HIGH-MOLECULAR WEIGHT ADIPONECTIN, AND TYG-BMI, ARE BETTER PREDICTIVE MARKERS THAN TYG INDEX AND HBA1C TO PREDICT PRE-DIABETES IN OVERWEIGHT ADULTS

Masar Hussain Ali [1,2] and Ahmed Alshawi [3]

[1]Department of MTL, College of Health and Medical Technology, Al-Furat Al-Awsat Technical University, Kufa, Iraq and [2]Murjan Teaching Hospital, Ministry of Health, Babylon, Iraq.
[3]Department of Medical Laboratory Technology, Kufa Institute, Al-Furat Al-Awsat Technical University, Kufa, Iraq.

Corresponding author:
Ahmed Alshawi
Mobile: 009647717966223
E-mail:
ah_alshawi@atu.edu.iq

Received: 01/01/2024
Accepted: 05/02/2024

Online ISSN: 2735-3540

ABSTRACT:

Background: *The prevalence of pre-diabetes has been increased rapidly not in developing countries only. Pre-diabetes is associated with overweight. The diagnosis criteria of pre-diabetes are controversial issue.*

Aim of the work: *The aim of this study was to establish useful parameters to predict pre-diabetes in overweigh adults.*

Subject and Methods: *Thirty-eight adult participants were enrolled and they were divided into two groups 22 were control healthy volunteers and 16 participants were overweight. Biochemical investigations (glucose level, lipid profile), and High-molecular weight adiponectin (HMW-Adipo) hormone were done for both groups.*

Results: *The results showed that the level of HMW-Adipo was significantly reduced in the overweight group, associated with an increase in fasting plasma glucose (FPG), triglycerides, and reduction in high-density lipoprotein (HDL-C) in the overweight group. The Pearson correlation for Triglyceride glucose- Body Mass Index (TyG-BMI), Body Mass Index (BMI), and tri-Ponderal index were positively correlated with FPG; while HMW-Adipo was negatively correlated with FPG. The area under the curve for TyG-BMI, PI and HMW-Adipo showed an excellent prediction for pre-diabetes in overweight adults.*

Conclusion: *HMW-Adipo and/or TyG-BMI are better predictive markers for pre-diabetes adults rather than TyG-index and impair fasting glucose alone.*

Keywords: *Pre-diabetes, high molecular weight Adiponectin, overweight, Triglyceride Glucose-Body mass index.*

INTRODUCTION:

Due to changes in lifestyle and nutritional habits, the prevalence of obesity and overweight has increased not only in developing countries but in low- and middle-income countries as well(1&2). Overweight and/or obesity are one of the most causative agents for diabetes. The prevalence of diabetes mellitus has increased globally(3). The risk of death due to diabetes increases to 46.2% in people lower than 60 years worldwide(4-6). In 2017, 374 million adults were pre-diabetes and this number expected to increase to 540 million by 2045. Impair glucose tolerance (IGT) and/or impair fasting glucose (IFG) are associated with pre-diabetes. Overweight and/or obesity are associated with pre-diabetes. The diagnosis of pre-diabetes is controversial issue. Diagnosis of pre-diabetes is depending on the criteria of The Health World Organisation (WHO) and American Diabetic Association (Raimi, #14), impair of glucose tolerance and/or impair fasting plasma glucose level and increase HbA1c(5-7). Previously, impair

fasting glucose was defined as blood glucose level ranging from 110-126 mg/dl (6.1-6.9 mmol/L). Recently, in 2003 the ADA reduced the range of IFG to 100-126 mg/dL, 5.6-6.9 mmol/L.)[5,8&9]. The recommendation of the ADA is that overweight and/or obese adults have to have annual follow-up on their fasting plasma glucose and HbA1c[5&7]. Adiponectin hormone, which is secreted from adipose tissue (white cells), has a critical role in glucose regulation and lipid metabolism[10&11]. It has different complexes low-molecular weight (LMW), middle-molecular weight (MMW), and High-molecular weight (HMW). The latter complex has been shown to be more effective with anti-hyper-glycaemic treatment[12]. A low level of adipo-nectin has been reported in obese and high-fat-diet rodents[13].Triglyceride glucose index (TyG index) is one of the parameters that is used to measure insulin resistance[14-16]. It is also used as predictive parameter to predict T2D in pre-diabetes in obese patients[17], and it is also a predictor for cardiovascular disease in T2D[18]. Barry et al 2016 reported that measuring of HbA1c is not sensitive or specific and fasting plasma glucose level is also not sensitive but specific for pre-diabetes[19]. Moreover, impair glucose tolerance is disheartened due to many reasons[9].

AIM OF THE WORK:

This study aimed to investigate

1.The changes in lipid profile and the level of high-molecular weight adiponectin in overweight adults and whether HMW-adiponectin can be used as predictive marker for pre-diabetes.

2.Whether lipid parameter ratio TG/HDL, TyG index, TyG-BMI and/or Tri-Ponderal index could be used as predictive markers to assume the development of diabetes in pre-diabetes overweight adult persons.

