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ORIGINAL ARTICLE

Compare the Insuline Resistance of Diabetic Type 2 Men and Women Subjects

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ABSTRACT
Objective: Diabetic type 2 men and women are the subjects of this research, which aims to assess insulin resistance.
Study Design: Observational/Prospective
Place and Duration: Rawalpindi Medical University, Holy Family Hospital. Nov 2019-April 2020
Methods: There were 100 patients of both genders in this research. Patients ranged in age from 20 to 70. After obtaining written permission, we collected demographic data on each patient, including age, gender, and BMI. Patients' fasting insulin and glucose levels were evaluated. IRI (insulin resistance indices) were calculated using HOMA-IR 1 (insulin resistance metre). SPSS 23.0 was used to analyze all of the data.
Results: We found that patients' mean age was 36.13± 4.15, with an average BMI of 27.15±8.65 kg/m2. Males accounted for 42 of the 100 patients, while females accounted for 58 of the 100 patients. Comparing men and girls, serum glucose levels in the males were higher than those in the females at 13.35 ±6.88 mmol/L and 9.12 ± 11.45 mmol/L, respectively, and insulin resistance was higher in the males at 7.45±8.121and 6.13±4.32 in females. In terms of gender, there was no statistically significant difference (p value 0.004).
Conclusion: In this research, we found that increasing insulin sensitivity was more challenging in males. This might indicate that males who are insulin-resistant may need to take a more active role in preventing the development of metabolic or diabetic disorders.
Keywords: Insulin resistance, Diabetic type 2, Hyperinsulinemia, Hyperglycemia,

INTRODUCTION
We are seeing more and more evidence that there are important differences between men and women when it comes to the spread of diseases as well as their treatment and outcomes. This seems to be especially true when it comes to noncommunicable diseases. In order to increase the scientific quality and social relevance of the information, technology, and innovation created, several organisations today urge for the inclusion of the sex and gender component in biomedical research. In the realm of endocrinology and metabolism, investigations in the field of type 2 diabetes mellitus provide the most evidence for substantial clinical consequences of sexual dimorphisms (T2DM). Health care systems face a problem as T2DM and its consequences spread around the world as a result of factors including genetics, environment, and way of life [1,2]. As a result, this review will give crucial, but frequently overlooked, information on the variations between men and women in type 2 diabetes, raising awareness among all health professionals and readers with an interest in the field.

Different chromosomes, autosomes, and hormones, as well as their impact on organ systems, all play roles in the biological distinctions that exist between men and women [1,3]. Hormonal and physical changes are more pronounced in women than in males because of the unique circumstances of female reproduction.

Whether or not men have higher insulin resistance than women is a matter of debate. Insulin resistance varies from gender to gender in mice[4,6] and humans[5,6]. As an example, studies have revealed that older obese males had higher levels of insulin resistance than older obese women[7], while having lower levels of total body fat, subcutaneous fat, and free fat mass. It's less convincing evidence, on the other hand, that people with type 2 diabetes really have insulin resistance. There is no statistically significant difference between men and females in the overall prevalence of diabetes among adults aged 18 to 79 according to the CDC, however there are years when the prevalence of diabetes among females is greater.[8]

Weight reduction promotes insulin sensitivity on a dose-dependent manner, according to previous research.[9, 10] But the question of whether sex may predict the degree of enhanced insulin sensitivity after weight reduction was not thoroughly addressed.

MATERIAL AND METHODS
This prospective/observational study was conducted at Rawalpindi Medical University, Holy Family Hospital and comprised of 100 patients. After obtaining written agreement, demographics such as age, sex, and BMI were recorded. There were no agreed-upon exclusion criteria for those with serious medical conditions.

Presenting patients ranged in age from 20 to 70 years old. It was determined that the patients' serum levels were in mmol/L, their insulin levels were in mIU/L, and their insulin resistance indices Insulin resistance was assessed using the Homeostasis Model Assessment (HOMA-IR). After centrifugation, a blood sample was collected from each patient to isolate serum from the blood. Statistical analysis was performed using SPSS 23.0.

