EXPLORING THE EFFECT OF DIFFERENT ANTHROPOMETRIC PARAMETERS IN DIABETICS OF SUBHIMALAYAN REGION

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Abstract

Background-Obesity is the one of the biggest risk factors for diabetes with its different complications. Some authors and clinical corroboration showed the powerful bonding of obesity and diabetes. This study was aimed to compare the association between type 2 diabetes mellitus and various anthropometric measures to assess the practicality of the computation in impersonal practice. **Aim** - Exploring the effect of different Anthropometric Parameters in Diabetics of Sub Himalayan Region. **Method-** After the Ethical approval of SGRR Medical College, Dehradun. The study was conducted in the Dept. of Biochemistry, GMC, Haldwani, Uttarakhand. The eligible subjects (250) aged 35-60 years were involved after the informed consent in which 200 subjects were pin up in study Group - A; 50 were attach for Control Group-B; after fasting blood glucose level and HbA1C (Turbidimetry method). Various anthropometric measurements were used according to standard World Health Organization protocols. **Result**- There was statistically significant difference in waist circumference between study group with control group. **Conclusion**- Muscular connection is recognized between the plumpness of waist mark and diabetes. So, BMI and WC can be used in medical practice as preventive measure to modify lifestyle.

Abbreviations
BMI-Body Mass Index, FBG- Fasting Blood Glucose, HbA1C- Glycated Haemoglobin, T2DM-Type 2 Diabetic Mellitus, WC- Waist Circumference-Waist Hip Ratio

Introduction-Diabetes mellitus (DM) is a chronic metabolic disorder characterized by persistent hyperglycaemia, may be due to insufficient insulin secretion, resistance to peripheral actions of insulin. This Insulin resistance and its complications is multifactorial but most commonly develops from increased body mass index, which advance with aging. Many of the authors and clinical corroboration showed the powerful bonding of obesity with diabetes.

This study was aimed to compare the association between type 2 diabetes mellitus with various anthropometric measures to assess the practicality of the computation in impersonal practice.

According to International Diabetes Federation (IDF) the incidence of non-communicable disease (diabetes) has been increase continuously as years pass away. Diabetes mellitus is the one of the 14th

worldwide biggest reason for Disability Adjusted Life Years (DALYs) [1] As per, survey of 2019 by International Diabetes Federation, 17.5% Indians community is the diabetes sufferer out of the of the world's population 1.37 billion [2,3]. This value enhanced the future by 30% of current value in 2045[4]. From the total community of India, near about old age population that was the 2nd largest diabetes population [5,2].

Effect Of Urbanization-Modernization is the one of the outcomes for gloomy diabetes in all continent and subcontinent.
Evidence proven the strong bonding of Urbanization with increased BMI behavior of pro-diabetic [6]. Urban modification in nutritional environments is play a key role for the increased body mass index due to excessive consumption of junk food, preserve food with unhealthy lifestyle that can be responsible cause of increased diabetes cases [3,7]. This rapid citification led to changes in way of living that affect metabolism negatively and thus give rise in many diabetic's [8]. The advancement behavior of the growing country affects metabolism activities. Enhance several folds Diabetes and Cardiovascular diseases in modern communities [9].
Chronic hyperglycemia, impair the structure and function of small arteries and capillaries of that supplies blood to eyes, nerves and kidneys which eventually may attempt for diabetic retinopathy, neuropathy, and nephropathy respectively.

CRITERIA FOR OBESITY AND BLOOD PRESSURE
BMI ≥ 25 kg/m^2 - overweight and BMI ≥ 30 kg/m^2 - obese [10].WHR ≥ 0.90 for males and ≥ 0.85 for females (truncal obesity) [11].WC > 90 cm in males and > 80 cm in females (central/ abdominal obesity) [11].Blood pressure was classified according to Joint National Committee VII (JNC VII) criteria [12].

Effect of BMI, waist hip ratio, waist circumference on type 2 diabetes
Role of Increased body mass index is the risk factor for development of chronic kidney disease in diabetes patients [13]. Moreover, its role in the diabetes nephropathy is independent of DM and glycemic index control. So, the proper healthy diet and reduces body weight, decrease proteinuria, and maintain homeostasis of kidney function in the sufferer [14].

Aim -Exploring the effect of different Anthropometric Parameters in Diabetics of Subhimalayan Region.
Early prevention to maintain body mass index as a preventive measure for the early reduction of diabetes and its complications.