PATIENTS AND METHODS:

This study conducted Thirty-eight participants and they were divided into two groups. Group A was control (n=22), and group B (n=16) was overweight participants. All participants in group B had no previous medical treatment for anti-hyperglycaemia and/or anti-hyperlipidaemia. Demographic information (Age, gender, weight, and length) were collected. Body mass index obtained through dividing weight[9] on the square of length (m^2). PI was assessed as the ratio of weight[9] to cubic length (m^3)[20,21]. All participants asked for 14h fasting before 5 ml antecubital venous blood were withdrawn. The sample was left for 15-30 min on the bench before serum separation at 4000 rpm for 20 min Biochemical tests were performed directly after centrifugation and the rest was stored at -8 0^{o}C for further investigations. Adiponectin (High-molecular weight) hormone was done by sandwich ELISA following the instruction of manufacture.

Statistical analysis:

The results were analysed by using GraphPad PRISM software 8.4 and all results are expressed as Mean ± SEM. Statistically significant was performed Student's unpaired *t*-test *P-value <0.05.*

Ethical Consideration:

All participants were informed and they signed the consent form before blood collection. Iraqi Ministry of Health and Marjan Medical city approved this project (1452, 25/09/2023), and this study followed the Declaration of Helsinki.

RESULTS:

In this study our first goal was to test the changes in lipid profile in overweight adults. Female participants were 60% in both groups.

The mean age for the overweight group was 47.44±2.3 vs. 48.95±2.07 for the control group. Overweight participants had a significant increase in weight compared with the control group (80.94±3.49 vs 62.41±1.52, respectively) as shown in Table (1). Triglycerides and very low-density lipoprotein (VLDL) showed a significant increase in the overweight group (1.575±0.14 vs 1.209±0.1 and 0.315±0.02 vs 0.241±0.02, respectively). A significant decrease in high-density lipoprotein cholesterol (HDL-C) was noticed in the overweight group compared with the control group (1.2±0.055 vs 1.37±0.055, respectively). Whereas, low-density lipoprotein cholesterol (LDL-C) showed a trend toward a non-significant increase in the overweight group (2.97±0.3 vs 2.35±0.2). Both triglyceride to HDL and LDL to HDL ratios, like TG and VLDL, were increased in the overweight group (1.4±0.18 vs 0.94±0.1, and 2.64±0.34 vs 1.82±0.19, respectively) Table (1).

Table 1: Characterisation and lipid markers for the participants.

	Control group	Overweight group	*P-value*
Age (years)	48.95±2.07	47.44±2.3	*0.437*
Gender			
Female n (%)	13 (60)	10 (60)	
Male n (%)	9 (40)	6 (40)	
Weight (Kg)	62.41±1.52	80.94±3.49 ***	*<0.0001*
TC (mmol/L)	3.97±0.205	4.48±0.29	*0.149*
TG (mmol/L)	1.209±0.1	1.575±0.14 *	*0.036*
HDL-C (mmol/L)	1.37±0.055	1.2±0.055 *	*0.038*
LDL-C (mmol/L)	2.35±0.2	2.97±0.3	*0.088*
VLDL (mmol/L)	0.241±0.02	0.31.5±0.02 *	*0.036*
LDL/HDL ratio	1.826±0.19	2.64±0.34 *	*0.032*
TG/HDL ratio	0.94±0.1	1.4±0.18 *	*0.025*
Non-HDL (mmol/L)	2.6±0.21	3.2±0.126	*0.068*

Abbreviations: HDL-C High-Density Lipoprotein-Cholesterol; LDL-D Low-Density Lipoprotein-Cholesterol; TC Total Cholesterol, TG Triglycerides; and VLDL Very-Low Density Lipoprotein. *P<0.05 vs. control group

Next, we investigate the levels of fasting glucose, HbA1c and body parameters in both groups. Fasting plasma glucose (FPG) was increased significantly in the overweight group (5.6±0.09 vs 4.7±0.132, respectively) Diagram (1 A). HbA1c, unlike FPG, had a non-significant difference between the two groups. Diagram (1 B). The body mass index is a parameter that is widely used to determine the overweight and obesity. The overweight group showed a significant increase in the body mass index (BMI) compared with the control group (28.94±0.69 vs 22.2±0.41, respectively) Diagram (1 C). Previous studies reported that weight does not, always, correspond to high squared; therefore, the tri-Ponderal index[4] was used together with the BMI. Like the BMI, PI also showed a significant (P <0.01) increase in the overweight group (17.41±0.46 vs 13.28±0.3) Diagram (1 D). The association between TyG-BMI and metabolic syndromes has been reported previously specially with insulin resistance (IR). Although TyG index was associated with IR[16,22]. Here, we measure both Triglyceride TyG-BMI and TyG index for both groups. The results showed that TyG-BMI and TyG index were significantly elevated in the overweight group (137.2±3.35 vs 100.5±2.34 and 4.74±0.047 vs 4.52±0.041, respectively) Diagram 1 (E and F).

