A CORRELATION STUDY TO ASSESS THE BODY MASS INDEX, WAIST HIP RATIO AND BLOOD SUGAR LEVEL AMONG THE PATIENTS WITH DIABETES MELLITUS AT SVMCH&RC, PUDUCHERRY.

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Abstract

A correlation study to assess the body mass index, waist hip ratio and blood sugar level among the patient with diabetes mellitus in SVMCH&RC, puducherry.To find out the relationship between the body mass index, waist hip ratio and blood sugar level among the patients with diabetes mellitus with the selected demographic variables at vekateshwara medical college and hospital ariyur, puducherry. This study is quantitative approach with correlation design through consecutive Sampling Technique, 60 patients were selected, among the diabetes mellitus. Demographic and clinical variables was collected by using a structured questionnaire schedule and the body mass index was assessed by International classification of body mass index scale, waist hip ratio was assessed by Mayoclinic waist hip ratio scale and blood sugar level was assessed by blood glucose chart. The collected data were analyzed based on the above mentioned objectives using descriptive and inferential statistics.This study shows that the correlation between body mass index and blood sugar level was 0.5, waist hip ratio and blood sugar levels was 0.59 and body mass index, waist hip ratio and blood sugar level was 0.6. Hence the study concludes that there is significant relationship between body mass index, waist hip ratio and blood sugar level.

Key words: Body mass index, waist hip ratio, blood sugar level, diabetes mellitus.

Introduction

"Take control live well"

Diabetes mellitus is a group of metabolic disease and heterogeneous disorders characterized by high levels of blood glucose in the blood that results from defects in insulin secretion or its action.Diabetes mellitus is a serious health problem throughout the world and its prevalence is increasing rapidly. Diabetes is the leading cause of adult major contributing factor for heart disease and stroke. The

risk for stroke is also two to four times higher among people with diabetes.Diabetes mellitus is a common disease all over the world, its prevalence and incidence is steadily increasing. The availability of wide variety of treatment options result in improvement or even normalization of hyperglycemia as well as accompanying complication. However people with diabetes continue to suffer from the complication of the disease. According to **the International diabetes federation (2013)** in worldwide 382 million people suffer from diabetes with the prevalence of 8.2%. According to **the world health organization (2011),** in India 50 million people suffering from diabetes. By the year of 2030, over 100 million people in India are likely to suffer from diabetes. The present study has shown in tamilnadu the prevalence of diabetes in the year 2009 & 2010 is (12.4% & 12.11%) and of pre diabetic in year 2009 and 2010 is (13.5 & 14.3%) respectively which is quiet correspondent with urban prevalence of diabetes in India. In Puducherry studied about prevalence and risk factors of type-II diabetes mellitus. They found that there is a significant association between reduced physical activity, body mass index, family history of diabetes mellitus, smoking and alcohol conception and fasting blood glucose.

Statement of the problem:

A correlation study to assess the body mass index, waist hip ratio and blood sugar level among the patients with diabetes mellitus at SVMCH&RC, Puducherry.

Objectives:

- To assess the body mass index, waist hip ratio and blood sugar level among the patients with diabetes mellitus.
- To find out the relationship between body mass index and blood sugar level among the patients with diabetes mellitus.
- To find out the relationship between waist hip ratio and blood sugar level among the patients with diabetes mellitus.
- To find out the relationship between body mass index, waist hip ratio and blood sugar level among the patients with diabetes mellitus.
- To associate the body mass index, waist hip ratio and blood sugar level among the patients with diabetes

Methodology

Research approach

Quantitative research approach

Research design

Descriptive research design

Setting of the study

Sri Venkateshwara Medical College Hospital And Research Center, Ariyur, Puducherry

Population

The study population comprises of diabetes mellitus patients

Sample

Age group between 45-65 years of patients was admitted in medical wards who fulfills the inclusion criteria.

Sample size

The sample size was 60

Sampling technique

Non-probability consecutive sampling technique was used in this study.

