Frequency and Association of Gamble Variables of Impaired Glucose Tolerance Among Medical Students

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Abstract

Objective: To find out the frequency and association of gamble variables of impaired glucose tolerance among medical students.

Method: This cross-sectional study was conducted at Quaid-e-Azam Medical College Bahawalpur in month of March 2022 to assess the frequency of impaired glucose tolerance and the factors predisposing to the same. After necessary permissions, participants giving written informed consent were interviewed and participants were subjected to an oral glucose tolerance test (OGTT) and their heights, weights were measured.

Results: None of the participants had increased fasting blood glucose but 60 min after OGTT serum glucose levels were increased in 79(49.37%) subjects and 120 min after OGTT serum glucose was increased in 15 (9.3%) subjects. There was association of age, male gender, increased BMI, positive family history of diabetes, lack of physical activity, junk food intake and smoking with impaired glucose tolerance in medical students.

Conclusions: Impaired glucose tolerance was found in a substantial number of non-diabetic medical students and had a statistically significant association with gamble variables high BMI, family foundation of diabetes middle financial class, scarce physical activity, high junk food intake and smoking.

Keywords: Diabetes Mellitus, Prediabetes, Gamble Variables, Impaired fasting glucose (IFG), Impaired Glucose Tolerance (IGT).

Introduction

Diabetes mellitus is an ongoing illness. As per the According to the International Diabetes Federation (IDF), the current burden of diabetes worldwide is approximately 415 million and is projected to rise to 642 million by 2040.[1] Death rates for individuals with diabetes are 2-3 overlay higher than non-diabetics; with cardiovascular and renal illnesses as the main source of death.[1] Albeit the commonness of both sort 1 and 2

Diabetes Mellitus is expanding around the world, the pervasiveness of sort 2 Diabetes Mellitus is rising significantly quickly, apparently due to expanding stoutness, diminished movement levels as nations have become more motorized, and the maturing of the populace. Similarly, there is a growing trend towards the development of type 2 diabetes mellitus at a much younger age than in the past.[5] The unusual glucose homeostasis in prediabetes leads to impaired fasting glucose (IFG) or impaired glucose tolerance (IGT). Various way of life changes and pharmacologic specialists forestall or postpone the beginning of DM.4 Early detection and treatment are crucial in reducing morbidity and mortality associated with type 2 diabetes mellitus. Screening for diabetes and pre-diabetes should be considered in males, especially those with a BMI greater than 25 kg/m², by a healthcare professional within the healthcare setting.[1] Gamble variables also include family foundation of

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diabetes, wealth index, junk food intake ,smoking and many more. The oral glucose resistance test (OGTT) is as of now the highest quality level for the conclusion of populace with prediabetes.[2]

Material and Methods

This cross sectional study was study was conducted at was conducted at Quaid-e-Azam Medical College Bahawalpur during the month of March 2022 to assess the prevalence of impaired glucose tolerance among medical students and the factors leaning toward something almost identical among them. Ensuing to getting assents from the Ethical review Board ERB and trained professionals. for coordinating the survey, individuals thru convenient sampling, giving created informed consent (n=160) after excluding 5 who had fasting serum sugar of >120 mg per dl, were talked with the aid of a predesigned and pretested survey sheet. Height of every member was estimated by a typical estimating tape upward lifted on an upward wall and the weight was estimated by a spring type pre-adjusted balance. Members were asked to fast for 8 hours and then exposed to an Oral Glucose tolerance Test. 75 gm of glucose dissolved in 100ml of water was given for ingestion and blood glucose was estimated utilizing a pre-adjusted hand held glucometer gadget before the glucose challenge I e. after 8 hours fasting and then after the glucose challenge at 60 min, and 120 min stretches. The got information was analysed through SPSS version 24. Simple frequencies and percentages were calculated and presented in the form of tables and figures. Chi square test was used as test of significance as the variables are qualitative in nature. P-value <0.05 was considered significant. Diabetes is defined as fasting serum glucose of >7.0 m mol per litre (126 mg per dl). Prediabetes is a condition characterized by fasting serum glucose levels ranging from 6.1 to 6.9 mmol/L. (110-125 mg per dl) and impaired glucose tolerance is defined as a serum glucose level >140 mg per dl after 120 min of 75 gms of oral glucose tolerance test.

It is a determinant or a factor which is associated with an increased risk of any disease or infection.

BMI :

calculated by weight in kg divided by height in meter square .WHO classification for BMI was used.

