CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

http://doi.org/10.5281/zenodo.1423094

Available online at: http://www.iajps.com Research Article

ASSOCIATION BETWEEN INSULIN RESISTANCE AND MEASUREMENT OF PHYSICAL ACTIVITY IN OLDER ADULTS WITHOUT DIABETES MELLITUS

[1]Dr. Nadeem Abbas, [1]Dr. Malik Muhammad Yousuf, [1]Dr. Muhammad Zubair Niaz
[1]Medical Officer at THQ Hospital Jatoi

Abstract:
Introduction: *The aging population is growing worldwide and the proportion of people above 60 years old accounts for 15% of the whole population which is estimated to 7.5 billion. In general, 20% of old people have DM, and a similar proportion have undiagnosed DM. Reported frequencies vary from 18% to 33%.* ***Aims and objectives:*** *The basic aim of the study is to find the association between insulin resistance and measurement of physical activity in older adults without diabetes mellitus.* ***Material and methods:*** *The study was conducted at THQ Hospital Jatoi, Pakistan during 2018. The data was collected from 100 diabetic patients who was suffering from diabetes from last one year. After approval by the hospital ethical review committee, informed written consent was taken from the patients prior to inclusion in the study. Patients from both genders, age range 35 to 65 was selected for this study.* ***Results:*** *The demographic values shows that there is a significant relation between diabetes and hyperlipidemia in a local population of Pakistan. The value of HbA1C is 5.77 ± 0.50 in diabetic patients as compared to normal group. Insulin resistance is the major finding in several metabolic disorders, including type 2 diabetes, metabolic syndrome, dyslipidemia, and hypertension.* ***Conclusion:*** *DM is frequently unnoticed in old patients as it is either asymptomatic or symptoms are nonspecific. Consequently, systematic screening of postprandial GMD is the best way to get an early diagnosis and prevent diabetes-related complications. Furthermore, aging is characterized by high prevalence of associated co-morbidities and risk of frailty.*

Key words: *DM, old patients, Insulin, Resistance*

Corresponding author:
Dr. Nadeem Abbas,
Medical Officer at THQ Hospital,
Jatoi

QR code

Please cite this article in press Nadeem Abbas et al., ***Association Between Insulin Resistance And Measurement Of Physical Activity In Older Adults Without Diabetes Mellitus.,*** *Indo Am. J. P. Sci, 2018; 05(09).*

INTRODUCTION:

Diabetes mellitus (DM) has been emerging as a major healthcare problem in Pakistan with 7.0 million people suffering from it and the number of diabetic patients is estimated to rise to a staggering figure of 14.4 million by the year 2040 making Pakistan the 8th highest country in the world in terms of burden of diabetic patients [1].

The aging population is growing worldwide and the proportion of people above 60 years old accounts for 15% of the whole population which is estimated to 7.5 billion. In general, 20% of old people have DM, and a similar proportion have undiagnosed DM. Reported frequencies vary from 18% to 33%. This range may reflect differences in the age, life style, and genetic background of the analyzed populations. On another hand, 30% of old people have impaired glucose regulation which means an increased risk for DM [2]. Actually, DM in elderly includes two groups: "survivors" of young or middle age onset of diabetes, and incident diabetes in older age or type 2 DM. Type 1 DM is exceptional in elderly as auto immune diseases affect young populations. So old people with type 1 DM are practically at the end stage of their disease and are multi complicated. Most people over than 60 years old suffer from type 2 DM due to insulin resistance. However, insulin secretion may be severely reduced at the end stage of type 2 DM[3].

Consequently, complications, and management of DM in elderly vary according to hyperglycemia duration, personal background, and co-morbidities. Some old people do not have any complication and are easy to manage; others are multi complicated and have additional severe diseases difficult to treat even in highly specialized centers. The last group is encountered among survivors of young onset DM. The main troublesome co-morbidities in elderly are heart and kidney insufficiencies leading to limitation in medicine prescription [4].

Background of the study

Insulin resistance is the major finding in several metabolic disorders, including type 2 diabetes, metabolic syndrome, dyslipidemia, and hypertension. Homeostasis model assessment (HOMA) was proposed as a simple and inexpensive technique to evaluate insulin resistance in vivo. Although the HOMA-IR has been widely used for the study of insulin resistance, the threshold value for insulin resistance has not been conclusive. The morbidity and mortality related to DM is mainly attributed to its microvascular complications including retinopathy, nephropathy and neuropathy. Chronic hyperglycaemia, increased reactive oxygen species, decreased nitric oxides and increased fatty acids are responsible for these chronic vascular complications by altering the vascular response [2]. The major ocular complication of DM is diabetic retinopathy (DR) which is the leading cause of irreversible blindness worldwide with prevalence of DR in newly diagnosed type II diabetics up to 40%[3]. Known risk factors for development and progression of DR include type and duration, age, gender, body-mass index (BMI), glycaemic control, hypertension, nephropathy, smoking, pregnancy and serum lipid levels [4].

