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DIABETES PREVALENCE AMONG AL-RUSAFA DISCRETE IN BAGHDAD/IRAQ 2022

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ABSTRACT

Background: No typical glycemic measurements, such as fasting plasma glucose levels, levels of glycated haemoglobin, or impaired glucose tolerance, are present in people with prediabetes. In the long run, type 2 diabetes will affect two-thirds of those with prediabetes. Early detection and the appropriate management will be able to halt or reverse its development. Information on the frequency of prediabetes in Iraq is scarce. Determine the sociodemographic characteristics and risk factors for prediabetes in the population being studied, as well as the efficacy of glycated haemoglobin in the early diagnosis of prediabetes. **Methods:** Adults (18-79 years old) who had been attending primary healthcare institutions in Baghdad Al-Rusafa/Iraq for a year were recruited in this cross-sectional research. Participants who were pregnant, had other medical disorders that would have influenced their glycated haemoglobin level, had known diabetes, were on anti-diabetic drugs, or had any of these circumstances were excluded from the research. facts gleaned via a face-to-face interview. Anthropometric measures and laboratory analysis were done to evaluate fasting plasma glucose, glycated haemoglobin, and lipid profile following an overnight fast. **Results:** 14.7% of people had prediabetes. Adults aged 40 to 62, those who were overweight or obese, and those with dyslipidemia had greater incidence rates. Excellent agreement was found between glycated haemoglobin and fasting plasma glucose. **Conclusion:** Iraq has a higher than predicted prevalence of prediabetes, which is linked to the same risk factors as type 2 diabetes. Glycated haemoglobin is a reliable test to assess for prediabetes in Iraq compared to fasting plasma glucose.

KEYWORDS: Prediabetes; intermediate hyperglycemia; glycated hemoglobin; Al-Rusafa; Iraq.

INTRODUCTION

Poor protein, carbohydrate, and lipid metabolism, which is a symptom of diabetes mellitus (DM), is caused by irregular insulin secretion, insulin resistance secretion, or both.[1] Considering that the global incidence of diabetes was 8.5% in 2014, estimations suggest that between 422 million and 642 million people will be afflicted globally by 2040.[2] DM and its adverse effects are among the top killers. Between 1990 and 2010, the disease's ranking dropped from 15 to 9, which corresponds to a 92.7% rise in the disease's burden. An increase in the community's average age, genetic factors, bad eating practises, sedentary lifestyles, and an increase in obesity that is associated with the expansion of urbanisation have all contributed to the large rise in the incidence of diabetes over the last 10 years.[3,4] Diabetes prevalence has significantly grown during the last three decades, especially in low- and middle-income countries. The Eastern Mediterranean Region (EMRO) has the highest average adult prevalence of diabetes in 2014, at 13.7%[5,6], compared to other WHO regions. In 1978, the prevalence of adult diabetes in Iraq was 5%; in 2019, it ranges from 8.5% to 13.9%. Since they are unable to manage their blood glucose, many diabetics are unaware of their problems.[7] From 20.6% in Iraq to 86% in Tunisia in the Middle East, and from 24.1 to 75.1% in other regions of the globe, a significant number of patients are unaware of their illness. The prognosis for DM is worsened and the cost of care increases with a delay in diagnosis.[8] The greatest observed frequency of DM in Iraq has been found in Baghdad, which is in the country's centre.[9] The purpose of this research was to ascertain the following: The prevalence of type 2 diabetes (T2DM) and pre-diabetes among adult residents of Baghdad city, the percentage of adults who are unaware they have diabetes, and the influence of socioeconomic factors such as gender, age group, education, ethnicity, immigration status, marital status, employment, and health insurance on the prevalence of T2DM are all factors to be considered.