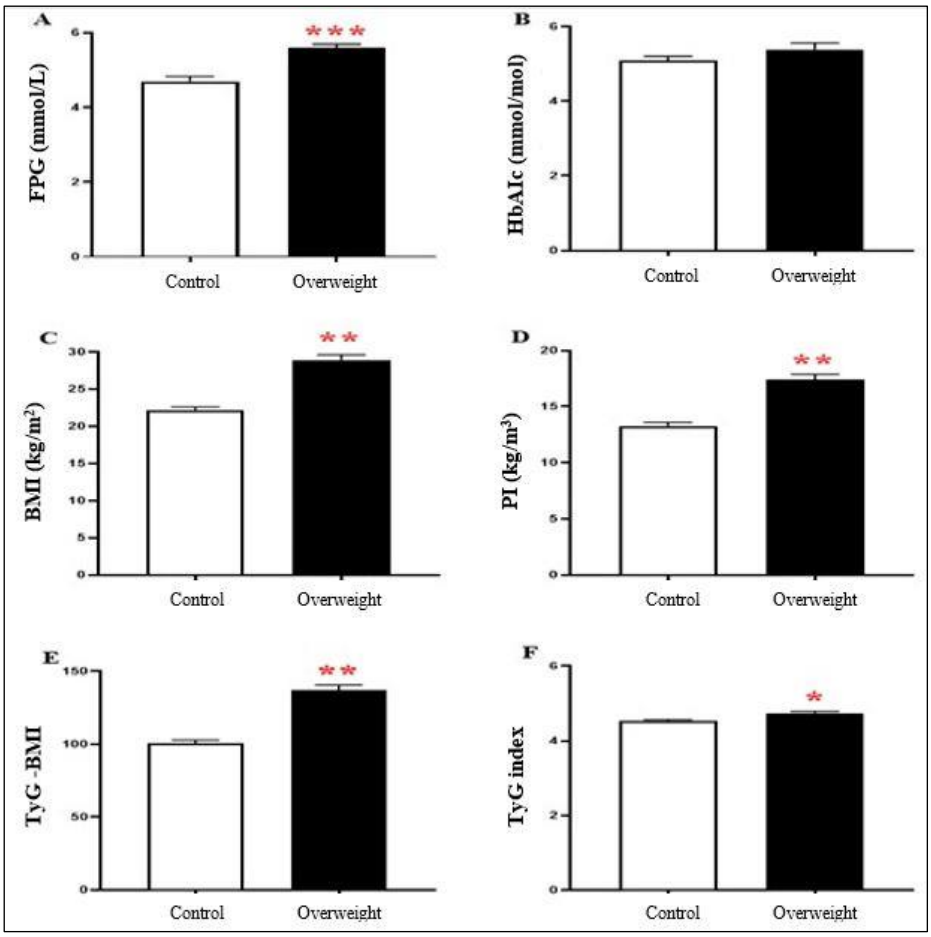


Diagram 1: Biochemical markers, (A) Fasting plasma glucose; (B) HbAc%; (C) BMI, Body mass index, (D) PI, Tri-ponderal index; (E) TyG-BMI, Triglycerides glucose-BMI; and (F) TyG index, Triglycerides glucose index. Results are expressed as Mean±SEM, *P<0.01, **P<0.001 and ***P<0.0001.

Brismar et al., 2023 reported that adiponectin is an independent predictor for pre-diabetes. Here, we test the level of High-Molecular Weight Adiponectin (HMW-Adipo.) in the serum of both groups. Our results revealed that the overweight participants had a significant reduced level of adiponectin compared with the control group (131.5±11.8 vs 239±12.17, respectively) Diagram (2).

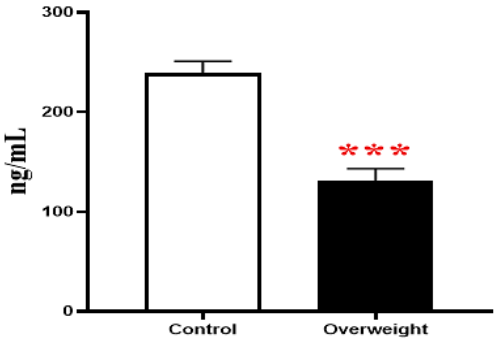


Diagram 2: High-Molecular Weight Adiponectin level. Results are expressed as Mean ± SEM, ***P<0.0001

Furthermore, we investigate the Pearson correlation (r) for FPG with Triglyceride-Glucose Body Mass Index (TyG-BMI), BMI, PI, TyG Index, and HMW-Adipo. Results showed that FPG had a positive correlation with all parameters except with HMW-Adipo. (r was 0.76, 0.73, 0.705, 0.56, and -0.5, respectively) Confidence Intervals (CI 0.58 to 0.87, 0.54 to 0.85, 0.49 to 0.83, 0.29 to 0.74, and -0.71 to -0.22, respectively) Diagram 3 (A-E).