Sample criteria

Inclusion criteria:

1. Patient who are diagnosed as diabetes mellitus.
2. Patient who are available at the time of data collection period.
3. Patient who can follow the command in Tamil or English.
4. Patient who belongs to the age group of 45-65 years.

Exclusion criteria:

1. Patient who are critically ill.
2. Patient who are not willing to participate in this study.

DESCRIPTION OF THE TOOL:

It consists of the following 3 sections:

SECTION- A: Demographic variables such as age, sex, religion, education, occupation, marital status, type of family, family income and dietary pattern.

Table No 4.1.1: Frequency and percentage distribution according to the demographic variables. (n=60)

S.NO	DEMOGRAPHIC VARIABLES	SAMPLE DISTRIBUTION	
		N	%
1.	**Age in years**		
	a.45-50 Years	7	11.67
	b.51-55Years	24	40
	c.56-60 Years	14	23.33
	d.61-65 Years	15	25
2.	**Gender**		
	a. Male	26	43.33
	b. Female	34	56.67
3.	**Religion**		
	a. Hindu	39	65
	b.Muslim	14	23.33
	c.Christian	7	11.67
	d.Others	0	0
4.	**Education**		
	a. No formal education	19	31.7
	b.Primary education	27	45
	c.High education	8	13.3
	d.Higher secondary education	3	5
	e. Graduate	3	5

5.	**Nature of physical activity**		
	a.Occupation with sternness physical activity	16	26.7
	b.Occupation with moderate physical activity	29	48.3
	c.Occupation with mild physical activity	14	23.3
	d.Occupation with no physical activity	1	1.7
6.	**Family income per month**		
	a. Below Rs.3000/-	14	23.3
	b.Rs.3000/- to 4999/-	12	20
	c.Rs.5000/- to 6999/-	13	21.7
	d.Rs.7000/- to 9999/-	13	21.7
	e. Above Rs. 10,000/-	8	13.3
7.	**Marital status**		
	a. Married	47	78.33
	b. Unmarried	2	3.33
	c. Widow	11	18.33
	d. Separated	0	0
8.	**Types of family**		
	a. Nuclear	28	46.67
	b. Joint	25	41.67
	c. Extended	7	11.67

The above table shows that the percentage distribution of demographic variables regard to the age group, 23(40%) were aged between 51 - 55 years, 15(25%) were aged between 61-65 years, 14(23.33%) were aged between 56-60 years and 7(11.67%) were aged between 45-50 years. With regard to the gender, most of the patient 34(56.67%) of them female and 26(43.33%) of them male. With the religion, 39(65%) of them Hindu and 14(23.33%) of them Muslim. In regard to the education status, 27(45%) were completed primary education and 19(31.7%) had no formal education. Based on nature of physical activity, 29(48.3%) were working in occupation with moderate physical activity, 16(26.7%) were work in occupation with sternness physical activity and 14(23.3%) were working in occupation with mild physical activity. Regarding family income per month, 14(23.3%) were earning below Rs. 3000/- and 13(21.7%) of them earning Rs.5000-6999. With regard to marital status, 47(78.33%) were married. Regarding type of family 28(46.67%) were living in nuclear family and 25(41.67%) were living in joint family.

Tables No 4.1.2: Frequency and percentage distribution according to the clinical variables.

(n=60)

S.N0	CLINICAL VARIABLES	SAMPLE DISTRIBUTION	
		N	%
1.	**Is there any family history of diabetes mellitus**		
	a. Yes	17	28.33
	b. No	43	71.6
2.	**If yes, specify the relationship**		
	a. Mother	11	18.33
	b. Father	6	10
	c. Others	0	0
3.	**Duration of diabetes mellitus**		
	a.<1year	16	26.66
	b.1-3Years	24	40
	c.4-6Years	11	18.33
	d.>6 Years	9	15
4.	**Types of diabetes mellitus**		
	a. Type-I	13	21.66
	b. Type-II	47	78.33
	c. Pre diabetes	0	0
	d. Diabetes associated with other disease	0	0
5.	**Level of physical activity**		
	a. Very active	17	28.33
	b. Sufficient self active	36	60
	c. Insufficient self active	7	11.66
6.	**Dietary pattern**		
	a. Vegetarian	20	30
	b. Non-vegetarian	40	70

