance and monitoringtechniques need to be in place to tackle the problem of diabetes in an efficient manner.

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