Underweight	18.5
Normal	18.5-24.9
Overweight- preobese	25-29.9
Obese	>30

Financial Status was based on income of the family in a month (in rupees)

Priveleged class	>100000
Working class	50000-100000
Lower class	<50000

Results

The circulation of study members as per age and gender shows that 88 (55%) of the members were women, while 72 (44%) were men. 80(50%) of all the members were between 21-23 years age bunch. Segment profile of the members is portrayed in (Table 1). Oral Glucose tolerance test OGTT: This study concluded that after 60min of OGTT, Out of 88 females,44(50%) had serum sugar 140-200 mg per dl while out of 72 males, 32 (44.44 %) had serum sugar 140-200 mg per dl. Only 3% of all had serum sugar >200 mg per dl after 60 min of glucose tolerance test. Out of total 160 study participants, 15(9.3%) had impaired glucose tolerance (serum Sugar >140 mg per dl).Out of 88 females,8(7.95%) and out of 72 males,7 (11.11%) had impaired glucose tolerance being slightly higher frequency in male medical students (Table 2) Association of Gamble variables with Impaired glucose tolerance: This study concluded that there was higher frequency of Impaired glucose tolerance in Male (11.11%) as compared to female (7.95%) medical students of Quaid-e-Azam medical college but this difference was statistically insignificant p= 0.891587 (Table 3). Regarding Association of financial status with Impaired glucose tolerance, this study proved that there is more frequency (66.5%) of impaired glucose tolerance in working class as compared to privileged and lower class and this difference is statistically significant. P= 0.010768 (Table 3) This study also concluded that Out of 15 (9.3%) medical students having impaired glucose tolerance 08(53.33%) had family history of paternal or maternal diabetes compared to 23(15.86%) out of 145 with normal glucose levels after 120 min of OGTT and this difference being statistically significant (p=.000473) proving an association of family foundation of diabetes with impaired glucose tolerance among medical students (Table 4) It was demonstrated in this cross sectional study that most 8(53.33%) out of 15 participants with impaired glucose tolerance were Obese as compared to normal and overweight in the study and this variation with high statistical significance. (p= .000104). Regarding history of surgery or trauma in study participants, it was observed that 05 (33.33%)

out of 15 with impaired glucose tests had history of surgery or trauma showing an insignificant (p=0.229472) association with it. (Table 4) This became evident in this study that daily Exercise and physical activity is an important gamble variable of impaired glucose tolerance in young adults as 08 (53.33%) out of 15 with impaired glucose resistance did no exercise as compared to those who do exercise daily proving a significant (p= 0.027794) association of lack of physical activity with Impaired glucose tolerance among medical students. (Table 4) As far as consumption of junk food is concerned, majority 7(46.66%) out of 15 suffering from impaired glucose tolerance consumed junk food on daily basis as compared to those who less oftenly ate junk food showing a statistically significant (p= .004849) relation between junk food consumption and impaired glucose

Table 1: *Age and gender distribution of study participants*

Age	Women (%)	Men (%)	Total
18-20	40(45.45%)	18(25.0%)	58
21-23	40(45.45)	40(55.55%)	80
24-26	8(9.0%)	14(19.44%)	22
Total	88	72	160

Table 2: *Oral Glucose Tolerance test*

	Levels mg/dl	Women	Men
Serum glucose 60 in after OGTT	<100	1(1.13X)	2 (2.7%)
	101-140	42 (47.72%)	36 (50%)
	140-200	44 50%)	32 (44.44%)
	>200	1 (1.13%)	2 (2.7%)
Serum glucose 120 minimum After OGTT	< 140	80 (92.04%)	65 (88.88%)
	> 140	8 (7.95%)	7 (11.11%)
		88	72

Table 3: *Association Socio-Economic variable with impaired Glucose tolerance test*

Association of Gender with Impaired Glucose Tolerance	Impaired Glucose Tolerance	No. Impaired Glucose Tolerance	Total	Chi Squire test P Value
Male	07	65	72	X^2=0.018
Female	08	80	88	P value= 0.891587 Insignificant
Total	15	145	160	
Association of Socio-Economic status	Impaired Glucose Tolerance	No. Impaired Glucose Tolerance	Total	Chi Squire test P Value
Privileged class	07	25	32	X^2= 9.0623
Working class	05	101	106	P value = .010768 Significant
Lower Class	03	19	22	
Total	15	145	160	

Table 4: *Association Personal Characteristics with impaired Glucose tolerance test*

Characteristics	Impaired Glucose Tolerance	No. Impaired Glucose Tolerance	Total	Chi Squire test P Value
Family History of Diabetes	08	23	31	X^2= 12.2187
No Family History of Diabetes	07	122	129	P value = .000473 Significant
Total	15	145	160	
(BMI) Normal	05	78	82	X^2 = 18.3387
Over Weight	03	52	55	P value = .000104 Significant
Obese	08	15	23	
Total	15	145	160	
History of Surgery Or trauma	05	29	34	X^2 = 1.4441
No History of Surgery Or trauma	10	116	126	P value = .229472 Insignificant
Total	15	145	160	
(Exercise/ Physical activity) No Exercise/ Physical activity	08	32	40	X^2 = 7.1659
Physical Activity up to 02 hours	04	72	76	P value = 0.027794 Significant
Physical Activity > 02 hours	3	41	44	
Total	15	145	160	
(Junk food intake) Daily	07	20	27	X^2 = 10.6579
2-3 times per week	06	103	109	P value = 0.004849 Significant
Once a week	02	22	24	
Total	15	145	160	
Smoking	10	54	64	X^2 = 4.9042
No Smoking	05	91	96	P value = 0.026791 Significant
Total	15	145	160	

tolerance. (Table 4) This was elucidated in this study that there was high frequency of smoking 10(66.66%) among those who had impaired tolerance to glucose hence showing a statistically significant (p= 0.026791)

relation between smoking and impaired glucose tolerance. (Table 4)