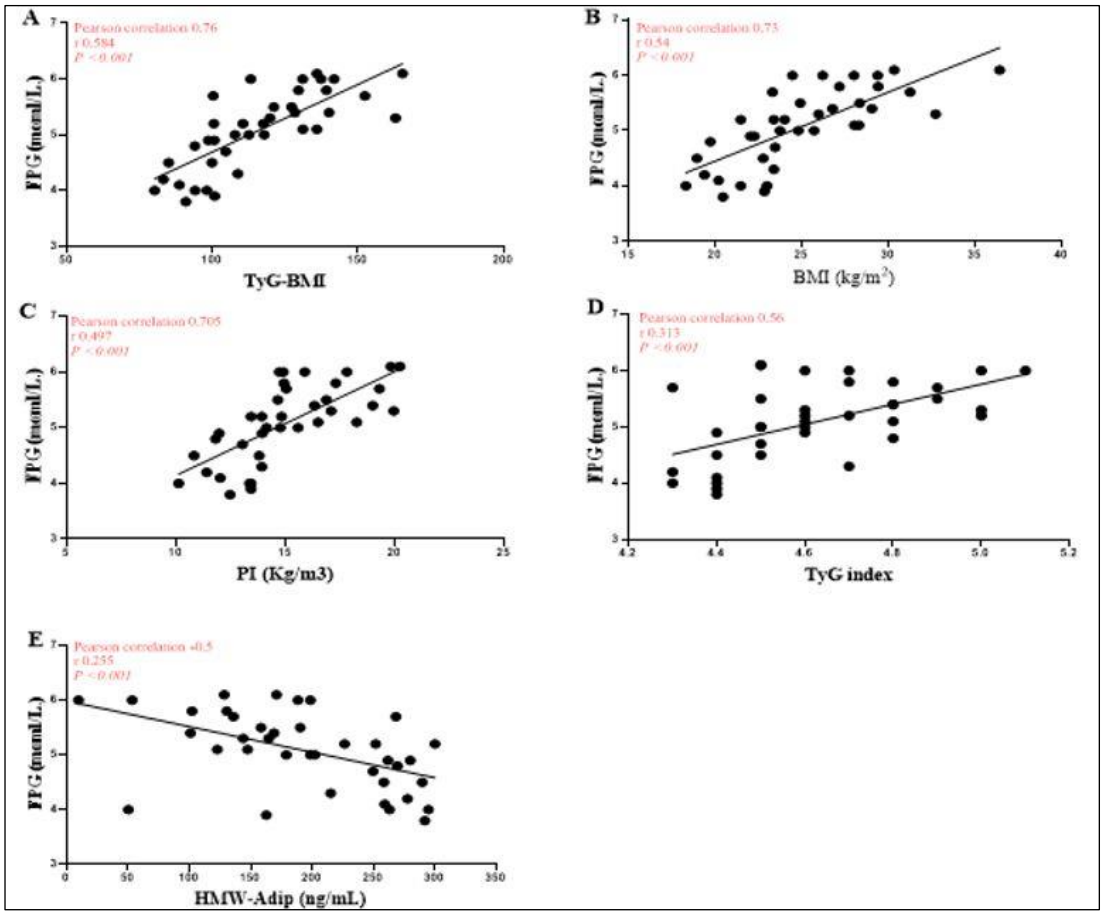
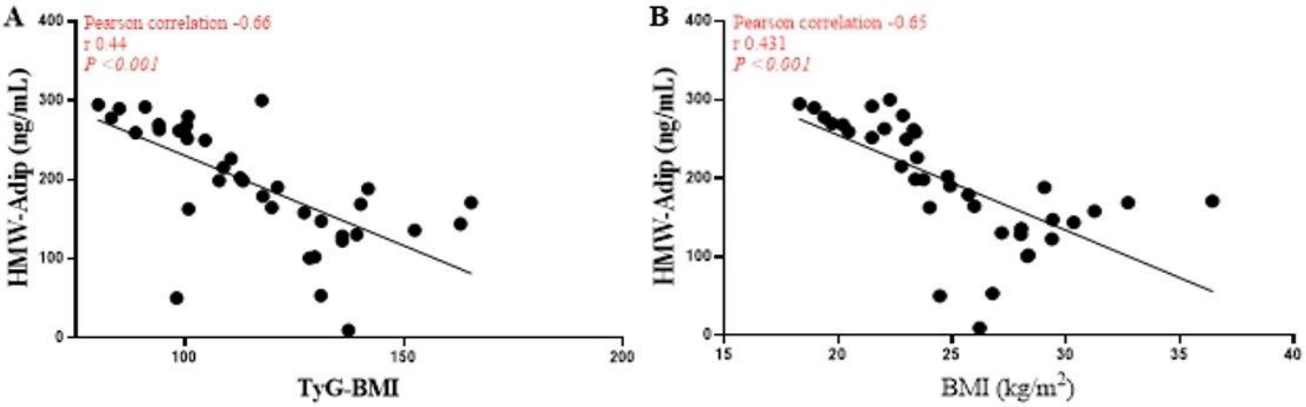


Diagram 3: Linear Correlation for FPG with (A) TyG-BMI; (B) BMI; (C) PI; (D) TyG index; and (E) HMW-Adipo.

A negative correlation was also seen for HMW-Adipo with TyG-BMI, BMI, PI, and TyG index (r were -0.66, -0.65, -0.62, and -0.34, and CI -0.81 to -0.43, -0.8 to 0.4, -0.78 to -0.38, and -0.59 to -0.02 respectively) Diagram 4 (A-D).