Method- Approval of Ethics committee was taken from the Dept. of Biochemistry of Shri Guru Ram Rai Institute of Medical and Health Sciences and associated Shri Mahant Indiresh Hospital, Dehradun (A constituent of Shri Guru Ram Rai University). The study participants were enrolled only after obtaining written inform consent.
Then Study was conducted in Dept. of Biochemistry. Outdoor and indoor patients of Internal Medicine, STM Govt. Hospital, Haldwani, Uttarakhand were selected. Fifty non-diabetic healthy subjects were enrolled in Control Group (Group A)). Two hundred diagnosed of Type two Diabetes Mellitus were included as subjects to study (Group B). Various anthropometric measures were used according to standard World Health Organization (WHO).

Inclusion criteria-Patients irrespective of their gender, With in age group of 35-60 years.
Diagnosed with T2DM were included as subjects to study group and non-diabetic attendants of the patient were included as subjects to control group.

Exclusion criteria-Patients with any known renal anomaly. Red blood cell wall defects. Hemoglobinopathies. Hypertension, cardiovascular diseases. Malignancies. Urinary tract infections,

acute febrile illness, any other condition/ medication which may interfere with the proteinuria assessments in the patients were excluded from the study.

Methodology- After the Approval of Ethics committee and singed informed consent of the selected subjects, their base line parameters were assessed including detailed medical history, anthropometric measurements were taken, blood samples of all the subjects were taken for biochemical analysis. All the Subjects were aware about the objectives of the study and their rights during study.

Anthropometric parameters-Body Weight-measured to the nearest value of 0.1kg using a portable scale with minimal clothing & no shoes. Height- measured in meter with deviation 0.1cm using wall mounted stadiometer without shoes. weight in kg. Body mass index- calculated by the quatlet index (kg/height meter)[2].

Waist and Hip circumference- measured in centimetres with flexible measuring tap (taken midway between the lowest rib and the iliac crest and at the maximal protuberance of the buttocks respectively). Then waist hip ratio was analyses.
Blood sampling and analysis were collected by aseptic technique from antecubital vein puncture from each subject in a sterile syringe and transferred to different vials.
• Serum was separated by low-speed centrifugation for 15 minutes at 3000 rpm.
• Blood Fasting Glucose by Enzymatic reference method with hexokinase.
• HBA1C– estimation–latex enhanced immuno-turbidimetry method.

Result
Correlation of HbA1C and fasting blood glucose level with BMI, WAIST, HIP AND WAIST HIP ratio

Group Type	AGE	HbA1C	FBG	BMI	WAIST	HIP	W/H R
Control Group=A N=50	50.3±7.60	5.3±0.33	5.3±0.18	23.42±0.89	79.6±4.75	96.47±5.81	0.82±0.52
Study Group=B N=200	49.98±2.23	9.23±2.23	9.32±2.33	29.20±2.61	95.04±6.35	95.92±5.47	0.99±0.08
P-Value	0.60	<0.001	<0.001	<0.001	<0.001	0.52	<0.001

Result-HbA1C and fasting blood glucose level showed statistically significant difference between control group=A and uncontrol group=B
 Body mass index, waist circumference and waist hip ratio showed statistically significant difference with P-value <0.001 between control group with study group. But there is nonsignificant difference was showed in age, hip (0.6,0.5 respectively) circumference between study group with control group. So, it showed bonding of HbA1C and fasting blood glucose level with BMI, waist circumference and waist hip ratio.