METHOD

A cross-sectional research in Baghdad/Al-Rusafa examined non-communicable illnesses and risk variables. The Iraqi capital, Baghdad (5169 km2), has almost 8 million people. The Tigris divides Karkh and Rusafa. PHC centres were selected using a multistage random selection method from the eastern Baghdad Al Rusafa health directorate. Four health sectors were picked from a total of nine. Four primary health care (PHC) facilities were randomly selected from each health sector, each with an average of 45 individuals, to acquire 723 adults from the Al-Rusafa health directorate. Diabetes, hemoglobinopathies, malignancy, hypo- or hyperthyroidism, pregnancy, and drug or alcohol abuse were excluded. Everyone was interviewed directly. Age, sex, residence, employment, and medical history were reported. With the individual standing erect, wearing light clothes and no shoes (recommended for nutrition clinics), an electronic scale determined the weight to the closest 0.5 kg. Height was measured using a 0.1-cm-accurate height tape measure. BMI measured obesity, overweight, and body fat. Body weight/height2 (Kg/m2) determined it. WHO defined underweight, normal weight, overweight, and obese.[10] A mercury sphygmomanometer measured sitting participants' blood pressure. Two five-minute tests determined the mean blood pressure. mmHg measures blood pressure.[11] Hypertension was diagnosed when the systolic blood pressure was 140 mmHg, the diastolic was 90 mmHg, or the patient was receiving antihypertensive medication.[12] Diabetic criteria were used to calculate prevalence. Each participant had a venous blood sample after fasting overnight. One millilitre was collected in a vacuum collection K3 EDTA tube (thoroughly mixed) and one in a gel and clot activator glass tube. Both were kept in ice-cool boxes (2-8 °C) and analysed by a laboratory technician within 4-5 hours. Siemens Dimension EXL 200 measures serum FPG and lipid profiles. The enzymatic technique [ion exchange high-performance liquid chromatography (HPLC) technology to separate glycated (L-A1c and S-A1c) and non-glycated (HbA0) forms of haemoglobin] was employed to analyse a venous blood sample used for A1C measurement (Menarini). Prediabetes was defined by the ADA as a non-diabetic A1C between 5.7 and 6.4 or an FPG between 100 and 125 mg/dl. Diabetes is diagnosed when the FPG is 126 mg/dl and the A1C is 6.5 or higher.[13] The Friedewald formula calculated LDL-c (14): LDL-c = total cholesterol – HDL-c – (TGS)/5. High cholesterol was 200 mg/dl or more. TGS high at 150 mg/dl. HDL-c was low at 40 mg/dl and LDL-c high at 160 mg/dl.[15] Data were input, coded, and evaluated (Statistical Packages for Social Sciences, version 26). Descriptive statistics for continuous measures were means and standard deviations; for categorical measurements, frequencies and percentages. The Chi-square test or Fisher exact test assessed categorical data relationships and tested agreement between testing results. Student t-test and 1-way analysis of variance compared continuous data. Statistical significance was 0.05.

RESULTS

Of the total individuals (723) enrolled, 29 (4.0%) were found to be in the diabetes range either by FPG or A1C and were excluded from the analysis. Females were the predominant gender compared to males as shown in Figure 1.