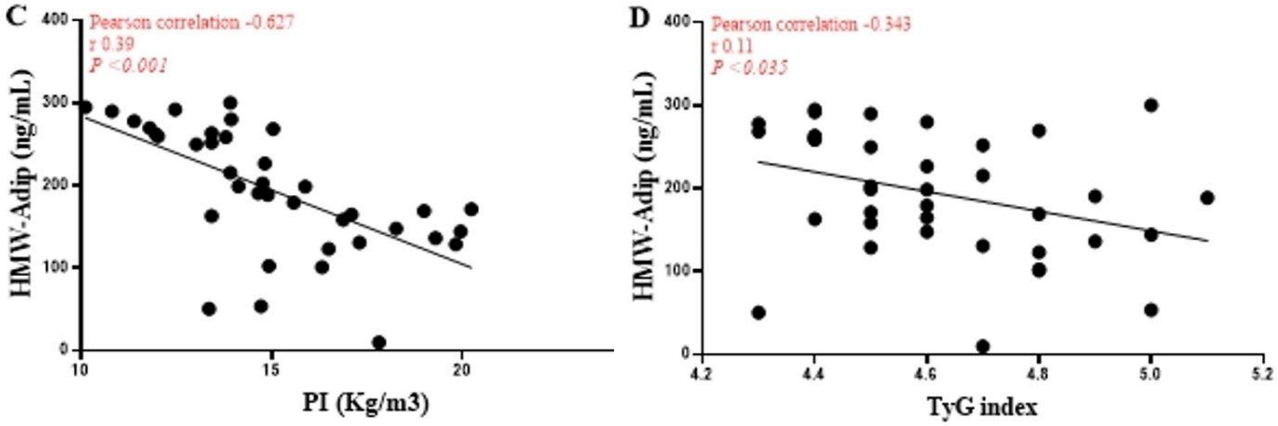


Diagram 4: Linear Correlation of HMW-Apio. with (A) TyG-BMI; (B) BMI; (C) PI and (D) TyG index.

Finally, we calculated the Area Under the Curve[13] for the TyG-BMI, PI, HMW-Adipo, FPG, TyG-index, and HbA1c. The results of the AUC showed that TyG-BMI, PI, and HMW-Adipo demonstrate excellent predictors for pre-diabetes in overweight adults (0.994, 0.947, and 0.94; CI 0.97 to 1.0, 0.93 to 1.0, and 0.85 to 1.0, respectively, *P-value* <0.0001). While, the AUC for FPG and TyG-index showed good predictors (0.89 and 0.8, CI 0.78 to 0.99 and 0.66 to 0.93, respectively, *P-value* 0.001) Diagram 5 (A-F).

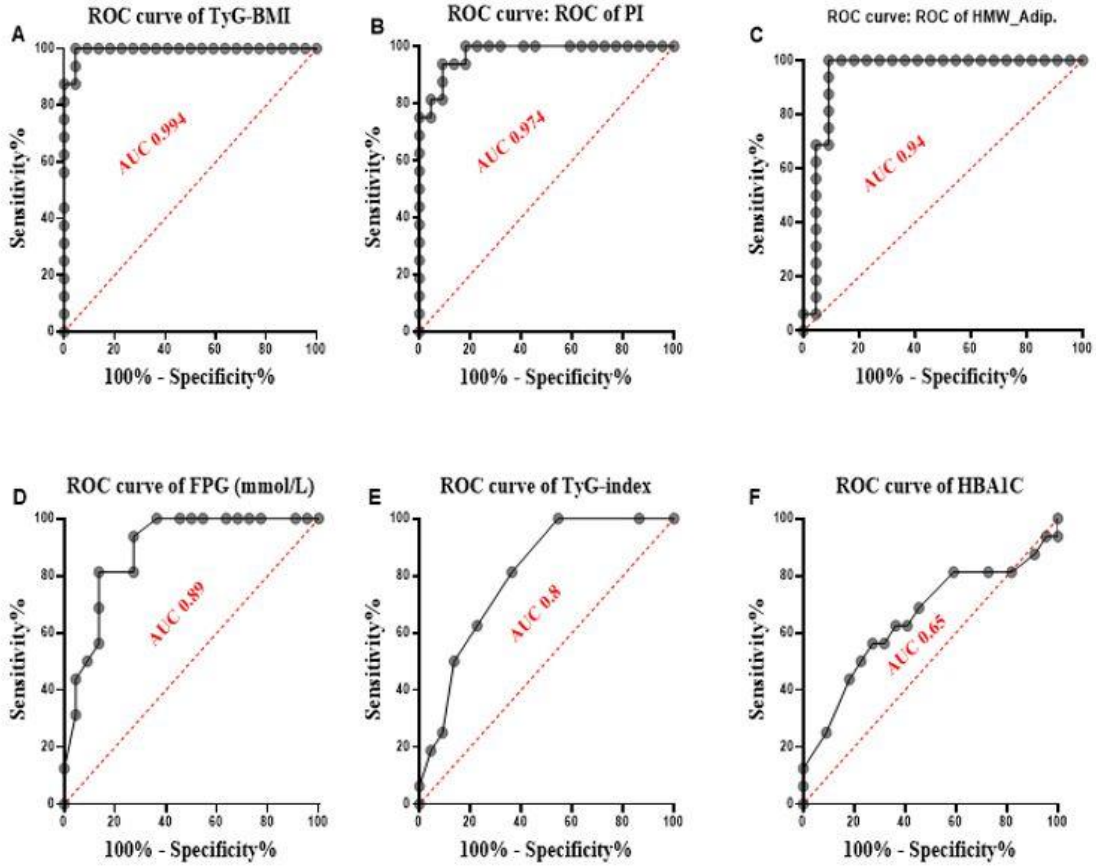


Diagram 5: The area under curve for (A) TyG-BMI; (B) PI; (C) HMW-Adipo; (D) FPG; (E) TyG index; and (F) HBA1c.