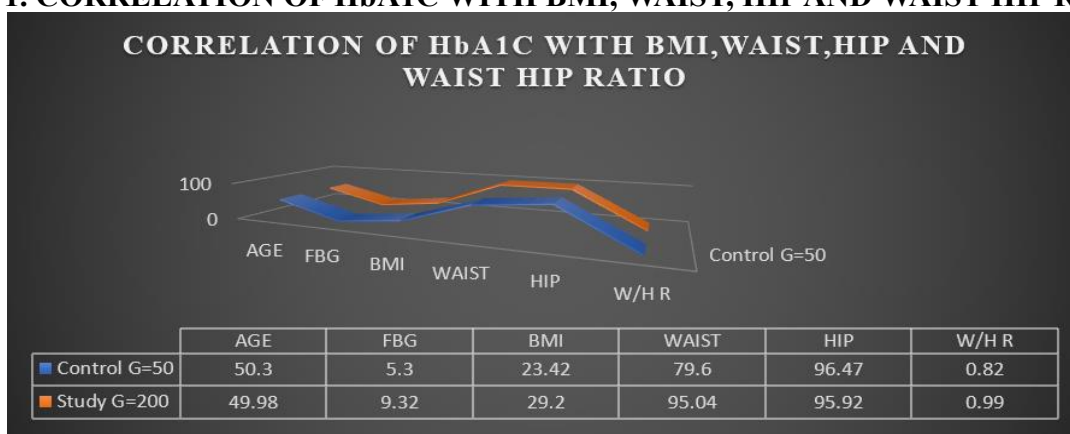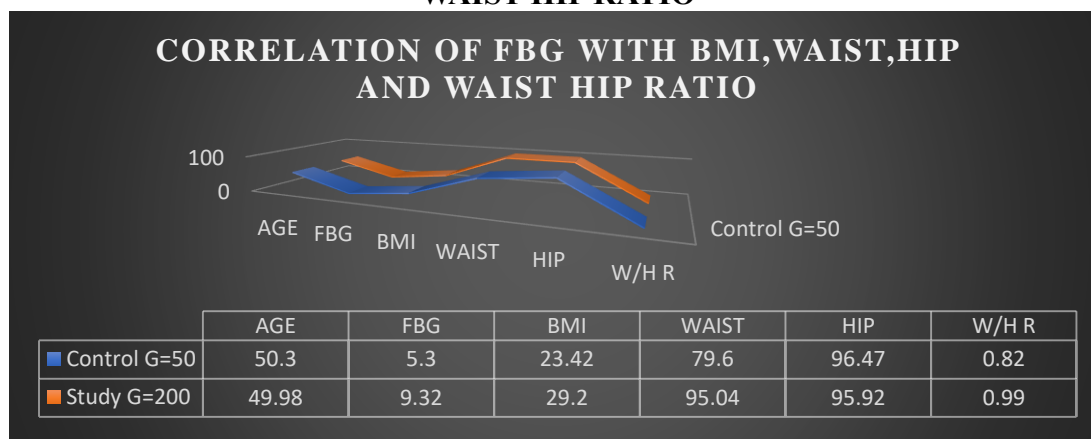**FIG 1. CORRELATION OF HbA1C WITH BMI, WAIST, HIP AND WAIST HIP RATIO**

	AGE	FBG	BMI	WAIST	HIP	W/H R
Control G=50	50.3	5.3	23.42	79.6	96.47	0.82
Study G=200	49.98	9.32	29.2	95.04	95.92	0.99

FIG 2. CORRELATION OF FASTING BLOOD GLUCOSE WITH BMI, WAIST,HIP AND WAIST HIP RATIO

CORRELATION OF FBG WITH BMI,WAIST,HIP AND WAIST HIP RATIO

	AGE	FBG	BMI	WAIST	HIP	W/H R
■ Control G=50	50.3	5.3	23.42	79.6	96.47	0.82
■ Study G=200	49.98	9.32	29.2	95.04	95.92	0.99

Discussion- This present study resultant BMI, WC and WHR to be associated with type two diabetes mellitus and fasting blood glucose level than Hip circumference.

High BMI, waist circumference and WHR was more as compared to a non-diabetic individual which showed association of anthropometric parameters with HbA1C and fasting blood glucose level. Different anthropometric cut-off values for various ethnic groups and populations, always makes comparisons difficult and limits generalizability. In most of the studies BMI performed poorly as an anthropometric predictor for type two diabetes mellitus which contrasted with the present study where BMI was found to be the sensitive marker for diabetes and especially among females.

This study supported Davidson's study , that the diabetes stately increases with age and increasing body mass index [15].Awasthi A. study [16] concluded that overweight/obese individual without metabolic syndrome were at increased risk for diabetes which were comparable with the above results. In the present study, WHR was not a sensitive marker for type two diabetes mellites. But there are contrasting views on this anthropometric measure in literature [17, 18].

WC was found to be a significant predictor of type two diabetes mellites in a systematic review [19,20] and a prospective cohort study [21,22] which was concurring with the present study findings. Also identified WSR to be a more useful clinical screening tool like the present study generalizability of the results is a limitation of the study because of the smaller sample size and due to disparities in various cut-offs used to define BMI. Muscular connection is recognized between the plumpness mark and diabetes. So, among the different anthropometric parameters, BMI, Waist circumference, Waist hip ratio was found to have the discriminatory power. Waist circumference as a single measure could be advocated due to simplicity of measurement and usage either in hospital or community settings in the available literature were also found to be sensitive markers can be used in medical practice as preventive measure to modify lifestyle.

This study found stronger associations between anthropometric markers that reflect abdominal obesity and incident T2DM than for BMI and weight. The use of these measurements in risk prediction should be encouraged in daily practice.

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