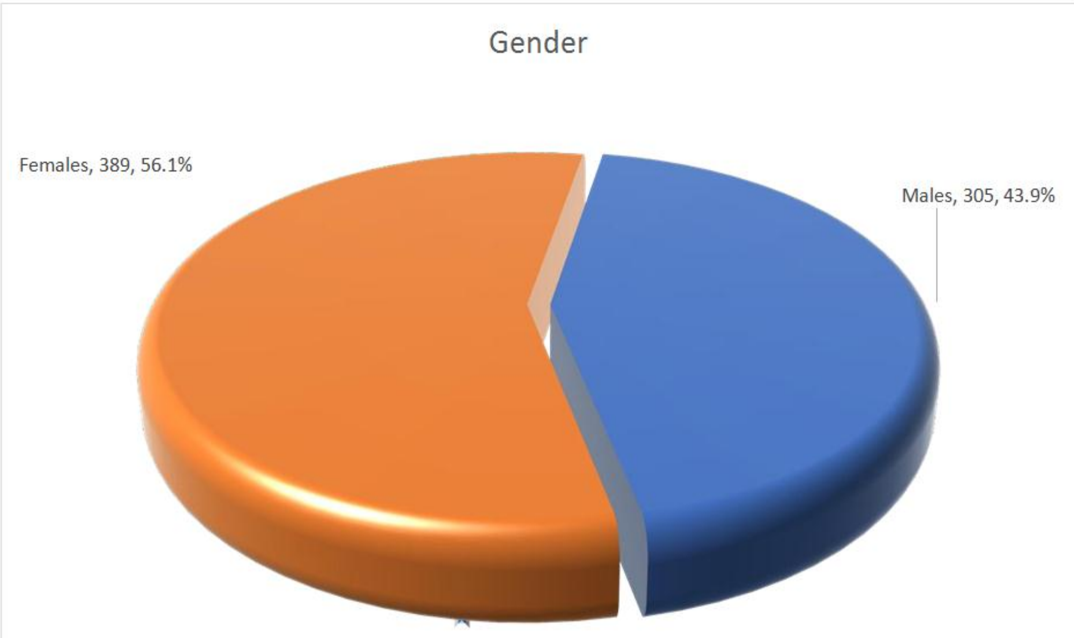

Figure 1: the distribution of the participant's gender.

Of the majority of the study's 694 participants, 592 (85.3%) were norm glycemic, while 102 (14.7%) had prediabetes (Table 1). A1C identified 97 (95.1%) and fasting plasma glucose (FPG) identified 82 (80.4%) patients with prediabetes, respectively. There were 77 people with both prediabetes and elevated A1C and FPG (11.1%). Participants had a mean age of (45.8±12.4) years, and those with prediabetes were older (52.3 % of them were between 40 and 64 years old) with a small male predominance. Table 1 demonstrates that the majority of them were married and had lower employment and education rates.

Table 1: Sociodemographic features of the participants (N=694).

Variable		Non-diabetic n=592	Prediabetes n=102	P-value
Age (Mean±SD)		44.3±13.4	52.3±12.1	**<0.0001**
Sex	Male	253 (42.7%)	52 (51.0%)	0.121
	Female	339 (57.3%)	50 (49.0%)	
Marital status	Married	436 (73.6%)	76 (74.5%)	0.855
	Single	156 (26.4%)	26 (25.5%)	
Occupation	Employed	262 (44.3%)	42 (41.2%)	0.562
	unemployed	330 (55.7%)	60 (58.8%)	
Education	Illiterate	89 (15.0%)	36 (35.3%)	**<0.0001**
	Secondary	196 (33.1%)	32 (31.4%)	
	College	307 (51.9%)	34 (33.3%)	

Individuals with prediabetes exhibited significantly higher BMIs, total cholesterol, TGS, and LDL-c compared to those with normoglycemia, as well as a higher prevalence of hypertension. Smoking and HDL-c levels did not significantly differ across the research groups (Table 2).

Table 2: the association of the various participant variables with the glycemic groups of the participants.

Variable		Non-diabetic n=592	Prediabetes n=102	P-value
Hypertension	Yes	142 (24.0%)	37 (36.3%)	**0.008**
	No	450 (76.0%)	65 (63.7%)	
Smoking	Current smoker	159 (26.9)	29 (28.4)	0.842
	X smoker	218 (36.8%)	39 (38.3%)	
	Not smoker	215 (36.3%)	34 (33.3%)	
BMI (Mean±SD)		26.4±4.0	28±4.3	**<0.001**
FPG (Mean±SD)		89±7	118±10	**<0.001**
A1C (Mean±SD)		5.0±0.6	6.1±0.2	**<0.001**
TC (Mean±SD)		190±38	223±34	**<0.001**
TGS (Mean±SD)		139±51	172±59	**<0.001**
LDL (Mean±SD)		100±34	137±43	**<0.001**
HDL (Mean±SD)		52±7	51±7	0.67

The findings of A1C and FPG showed statistically significant agreement (kappa=0.91), with A1C having a sensitivity and specificity of 96.73% and 93.9%, respectively (Table 3).

Table 3: Test of agreement (FPG and A1C).