DISCUSSION:

Overweight and obesity are the major risk for developing diabetes. Although, other metabolic complications, such as cardiac complications, are mostly associated with the pre-diabetes [23-25]. Many studies have reported that pre-diabetes adults who are overweight or obese have been undiagnosed for many years[23]. Complications associated with diabetes are widely distrusted such as (CVDs, retinopathy). In the present study we aimed to demonstrate the useful parameters that could be used to predict pre-diabetes in overweight adults. Our main findings are that the overweight persons have slightly irregular glucose level and lipid metabolism without changing in HbA1c. Although the level of HMW-Adipo is decreased in the overweight persons. The criteria of diagnosis of pre-diabetes are depending on i) impair glucose tolerance (IGT) > 140mg/dl.; ii) impair of fasting glucose (IFG) >126 mg/dl ; and iii) high HbA1c level >6.5% according to the ADA and WHO[5-7]. The criteria of impair fasting glucose was reduced in 2003 to 100 mg/dl. (5.6mmol/L) by the ADA[3,8,26]. Although, the diagnosis of pre-diabetes is depending on several criteria such as obesity and/or overweight and insulin resistance. However, in this study the level of fasting glucose seems to be within normal range but those participants show a moderate elevation in the BMI. Increased BMI is associated with many metabolic syndromes. Our findings show that overweight participants had a significant increase in their BMI and this increase associated with increase in triglycerides, VLDL, LDL/HDL and TG/HDL ratios with a significant decrease in HDL-C and our results are in agreement with previous study by Bhatti et al[27]. These results indicated that increase BMI is associated with lipid profile dysfunction and similar to the previous studies which is indicated that reduction in BMI is useful to restore lipid profile[28]. Moreover, dyslipidaemia and obesity and/or overweight are one of the risk factors that are associated with metabolic syndromes such as insulin resistance, pre-diabetes, and T2D. Over-weight participants had irregular glucose and lipid metabolism Diagram (1) and Table (1).

It has been reported that TyG index and TG/HDL ratio are good parameters to predict insulin resistance[14,17,18]. Those parameters were slightly increased in the overweight group, while FPG, BMI, TyG-BMI and PI showed highly differences in the overweight group. Although FPG level was positively correlated with BMI, TyG-BMI and PI. The area under the curve also showed excellent prediction for pre-diabetes in overweight adults. This indicated that prediction of pre-diabetes in overweight people could be delivered from TyG-BMI and PI together with estimation of FPG. The pre-inflammatory hormone adiponectin that is secreted from adipose tissue reduce in many metabolic disorders in children and adults[29-32]. Adiponectin is expressed in three oligomeric complexes. One of these complexes is high molecular weight (HMW) adiponectin[32]. Moreover, Adiponectin hormone proposed to intermediate the metabolism of glucose and lipid and it releases from adipose tissue and many studies reported that patient with diabetes and pre-diabetes associated with low level of adiponectin hormone[13,33]. In this study we proposed that HMW-Adipo is decreased in overweight adults and this could be a critical parameter for prediction of pre-diabetes. Our results show that the level of HMW-Adipo was reduced in the overweight group and it has a negative correction with FPG, TyG-index, PI, and BMI. The AUC for HMW-Adipo was excellent which make it as one of the predictive parameters to predict pre-diabetes in overweight adults as shown in Diagram (5).

Conclusion:

In conclusion, we concluded that measuring the level of HMW-Adipo and TyG-BMI together with the FPG are better predictive markers for pre-diabetes prediction in overweight adults. The limitations of this study are that the number of participants is small, and with a limited population, there is only one governorate. Further study with a high number of participants from different governorates is highly recommended.

Competing interests:

The authors have no conflicts of interest regarding these investigations.

Funds

This project has self-funded.

Acknowledgments

We would like to thank Mr. Ali Abass Jassim and Mr. Gaeth Kamel Juaid for their help in samples collection.

REFERENCES:

1. **Endalifer, M.L. and G. Diress,** *Epidemiology, predisposing factors, biomarkers, and prevention mechanism of obesity: a systematic review.* Journal of obesity, 2020. 2020.
2. **Hoffman, D.J.,** *Obesity in developing countries: causes and implications.* Food Nutrition and Agriculture, 2001. 28: p. 35-44.
3. **Beulens, J., F. Rutters, L. Ryden, O. Schnell, L. Mellbin, H. Hart, and R. Vos,** *Risk and management of pre-diabetes.* European journal of preventive cardiology, 2019. 26(2_suppl): p. 47-54.
4. **Mayoral, L.P.-C., G.M. Andrade, E.P.-C. Mayoral, T.H. Huerta, S.P. Canseco, F.J.R. Canales, *et al.*,** *Obesity subtypes, related biomarkers & heterogeneity.* The Indian journal of medical research, 2020. 151(1): p. 11.
5. **Duan, D., A.P. Kengne, and J.B. Echouffo-Tcheugui**, *Screening for diabetes and prediabetes.* Endocrinology and Metabolism Clinics, 2021. 50(3): p. 369-385.
6. **Khan, R.M.M., Z.J.Y. Chua, J.C. Tan, Y. Yang, Z. Liao, and Y. Zhao,** *From pre-diabetes to diabetes: diagnosis, treatments and translational research.* Medicina, 2019. 55(9): p. 546.
7. **Saeedi, P., I. Petersohn, P. Salpea, B. Malanda, S. Karuranga, N. Unwin, *et al.*,** *Global and regional diabetes prevalence estimates for 2019 and projections for 2030 and 2045: Results from the International Diabetes Federation Diabetes Atlas.* Diabetes research and clinical practice, 2019. 157: p. 107843.
8. **Cheng, C., H. Kushner, and B.E. Falkner,** *The utility of fasting glucose for detection of prediabetes.* Metabolism, 2006. 55(4): p. 434-438.
9. **Genuth, S., K. Alberti, P. Bennett, J.** Buse, R. DeFronzo, R. Kahn, *et al.*, *Follow-up report on the diagnosis of diabetes mellitus.* Diabetes care, 2003. 26(11): p. 3160-3168.
10. **Tsankof, A. and K.** Tziomalos, *Adiponectin: A player in the pathogenesis of hormone-dependent cancers.* Frontiers in Endocrinology, 2022. 13: p. 1018515.
11. **Shklyaev, S.S., G.A. Melnichenko, N.N. Volevodz, N.A. Falaleeva, S.A. Ivanov, A.D. Kaprin, and N.G. Mokrysheva,** *Adiponectin: a pleiotropic hormone with multifaceted roles.* Проблемы эндокринологии, 2021. 67(6): p. 98-112.
12. **Wang, Z.V. and P.E. Scherer,** *Adiponectin, the past two decades.* Journal of molecular cell biology, 2016. 8(2): p. 93-100.
13. **Yamauchi, T., J. Kamon, H. Waki, Y. Terauchi, N. Kubota, K. Hara, *et al.*,** *The fat-derived hormone adiponectin reverses insulin resistance associated with both lipoatrophy and obesity.* Nature medicine, 2001. 7(8): p. 941-946.
14. **Fritz, J., W. Brozek, H. Concin, G. Nagel, J. Kerschbaum, K. Lhotta, *et al.*,** *The triglyceride-glucose index and obesity-related risk of end-stage kidney disease in Austrian adults.* JAMA network open, 2021. 4(3): p. e212612-e212612.
15. **VK, R.N., P. Satheesh, M.T. Shenoy, and S. Kalra,** *Triglyceride Glucose (TyG) Index: A surrogate biomarker of insulin resistance.* JPMA. The Journal of the Pakistan Medical Association, 2022. 72(5): p. 986-988.
16. **Raimi, T.H., B.F. Dele-Ojo, S.A. Dada, J.O. Fadare, D.D. Ajayi, E.A. Ajayi, and O.A. Ajayi**, *Triglyceride-glucose index and related parameters predicted metabolic syndrome in Nigerians.* Metabolic syndrome and related disorders, 2021. 19(2): p. 76-82.

17. **Li, X., M. Sun, Y. Yang, N. Yao, S. Yan, L. Wang, *et al.*,** *Predictive Effect of Triglyceride Glucose− Related Parameters, Obesity Indices, and Lipid Ratios for Diabetes in a Chinese Population: A Prospective Cohort Study.* Frontiers in Endocrinology, 2022. 13: p. 862919.
18. **Alshawi, A. and H.A. Alnaji,** *TG/HDL, Non-HDL, and TyG index as predictive parameters for CVDs in uncontrolled diabetic patients better than LDL-C and LDL/HDL ratio.* Research Journal of Pharmacy and Technology, 2022. 15(12): p. 5490-5494.
19. **Barry, E., S. Roberts, J. Oke, S. Vijayaraghavan, R. Normansell, and T. Greenhalgh,** *Efficacy and effectiveness of screen and treat policies in prevention of type 2 diabetes: systematic review and meta-analysis of screening tests and interventions.* bmj, 2017. 356.
20. **Shim, Y.S.,** *The relationship between tri-ponderal mass index and metabolic syndrome and its components in youth aged 10–20 years.* Scientific reports, 2019. 9(1): p. 14462.
21. **Abel, R.-C., V. Somers, J. Sierra-Johnson, R. Thomas, K. Bailey, M. Collazo-Clavell, and T. Allison,** *Accuracy of body mass index to diagnose obesity in the US adult population.* Int J Obes (Lond), 2008. 32(6): p. 959-966.
22. **Er, L.-K., S. Wu, H.-H. Chou, L.-A. Hsu, M.-S. Teng, Y.-C. Sun, and Y.-L. Ko,** *Triglyceride glucose-body mass index is a simple and clinically useful surrogate marker for insulin resistance in nondiabetic individuals.* Plos one, 2016. 11(3): p. e0149731.
23. **Zand, A., K. Ibrahim, and B. Patham,** *Prediabetes: why should we care?* Methodist DeBakey cardiovascular journal, 2018. 14(4): p. 289.
24. **Levitan, E.B., Y. Song, E.S. Ford, and S. Liu,** *Is nondiabetic hyperglycemia a risk factor for cardiovascular disease?: a meta-analysis of prospective studies.* Archives of internal medicine, 2004. 164(19): p. 2147-2155.
25. **Kurihara, O., M. Takano, M. Yamamoto, A. Shirakabe, N. Kimata, T. Inami, *et al.*,** *Impact of prediabetic status on coronary atherosclerosis: a multivessel angioscopic study.* Diabetes care, 2013. 36(3): p. 729-733.
26. **Echouffo-Tcheugui, J.B. and E. Selvin,** *Prediabetes and what it means: the epidemiological evidence.* Annual review of public health, 2021. 42: p. 59-77.
27. **Bhatti, M.S., M.Z.A. Akbri, and M. Shakoor,** *Lipid profile in obesity.* Journal of Ayub Medical College Abbottabad, 2001. 13(1): p. 31-33.
28. **Kiriyama, H., H. Kaneko, H. Itoh, T. Kamon, Y. Mizuno, K. Fujiu, *et al.*,** *Association between changes in body weight and lipid profile in the general population: a community-based cohort study.* European Heart Journal-Quality of Care and Clinical Outcomes, 2021. 7(1): p. 109-110.
29. **Magkos, F. and L.S.** Sidossis, *Recent advances in the measurement of adiponectin isoform distribution.* Current Opinion in Clinical Nutrition & Metabolic Care, 2007. 10(5): p. 571-575.
30. **Horakova, D., L. Stepanek, R. Nagelova, D. Pastucha, K. Azeem, and H. Kollarova,** *Total and high-molecular-weight adiponectin levels and prediction of insulin resistance.* Endokrynologia Polska, 2018. 69(4): p. 375-380.
31. **Gomez, J.A.M., D. Moreno-Mascareño, C.E.A. Rojo, and G.D. de la Peña,** *Association of total and high molecular weight adiponectin with components of metabolic syndrome in Mexican children.* Journal of Clinical Research in Pediatric Endocrinology, 2020. 12(2): p. 180.
32. **Shirazi, F.K.H., Z. Khodamoradi, and M. Jeddi,** *Insulin resistance and high molecular weight adiponectin in obese and non-obese patients with Polycystic Ovarian Syndrome (PCOS).* BMC Endocrine Disorders, 2021. 21(1): p. 1-7.
33. **Achari, A.E. and S.K. Jain,** *Adiponectin, a therapeutic target for obesity, diabetes, and endothelial dysfunction.* International journal of molecular sciences, 2017. 18(6): p. 1321.