Role of serum lipids in development and progression of DR has been evaluated worldwide with variable results. Diabetic dyslipidaemia characterized by elevated serum total cholesterol (TC), triglycerides (TG), low density lipoproteins cholesterol (LDL-C) and high density lipoproteins cholesterol (HDL-C) has been proposed as possible risk factors for DR [5]. Hyperlipidaemia causes endothelial dysfunction due to reduced bioavailability of nitric oxide and breakdown of blood retinal barrier leading to exudation of serum lipids and lipoproteins which results in DR changes and diabetic macular odema (DME) formation [6].

Aims and Objectives

The basic aim of the study is to find the association between insulin resistance and measurement of physical activity in older adults without diabetes mellitus.

Methodology of the study

The study was conducted at THQ Hospital Jatoi, Pakistan during 2018. The data was collected from 100 diabetic patients who was suffering from diabetes from last one year. After approval by the hospital ethical review committee, informed written consent was taken from the patients prior to inclusion in the study. Patients from both genders, age range 35 to 65 was selected for this study. The pre devised proforma was completed by single researcher endorsing subject's demography, and clinical profile. Fasting plasma glucose, serum TC, HDL-C, LDL-C, TG and insulin resistance was measured by using Randox kit.

Statistical analysis

SPSS 17.0 for windows was used for statistical analysis. Descriptive statistics i.e. mean ± standard deviation for quantitative values (age, duration of DM, BMI, BSF, lipid sub fraction levels and HbA1C) and frequencies along with percentages for qualitative variables (gender, smoking status) were used to describe the data. Independent sample 't' test

and One way analysis of variance (ANOVA) with post hoc analysis was used to compare quantitative data between groups, while chi square test for independence was used to compare qualitative data. Pearson's correlation coefficient test was performed to find association of different study variables. A p value < 0.05 was considered statistically significant.

RESULTS:

The demographic values shows that there is a significant relation between diabetes and hyperlipidemia in a local population of Pakistan. The value of HbA1C is 5.77 ± 0.50 in diabetic patients as compared to normal group. (Table 01)

Table 01: Clinical and biochemical profile of study population.

Variable	Diseased group	P value
Age (years)	48.04 ± 4.83	0.018
Male, n (%)	71 (50.71%)	0.285
Smoker, n (%)	32 (22.85%)	< 0.01
Duration (years)	4.60 ± 3.03	0.067
BMI (kg/m^2)	26.31 ± 2.71	0.418
Plasma Glucose (F) mg/dl	117.34 ± 7.93	< 0.01
HbA1C (%)	5.77 ± 0.50	< 0.01

We found strong positive correlation between severity of DR with BSF, HbA1c, serum LDL-C, TC and TG, whereas, age and duration of DM showed moderately positive correlation with severity of diabetes. (Table 2)

Table 02: Lipid sub fraction values among subgroups.

Lipid Profile	Diseased group	P value
Serum Cholesterol (mg/dl)	187.26 ± 17.46	< 0.01
Serum LDL-C (mg/dl)	92.59 ± 11.53	< 0.01
Serum HDL-C (mg/dl)	45.63 ± 4.44	< 0.01
Serum TG (mg/dl)	169.28 ± 9.83	< 0.01

Table 03: Oral medication used by old patients with DM

Oral antidiabetic drugs	Interesting because of	Limited use if	Contre - indications
Metformin	Low price, Efficient in insulin resistance Cancer prevention?	Gastro-intestinal troubles Creatinine clearance <30ml/mn Radiography with iodinated contrast agents	Lactic acidosis, heart insufficiency, kidney insufficiency, vascular accident, coronary insufficiency, heart infarction
Sulfonylureas			
Long action	Low price, efficient	Hypoglycemias To avoid if: Diarrhea, memory troubles, Alcoholism	Allergy Acute coronary syndrome
Short action (meglitinides)	low risk for hypoglycemias	Weight gain	
Thiazolinediones (pioglitazone*)	Low risk for hypoglycemias → used if Reduced glucose tolerance allergy to sulfonylureas	Fluid retention Increase in fracture risk High cost	Congestive heart failure
Alpha-glucosidase inhibitors (Acarbose. Miglitol)	Post prandial hyperglycemias	Flatulence and diarrhea Lack of long experience in elderly	
Incretin-based therapies			
DPP4 inhibitors	No hypoglycemias Weight neutral Can be associated to above mentionned treatments	High cost and no long experience in elderly	Dose ajustment in heart insufficiency (controversed)
GLP1 agonists	No hypoglycemias, weight loss Neuroprotective action	High cost, 2-4 weeks for titration	
Sodium-glucose co-transporter type 2 inhibitors (SGLT2)	Low risk for hypoglycemias	Genital and urinary infection risk, hypotension, increased risk or worsening of renal insufficiency	To avoid in elderly categories n°2 and 3 (nephrotoxicity)

DISCUSSION:

Actually, the quality of life has already improved considerably in patients taking one or two daily doses of intermediate insulin. However, before beginning insulin therapy, it is important to assess whether or not the patient is physically and especially cognitively able to use insulin. If a patient is capable of drawing up his insulin, knows to use an insulin pen, is able to decide for an appropriate insulin dose, knows how to monitor properly his blood glucose, and recognizes and treats his hypoglycemia, insulin is a very good alternative[7]. However, for older patients taking a fixed daily dose of insulin, capable of giving the insulin shot, but not drawing it up because of visual problems or another cause, a family member or a pharmacist may prepare a week's supply of insulin in syringes and leave them in the refrigerator[8]. Such a plan may allow an older patient to remain living independently at home, especially in-developed countries where people are used to live on their own. This problem is not a major one in developing countries as most old people live with their family. For example in North Africa, a survey showed only 2.6% of old people live on their own [9].