RESULTS
We found that patients' mean age was 36.13± 4.15, with an average BMI of 27.15±8.65 kg/m^2. Males accounted for 42 of the 100 patients, while females accounted for 58 of the 100 patients. (table 1)

Table 1: Included patients with baseline details

Variables	Frequency	%age
Gender		
Men	42	42
Women	58	58
Mean age (years)	36.13± 4.15	
Mean BMI (kg/m^2)	27.15±8.65	

Hypertension, diabetes mellitus, disorder of lipid metabolism and chronic ischemic heart disease were the most common comorbidities among patients of type 2 diabetes mellitus.(fig 1)

Comparing men and girls, serum glucose levels in the males were higher than those in the females at 13.35 ±6.88 mmol/L and 9.12 ± 11.45 mmol/L, respectively, and insulin resistance was higher in the males at 7.45±8.121and 6.13±4.32 in females. In terms of gender, there was no statistically significant difference (p value 0.004). (Table 2)

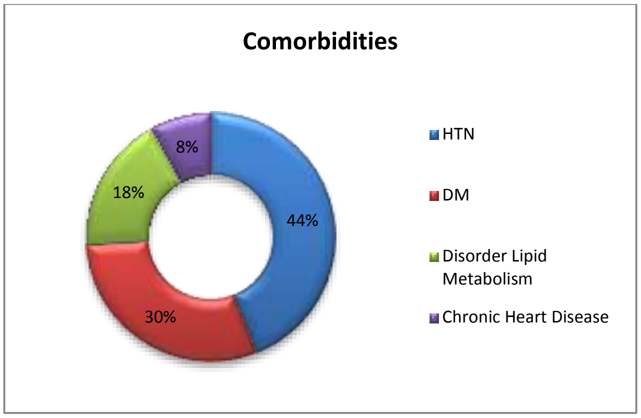

Figure-1: Association of comorbidities among all cases

Table 2: Glucose serum levels and insulin levels among cases

Variables	Men	Women
Findings		
Serum glucose levels mmol/L	13.35 ±6.88	9.12 ± 11.45
Serum insulin levels IU/mL	7.45±8.121	6.13±4.32
IRI	5.14±5.102	4.7±7.18

DISCUSSION

IRI's overall media gap between men and women was not found to be significant in this study (insulin resistance index). Insulin resistance is the same in both men and women, based on this information. It's possible that if we'd had a few more guys in our research with greater insulin tolerance, their levels might have been achieved after being added to the remainder of the group. Other research have revealed that guys are more insulin-resistant than females, and we would have benefitted them as well. Overall, we looked at 100 people with type 2 diabetes aged 20 to 70, with 42% being men and 58% being women. The mean age was 36.13± 4.15 years, which was in line with other research, and the results were similar across the board. [11,12]

The average insulin resistance index for men was 5.14±5.102, while the average for women was 4.7±7.18 in our study population. >2 was the IRI (insulin resistance index) (though it differed by population). According to these data, our community has a higher level of insulin resistance than the IRI reference point (>2). Different results may be influenced by our people's unique metabolic characteristics in combination with other factors[13,14]. The results in this investigation were not relevant to gender variations in serum insulin and glucose levels. Seventy-seven percent of people with type 2 diabetes may pass the disease on to their children[15]. A lower response to similar weight reduction may thus be anticipated if a greater number of guys possessed genes that predisposed them to diabetes than females in the study. No genetic data was acquired or analysed during this study. An increase in insulin resistance has been linked to both genetic and environmental disparities, with substantial evidence that insulin resistance rates are higher among African Americans than those of non-Hispanic whites, according to recent assessments. [16]

It's possible that the gender variations in the distribution of body fat are a better indicator of why men and women are different. The percentage of subcutaneous fat to visceral adio-adipose fat, also known as VAT, seems to be connected to both sexual orientation and age, with a larger proportion of females than men and younger persons than older people. [17,18] This gender difference seems to be driven by the function of oestrogen, since subcutaneous fat has greater amounts of oestrogen receptor and VAT has higher concentrations of androgen receptors. According to the findings of another piece of study, a higher rate of type 2 diabetes was related with a higher VAT in males in older men than in older women (14.6 percent versus 9.1 percent). [19,20] The only way that the HOMA-IR has significantly dropped is via high intense training, as shown by the findings of a study comparing the effects of high intensity training on patients with chronic heart failure who participated in moderate intensity training. [21,22]

However, there is no discrimination on the basis of gender nor the variables that were evaluated for correlation results. Our research led us to the conclusion that the fat distribution is responsible for metabolic abnormalities solely in men.

CONCLUSION

In this research, we found that increasing insulin sensitivity was more challenging in males. This might indicate that males who are insulin-resistant may need to take a more active role in preventing the development of metabolic or diabetic disorders.

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