7.	**If non vegetarian how frequently consumes the non vegetarian diet per week**

	a. Weekly once	11	18.33
	b. Weekly twice	25	41.66
	c. More frequent	3	5
	d. Rare	3	5
8.	**Do you follow any diet control measures**		
	a. Yes	45	75
	b. No	15	25
9.	**Are you practicing regular exercise**		
	a. Yes	26	43.33
	b. No	34	56.66
10.	**Do you have any bad habits**		
	a.Yes	15	25
	b. No	45	75
11.	**If yes, specify ----------**		
	a. Smoking	5	8.33
	b. Alcohol consumption	2	3.33
	c. Tobacco chewing	8	13.33
12.	**Fasting blood glucose levels**		
	a.80-100 mg/dl	12	20
	b.101-125mg/dl	19	31.66
	c.>126 mg/dl	29	48.33
13.	**Duration of treatment for diabetes mellitus**		
	a.< 1 year	15	25
	b. 1-3 years	25	41.66
	c. 4-6 years	9	15
	d. >6 years	11	18.33

14.	**Types of treatment for diabetes mellitus**		
	a. Insulin	12	20
	b. Oral hypoglycaemic agents	30	50
	c. Both (a) and (b)	18	30
	d. Alternative therapy	0	0

The above table shows that the percentage distributions of clinical variables regard to the family history of diabetes mellitus, majority 43(71.6%) had no family history of diabetes and 17(28.33%) had history of diabetes in their family. In that 11(18.33%) had diabetes among mother and 6(10%) had history of diabetes in father. Based on the duration of diabetes mellitus, 24(40%) of them had it for 1 -3 years. Regarding the types of diabetes mellitus 47(78.33%) had type-II diabetes mellitus. In regard to the level of physical activity 36(60%) were sufficiently self active. Regarding frequency of non vegetarian diet consumption 25(41.66%) consumed twice weekly and 45(75%) were followed diet control measures.Regard to the practice of regular exercises 34(56.66%) were not practicing any exercises. In relate to bad habits majority 45(75%) had no bad habits and 8(13.33%) were tobacco chewers and 2(3.33%) consume alcohol. With regard to the fasting blood glucose levels 29(48.33%) were > 126 mg/dl. Regarding to the duration of treatment, 25(41.66%) were taking treatment between 1-3 years. In regard to the treatment for diabetes mellitus, 30(50%) were taking hypoglycemic agents.

Section B

Distribution of the body mass index, waist hip ratio and blood sugar level among the patient with diabetes mellitus

Table No 4.2.1: Frequency and percentage distribution based on body mass index (n=60)

BODY MASS INDEX SCALE	N	%
Under weight	0	0
Normal	41	68.3
Over weight	14	23.3
Obese	5	8.3

The above table reveals that most of the patient 41(68.3%) had normal weight, 14(23.3%) had over weight and 5(8.3%) were obese.

Table No 4.2.2: Frequency and percentage distribution of Waist Hip Ratio

(n=60)

WAIST HIP RATIO SCALE	N	%
Excellent	0	0
Good	0	0
Average	8	13.3
At risk	52	86.7

The above table reveals that most of the patient 52(86.7%) had average and 8(13.3%) were in at risk category.

Table No 4.2.3: Frequency and percentage distribution of Blood glucose level

BLOOD GLUCOSE CHART	N (n=60)	%
Normal blood glucose	11	18.3
Moderately high blood glucose	20	33.3
High blood glucose	28	48.4

The above table reveal that 28(48.4%) had high blood glucose level, 20(33.4%) had moderately high blood glucose level and 11(18.3%) have normal blood glucose level.

Section-C

Correlation between the body mass index, waist hip ratio and blood sugar level among the patient with diabetes mellitus

Table No 4.3.1: Correlation between body mass index and blood glucose level

(n=60)

CORRELATION	Mean	SD	r value
Body Mass Index	23.86	3.10	0.5
Blood Glucose level	2.51	68.65	

The above table reveals that there is a moderate correlation found with BMI and blood glucose level.