يعد الأديبونيكتين عالي الوزن الجزيئي، و مؤشر كتلة الجسم الدهون الثلاثية الكلوكوز علامات تنبؤية أفضل من مؤشر الدهون الثلاثية الجلوكوز والسكر التراكمي لمرحلة ما قبل السكري لدى البالغين الذين يعانون من زيادة الوزن

مسار حسين علي[2,1] وأحمد فاضل الشاوي[3]

قسم المختبرات الطبية- كلية التقنيات الصحية والطبية جامعة الفرات الاوسط التقنية – الكوفة - العراق [1]
مستشفى مرجان التعليمي - وزارة الصحة دائرة صحة بابل - بابل العراق [2]
قسم المختبرات الطبية - المعهد التقني/كوفة جامعة الفرات الاوسط التقنية – كوفة - العراق [3]

لقد تزايدت معدلات الإصابة بمرحلة ما قبل السكري بسرعة ليس في البلدان النامية فقط. ترتبط مرحلة ما قبل السكري بزيادة الوزن. معايير تشخيص ما قبل السكري هي قضية مثيرة للجدل.الهدف من هذه الدراسة هو تحديد معايير مفيدة للتنبؤ بمرحلة ما قبل السكري لدى البالغين الذين يعانون من زيادة الوزن.

شملت الدراسة ثمانية وثلاثين مشاركًا بالغًا وتم تقسيمهم إلى مجموعتين، 22 من المتطوعين الأصحاء و16 مشاركًا يعانون من زيادة الوزن. تم إجراء الفحوصات البيوكيميائية (مستوى الكلوكوز، تحليل الدهون الكامل)، وهرمون الأديبونيكتين ذو الوزن الجزيئي العالي لكلا المجموعتين.

أظهرت النتائج أن مستوى هرمون الأديبونيكتين ذو الوزن الجزيئي العالي انخفض بشكل ملحوظ في المجموعة ذات الوزن الزائد المرتبط بزيادة نسبة الكلوكوز في بلازما الصيام، والدهون الثلاثية، وانخفاض البروتين الدهني عالي الكثافة في المجموعة ذات الوزن الزائد.

كانت علاقة بيرسون لـ مؤشر كتلة الجسم الدهون الثلاثية الكلوكوز, مؤشر كتلة الجسم مرتبطة بشكل إيجابي مع نسبة الكلوكوز في حالة الصيام ؛ بينما كان مستوى هرمون الأديبونيكتين ذو الوزن الجزيئي العالي مرتبطًا سلبًا بنسبة الكلوكوز في حالة الصيام. كما ظهرت المنطقة الواقعة تحت منحنى مستوى هرمون الأديبونيكتين ذو الوزن الجزيئي العالي , مؤشر كتلة الجسم الدهون الثلاثية الجلوكوز تنبؤًا ممتازًا لمرحلة ما قبل الإصابة بالسكري لدى البالغين الذين يعانون من زيادة الوزن.

الاستنتاج: يعتبر هرمون الأديبونيكتين ذو الوزن الجزيئي العالي و/أو مؤشر كتلة الجسم الدهون الثلاثية الكلوكوز من العلامات التنبؤية الأفضل للبالغين في مرحلة ما قبل الإصابة بالسكري بدلاً من مؤشر الدهون الثلاثية الكلوكوز وفشل الكلوكوز الصائم وحده.