Discussion

There is increasing prevalence of diabetes as well as prediabetes in younger populace in the world, therefore this cross sectional study to assess frequency and association of various gamble variables proved that Most of the subjects in this study were between 18-23 years, and a frequency of 9.3% having impaired glucose tolerance very similar to a study conducted in Swaziland where prevalence of prediabetes was 6.5 % in young adults[2] and also close to a study in England where impaired glucose tolerance was detected in 23% of 55 obese children (4 to 10 years) and 21% of the 112 overweight adolescents(11 to 18 years) Silent type 2 diabetes was observed in 4% of the fat adolescents.[6]

Our study concluded a statistically insignificant (p= 0.891) association of gender with impaired glucose tolerance among medical students of Quaid-e-Azam Medical College, Bahawalpur which is contrasting to a study on young adults in Swaziland where there was significant relation between male gender and Impaired tolerance to glucose and prediabetes[2] probably because of differences in sociocultural patterns and life styles.

This study also elucidated a strong association between working or middle financial class with impaired glucose tolerance which was statistically proven (p= 0.010768) and found to be similar to a study in the region of Augsburg KORA where a significant association was found between high socioeconomic class and impaired glucose tolerance as well as raised HbA1c.[21]

This study formed a source of a statistically significant (p= 0.0004) association between family foundation of diabetes and impaired glucose tolerance among young medical students and consequently enhancing the importance of regular screening and monitoring of progression from prediabetes to frank diabetes which was indistinguishable from results of a study on Hispanic population in United States, which also proved significance of the relation between family history and occurrence of diabetes[7] and this similarity might be due to biological and genetic predisposition to develop prediabetes and ultimately overt diabetes at much younger age group than expected.

In this current review, a strong statistically proven (p= 0.000104) relation was found between BMI and impaired glucose resilience. Correspondingly a study in Kerala found a positive relationship among BMI and a gamble of sort 2 diabetes mellitus.[8] In another concentrate, fundamentally high glucose levels were likewise tracked down in ladies with, high BMI and, low wellness and quick weight gain[9]. Also these results were in line with study of Swaziland[2]. where abnormal BMI was statistically related to prediabetes. However ,in a study conducted in Australia,[10] weight record, the level of muscle versus fat and similar midriff to hip ratio in a marginal glucose resistant populace were nearly same as our study results hence emphasizing on weight control strategies and programmes for addressing the diabetes epidemic situation in young adults contributing to renal and cardiometabolic morbidity and mortality.

This study concluded the role of scarce exercise and diminished activity levels in impaired glucose tolerance by proving a statistically significant (p= 0.027794) association between them, similar to a study in Uk, where ladies who participated in actual activity something like one each week had an age changed relative gamble (RR) of type 2 diabetes in contrast to ladies who did not practice showing that active work levels might be a promising way to reduce the burden of prediabetes and ultimately Diabetes in the young adults.[11]

In this current review, a statistically significant (p= 0.026) relation was found between junk food intake and development of impaired glucose tolerance matching to another study of America[22] where significant association was observed between unhealthy diets and frequency of diabetes type 2, featuring the significance of diet control at earliest stage of impaired glucose tolerance to hinder the progression of prediabetes to overt Diabetes. Assessment of prediabetes through hindered glucose tolerance is an important tool for prevention of compli-cations of diabetes in younger age bunch similar to esti-mates of study in China[13] which used post prandial glucose levels as an assessing gadget in contrast to A1c in overall population but another study suggested that 120min post OGTT to determine impaired glucose tolerance should have an increased threshhold level ie >200 mg per dl.[14] In another review among 300 students from college of Kansas,Lawrance.[15] the prevalence of hindered glucose was 9% showing the dangers associa-ted with it.This again proves the significance of addi-tional concentrated tests for early recognition of pre-diabetes and chance of diabetes in future.

Conclusion

A considerable number of non-diabetic medical students exhibited impaired glucose tolerance despite having normal fasting glucose levels. This was particularly observed in males and those who were severely overweight. These individuals with impaired glucose tolerance were likely to develop diabetes in the future. The presence of impaired glucose tolerance was positively associated with factors such as age, gender, socioeconomic status, BMI, physical activity, unhealthy dietary habits, and smoking. Consequently, the higher prevalence of prediabetes among these young medical students emphasizes the importance of implementing primary and secondary prevention strategies tailored to this specific population segment in order to enhance their quality of life.

Reverences

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Authors Contribution

SH: Conceptualization of Project
STJ: Data Collection
SH, MTJ, MHJ: Literature Search
MTJ, MHJ: Statistical Analysis
SH, MTJ, MHJ: Drafting, Revision
SH, MTJ: Writing of Manuscript