Table No 4.3.2: Correlation between waist hip ratio and blood glucose level

(n=60)

CORRELATION	Mean	SD	r value
Waist hip ratio	1.02	0.1	0.59
Blood sugar level	2.51	68.65	

The above table reveals that there is moderate correlation found between waist hip ratio and blood glucose level.

Table No 4.3.3: Correlation between body mass index, waist hip ratio and blood sugar level

(n=60)

CORRELATION	Mean	SD	r value
Body mass index	23.86	3.10	

Waist hip ratio	1.02	0.1	0.6
Blood sugar level	2.51	68.65	

The above table reveals that there is moderate correlation found between body mass index, waist hip ratio and blood glucose level among the patient with diabetes mellitus.

SECTION -D

Association between the body mass index, waist hip ratio and blood sugar level among the diabetes mellitus patient with the selected demographic variables.

S.NO	Demographic variables	N	%	Chi-square test
1.	**Age in years**			
	a. 45 -50 years	7	11.67	1.968 P<0.05 NS
	b. 51-55 years	24	40	
	c. 56-60 years	14	23.33	
	d. 61-65 years	15	25	
2.	**Gender**			
	a. Male	26	43.33	0.458 P<0.05 NS
	b. Female	34	56.67	
3.	**Religion**			
	a. Hindu	39	65	2.676 P<0.05 S
	b. Muslim	14	23.33	
	c. Christian	7	11.67	
	d. Others	-	-	
4.	**Education**			
	a. No formal education	19	31.7	5.865
	b. Primary school	27	45	

	c. High school	8	13.	P<0.05 NS
	d. Higher secondary school	3	5	
	e. Graduate	3	5	

Table No 4.4.1: Association between the body mass index with the selected demographical variables (n=60)

5.	**Nature of physical activity**			
	a.Occupation with sternness physical activity	16	26.7	7.619 P<0.05 NS
	b.Occupation with moderate physical activity	29	48.3	
	c.Occupation with mild physical activity	14	23.3	
	d. Occupation with no physical activity	1	1.7	
6.	**Family income per month**			
	a. Below Rs. 3000/-	14	23.3	15.728 P<0.05 S
	b. 3000/- to 4999/-	12	20	
	c. 5000/- to 6999/-	13	21.7	
	d.7000/- to 9999/-	13	21.7	
	e. Above Rs. 10,000/-	8	13.3	
7.	**Marital status**			
	a. Married	47	78.33	4.599 P<0.05 NS
	b. Unmarried	2	3.33	
	c. Widow	11	18.33	
	d. Separated	-	-	
8.	**Types of family**			
	a. Nuclear	28	46.67	7.743 P<0.05 S
	b. Joint	25	41.67	
	c. Extended	7	11.67	

The above table reveals The above table reveals that there is a significant association found between the body mass index with the religion, family income and types of family at P<0.5.

Table No 4.4.2: Association between the waist hip ratio with the selected demographical variables

(n= 60)

S.NO	Demographic variables	N	%	Chi-square test
1.	**Age in years**			
	a. 45 -50 years	7	11.67	0.031 P<0.05 NS
	b. 51-55 years	24	40	
	c. 56-60 years	14	23.33	
	d. 61-65 years	15	25	
2.	**Gender**			
	a. Male	26	43.33	7.333 P<0.05 S
	b. Female	34	56.67	
3.	**Religion**			
	a. Hindu	39	65	10.520 P<0.05 S
	b. Muslim	14	23.33	
	c. Christian	7	11.67	
	d. Others	-	-	
4.	**Education**			
	a. No formal education	19	31.7	3.362 P<0.05 NS
	b. Primary school	27	45	
	c. High school	8	13.3	
	d. Higher secondary school	3	5	
	e. Graduate	3	5	
5.	**Nature of physical activity**			
	a. Occupation with sternness physical activity	16	26.7	1.182 P<0.05 NS
	b.Occupation with moderate physical activity	29	48.3	
	c.Occupation with mild physical activity	14	23.3	
	d.Occupation with no	1	1.7	