		FPG		Total
		Normal	Prediabetes	
A1C	Normal	592	5	597
	Prediabetes	20	77	97
Total		612	82	694

DISCUSSION

Because there hasn't been many research on this topic in Iraq, the real prevalence of prediabetes may be underestimated, leading to a larger frequency than that predicted by the IDF. Additionally, IDF estimate only used impaired glucose tolerance (IGT) measurement as a tool for prediabetes screening and did not include other glycemic indicators, such as FPG or A1C.[16] Considering more than one parameter when screening for prediabetes and T2DM will improve the outcomes.[17] Our prevalence rate was comparable to that of our surrounding countries. For example, the prevalence was 7.8% in Jordan, 12.3% in Saudi Arabia and 13.9% in India.[18,20] Although it was greater in Kuwait (44.2%)

and Turkey (30.8%).[21,22] Our prevalence rate in Iraq was lower than the results given by Alogaily et al. (20.6%) and Al-Azzawi (33.7%) from Baghdad in 2015.[23,24] However, practically all studies demonstrated a relationship between prediabetes with T2DM risk factors regardless of the rate, indicating that the problem is complex in terms of screening tools and procedures as well as population sampling. Prediabetes were substantially older (44.3±13.4 VS 52.3±12.1, P=0.0001) than healthy participants, which is consistent with other studies in the area.[18,19] In developed nations, T2DM primarily affects the elderly, whereas, in Arab nations, it predominates in those under the age of 60. Several articles in Iraq documented this reality.[23] More than half of the prediabetic participants in our study were between the ages of 40 and 60, and this had a significant influence on both economic output and medical spending. Our findings support the finding by JC Won et al.[25], which indicated no difference or a minor male excess, that there is no statistically significant difference in sex among those with prediabetes. Higher BMI and prediabetes were substantially correlated. The weight of prediabetics differed statistically significantly from that of healthy people, which is consistent with other research done around the world. According to NHANES III, the National Center for Health Statistics, 78.5 percent of diabetics were overweight, and 45.7 percent were obese. Obesity is a significant predictor of T2DM in both genders and across all ethnic groups, according to a study by Phillip Tuso et al.[26,27] In line with our findings, the 2017 Diabetes Report Card from the Centers for Disease Control and Prevention (CDC) demonstrated an inverse relationship between diabetes prevalence and educational attainment. Prediabetics showed raised cholesterol levels with the exception of HDL-c and considerably higher rates of hypertension. Hypertension and dyslipidemia are well-known risk factors for type 2 diabetes, according to Abdulrahman et al.[28] The result of very strong concordance in the frequency of prediabetes between FPG and A1C was inconsistent with findings from other research, such as the survey of Caribbean people of African ancestry.[29] This might be explained by the variation in our sample's sociodemographic and epidemiological features. Our study has strengths and weaknesses, but it sheds light on the growing interest in prediabetes globally, particularly in light of the lack of research in this region of the world. A1C measurement-interfering settings have also been minimized to the greatest extent practicable. In people with normoglycemia and prediabetes, we concentrated on the most significant epidemiological risk factors that were thought to have a significant impact on accelerating the transition from normal to prediabetes and eventually to T2DM. Notably, the majority of these risk factors were modifiable. We can generalize from our findings because the vast majority of the people in our sample came to PHC centers for other purposes than to receive medical care (e.g., mothers accompanying children for immunizations, relatives of patients, some adults working there, people coming to complete paperwork, etc.). A restriction is that it is an observational study. Additionally, the participants' histories were used to compile information about current medical illnesses and conditions that affect how well A1C is measured; laboratory testing were not used to corroborate this information. Additionally, we did not perform the IGT in accordance with WHO recommendations even though we employed both the FPG and A1C to screen for prediabetes.

CONCLUSION

This study found that the frequency of prediabetes in Iraq was higher than anticipated, calling for additional epidemiological research on the significance of this metabolic condition. Prediabetes and T2DM patients shared many of the same risk factors, thus action needs to be taken right away to correct this serious condition. A1C is a trustworthy test to identify prediabetes in Iraq when compared to FPG. To better examine prediabetes screening methods in Iraq and to better understand the epidemiology of the disorder, more extensive research is required.

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