Despite the fact that hereditary qualities seems to assume an essential part in the advancement of diabetes, examine recommends that dietary decisions driven by natural and financial components are of critical significance. Amazing eating regimens assume an essential part in diabetes avoidance[8]. Suitable dietary adherence can enhance insulin affectability and glycemic control, and consequently add to way of life change and general personal satisfaction. Nonetheless, past research recommends that dietary adherence is seemingly among the most troublesome foundations of diabetes administration[9]. Higher HEI scores demonstrate nearer adherence to current dietary rules for singular food and supplement gatherings. For the sufficiency segments, for example, vegetables and natural product, a higher score demonstrates higher utilization. Dietary proposals depend on the useful effects of devouring products of the soil and expressly stress their constructive outcomes of decreasing corpulence and certain sorts of growths. The last three segments of the HEI incorporate refined grains, sodium, and discharge (calories from strong fats, liquor, and included sugars) and a higher score demonstrates bring down utilization [10].

However, to all useful treatments in elderly, there are some barriers to care. Actually old people may skip medication doses because of memory troubles or lack of interest in their life when depressed. On another hand, their dexterity is limited and their eyesight is generally poor which affect their ability to monitor blood glucose levels and insulin doses. The ideal care of old diabetic is a family help and a multidisciplinary approach in order to reduce cardiovascular risk factors and increase life expectancy with a high quality of life [11].

CONCLUSION:

Consequently, systematic screening of postprandial GMD is the best way to get an early diagnosis and prevent diabetes-related complications. Furthermore, aging is characterized by high prevalence of associated co-morbidities and risk of frailty. Therefore, it is important to provide high quality and specific care for old diabetic patients. Any treatment should be based on elderly classification and individualization to avoid iatrogenic complications, especially dehydration and hypoglycemias.

REFERENCES:

1. Kiran PU, Srinivas B. Study of glycated haemoglobin, lipid profile and uric acid levels in diabetic retinopathy. Sch J App Med Sci. 2015;3(7A):2480–2484.
2. Kanski JJ, Bowling B. Retinal Vascular Disease. In: Kanski JJ, editor. Clinical Ophthalmology – A Systematic Approach. 7th Ed. London: Elsevier, Saunders; 2011. pp. 533–591.
3. Rahman MR, Arslan MI, Hoque MM, Mollah FH, Shermin S. Serum lipids and diabetic retinopathy in newly diagnosed type 2 diabetic subjects. J Enam Med Coll. 2011;1(2):63–66.
4. Cetin EN, Bulgu Y, Ozdemir S, Topsakal S, Akin F, Aybek H, et al. Association of serum lipid levels with diabetic retinopathy. Intl J Ophthalmol. 2013;6(3):346–349. doi:10.3980/j.issn.2222-3959.2013.03.17.
5. Muluke M, Gold T, Kiefhaber K, Al-Sahli A, Celenti R, Jiang H, Cremers S, Van Dyke T, Schulze-Spate U. Diet-Induced Obesity and Its Differential Impact on Periodontal Bone Loss. J Dent Res. 2016 Feb;95(2):223-9.
6. Khader YS, Bawadi HA, Haroun TF, Alomari M, Tayyem RF. The association between periodontal disease and obesity among adults in Jordan. J Clin Periodontol. 2009 Jan;36(1):18-24.
7. Zimmermann GS, Bastos MF, Dias Goncalves TE, Chambrone L, Duarte PM. Local and circulating levels of adipocytokines in obese and normal weight individuals with chronic periodontitis. J Periodontol. 2013 May;84(5):624-33.

8. Wheeler ML, Dunbar SA, Jaacks LM, Karmally W, Mayer-Davis EJ, Wylie-Rosett J, Yancy WS Jr.Macronutrients, food groups, and eating patterns in the management of diabetes: a systematic review of the literature, 2010. Diabetes Care. 2012;35(2):434–445.
9. A jala O, English P, Pinkney J. Systematic review and meta-analysis of different dietary approaches to the management of type 2 diabetes. Am J Clin Nutr. 2013;97(3):505–516.
10. Newby PK, Tucker KL. Empirically derived eating patterns using factor or cluster analysis: a review. Nutr Rev. 2004;62(5):177–203.
11. Ocké MC. Evaluation of methodologies for assessing the overall diet: dietary quality scores and dietary pattern analysis. Proc Nutr Soc. 2013;72(2):191–199.