	physical activity			
6.	**Family income per mont**			
	a. Below Rs. 3000/-	14	23.3	5.172 P<0.05 NS
	b. 3000/- to 4999/-	12	20	
	c. 5000/- to 6999/-	13	21.7	
	d.7000/- to 9999/-	13	21.7	
	e. Above Rs. 10,000/-	8	13.3	
7.	**Marital status**			
	a. Married	47	78.33	0.545 P<0.05 NS
	b. Unmarried	2	3.33	
	c. Widow	11	18.33	
	d. Separated	-	-	
8.	**Types of family**			
	a. Nuclear	28	46.67	7.743 P<0.05 S
	b. Joint	25	41.67	
	c. Extended	7	11.67	

The above table reveals that there is a significant association found between the waist hip ratio with the gender, religion and types of family at P<0.5.

Table No 4.4.3: Association between the blood sugar level with the selected demographical variables

(n= 60)

S.NO	Demographic variables	N	%	Chi-square test
1.	**Age in years**			
	a. 45 -50 years	7	11.67	5.135 P<0.05 NS
	b. 51-55 years	24	40	
	c. 56-60 years	14	23.33	
	d. 61-65 years	15	25	
2.	**Gender**			
	a. Male	26	43.33	2.114

	b. Female	34	56.67	P<0.05 NS
3.	**Religion**			
	a. Hindu	39	65	2.676 P<0.05 NS
	b. Muslim	14	23.33	
	c. Christian	7	11.67	
	d. Others	-	-	
4.	**Education**			
	a. No formal education	19	31.7	5.865 P<0.05 NS
	b. Primary school	27	45	
	c. High school	8	13.3	
	d. Higher secondary school	3	5	
	e. Graduate	3	5	
5.	**Status with nature of physical activity**			
	a. Occupation with sternness physical activity	16	26.7	7.619 P<0.05 NS
	b.Occupation with moderate physical activity	29	48.3	
	c.Occupation with mild physical activity	14	23.3	
	d.Occupation with no physical activity	1	1.7	
6.	**Family income per month**			
	a. Below Rs. 3000/-	14	23.3	15.728 P<0.05 NS
	b. 3000/- to 4999/-	12	20	
	c. 5000/- to 6999/-	13	21.7	
	d.7000/- to 9999/-	13	21.7	
	e. Above Rs. 10,000/-	8	13.3	
7.	**Marital status**			
	a. Married	47	78.33	4.599 P<0.05 NS
	b. Unmarried	2	3.33	
	c. Widow	11	18.33	
	d. Separated	-	-	
8.	**Types of family**			

	a. Nuclear	28	46.67	6.197 P<0.05 NS
	b. Joint	25	41.67	
	c. Extended	7	11.67	

The above table reveals that there is no significant association found between the blood sugar level with the selected demographic variables.

CONCLUSION:

The correlation study was to assess the body mass index, waist hip ratio and blood sugar level among the patient with diabetes mellitus in Sri Venkateswara Medical Hospital and research center. The result of this study showed that there is positive correlation between body mass index, waist hip ratio and blood sugar level among the patients with diabetes mellitus. There is a significant association found between the body mass index and WHR with gender, religion and types of family. There is no association found between the blood sugar level with any other demographical variables.

RECOMMENDATIONS FOR FUTURE STUDY:

The following recommendations were made by the researcher after the study.

- A similar study can be conducted on a larger scale to generalize the study findings.
- An explorative study can be done at various settings like hospitals to identify factors influencing obesity among the patients with diabetes mellitus.
- A Correlation study can be done between the percentage of body fat and surrogate indices of obesity among the patient with diabetes mellitus.
- A descriptive study can be conducted to find the association between other anthropometric parameters and diabetes mellitus.

LIMITATION:

- Getting co-operation for procedure was difficult for few samples.

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