Mini Review
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Insulin as a predictor of diabetes type 2: a new medical hypothesis

Abstract

Since the discovery of diabetes, it is about insulin production, or function. In this study, we may introduce a controversial concept. Insulin as a predictor of diabetes, in other words, insulin can cause diabetes type 2. We think that this could serve as a new medical hypothesis. To examine this hypothesis, we analyzed dataset posted in Kaggle from India. The dataset included 763 female patients of whom 497 had no diabetes, and 266 with type 2 diabetes. We used routine statistical analysis and neural network analysis. The results showed that insulin level increases as the diabetes is progressed, and its relative contribution to diabetes was estimated as 28.4%. Taken together, insulin measurement is recommended to be considered in the management of diabetes.

Keywords: diabetes type 2, insulin, dataset, Kaggle, prediction

Volume 11 Issue 1 - 2021

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Received: December 01, 2020 | **Published:** January 05, 2021

Introduction

According toAmerican Diabetes Association (2020),[1] it is possible to classify diabetes into the following general categories:

1. Type 1 diabetes (due to the death of autoimmune cells normally leading to absolute shortage of insulin)
2. Diabetes type 2 (due to a gradual loss of sufficient secretion of b-cell insulin, sometimes on the basis of insulin resistance).
3. Diabetes mellitus gestational (diabetes diagnosed in the second or third trimester, of pregnancy that prior to conception was not explicitly overt diabetes).
4. Different forms of diabetes, e.g., monogenic diabetes syndrome, attributable to other causes (such as young people's neonatal diabetes and maturity-onset diabetes), diseases of exocrine pancreas (such as cystic fibrosis and pancreatitis) and substance- or drug-related disorders.

Diabetes type 2 is considered one of the most prevalent chronic and non-infectious diseases that ranks third behind cardiovascular diseases and cancer. There are complications that pose risks to human health and are associated with an economic burden at the level of individuals and societies.[2–5] I assumed that diabetic awareness has a philosophical issue that affects its treatment.Type 2 diabetes is defined "a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both.[6]

Insulin has been the basic treatment for type 1 diabetes for over 100 years. Insulin mitigates are at risk of developing diabetic ketoacidosis, a life-threatening acute complication of diabetes, by suppressing ketogenesis.[7] Several studies have revealed that the use of intensive insulin therapy to avoid or postpone the development of chronic microvascular and macrovascular complications. The results of this relatively short-term glucose regulation tend to confer lasting metabolic benefits for at least 30years.[8]

It is thought that the majority of patients with type 2 diabetes are likely to need insulin treatment because of accumulating defects in the islet b-cell.[9] Over previous decades, researchers and scientists were able to produce long -acting insulin so that it can last for 24 hours.[10–12]

Study objectives: The main objective of the present study was to introduce and test our new medical hypothesis:" insulin predicts the occurrence of diabetes significantly at $\alpha<0.05$".

Methodology

How the study was conducted

The present study was conducted by analyzing dataset as described below. We selected a dataset posted at Kaggle. The dataset was about diabetes from India. It consists of 763 female participants, of whom 497 had no diabetes, and 266 with type 2 diabetes. The data was analyzed using traditional statistical analysis to describe data, including frequencies and percentages for categorical variables, independent T test to examine the differences between the means and their standard deviations. The significance was considered at $\alpha<0.05$. We also used neural network analytics to determine the relative contribution of insulin as a predictor of diabetes.

The dataset focused on several risk factors among which is the insulin.Neural network analysis implies determining predictions of risk factors, independent variables, or covariates on the outcome, the disease. This process involved three layers, input layer (covariates), hidden layers, and output layer (dependent variable). This process differs from traditional statistics in giving predictions that can make impacts on the dependent variables. We integrated in this study traditional statistics and neural network analytics to indicate the importance of insulin as an independent predictor of diabetes.

Results

Basic characteristics of study participants

As shown in (Table 1& Figure 1), study sample included 763 participants, 65.14% of them were non-diabetics, and 43.86% were diabetics, significant differences were found ($p<0.05$). Participants were categorized into three categories according to glucose concentration: normal participants with glucose level mean 90.56±16.46mg/dl, pre-diabetic participants with glucose level mean 116.47±5.47mg/dl, and diabetic participants with glucose level mean 153.3±20.63. Significant difference in the mean levels of glucose were found in study groups ($p<0.05$).

Table 1 Basic characteristics of study participants

Variable	Description
Study sample (N, %):	
- Non-diabetic	497 (65.14%)
- diabetic	266 (43.86%)
Glucose level (M±SD): mg/dl	
- Normal participants	90.65±16.46
- Pre-diabetics	116.47±5.47
- Diabetics	153.3±20.63
Insulin level (M±SD): pmol/L	
- Normal participants	45.28±57.57
- Pre-diabetics	65.69±89.63
- Diabetics	122.04±152.32

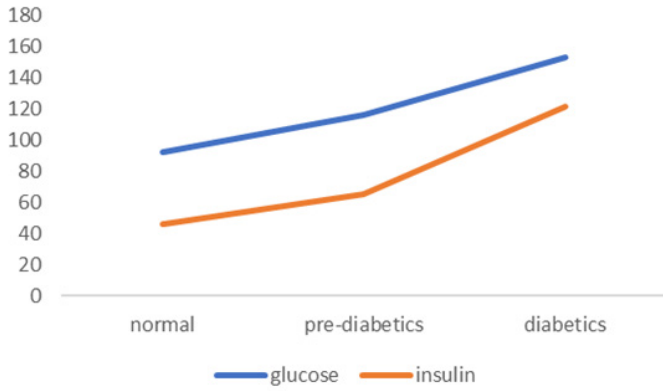

Figure 1 Levels of glucose and insulin in study groups.

The level of insulin was 45.28±57.57pmol/L in normal participants, and then it was significantly increased in pre-diabetic group to the level of 65.69±89.63 pmol/L ($p<0.05$). The level mean of insulin was further significantly increased to the level of 122.04±152.32 pmol/L ($p<0.05$).

Relative contribution of glucose and insulin as predictors of diabetes

As shown in (Table 2 & Figure 2), the results of neural network analytics showed that the relative importance of independent variables were 28.4% for insulin, and 100% for glucose.

Table 2 Independent variable importance

	Importance	Normalized importance
Insulin	0.221	28.40%
Glucose	0.779	100.00%

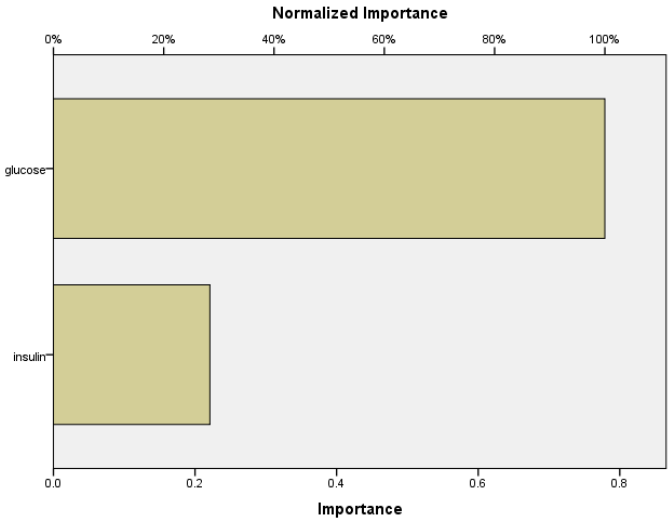

Figure 2 Representation of relative contribution of glucose and insulin as predictors of diabetes type 2.

Discussion

The main objectives of this article were to examine our proposed hypothesis that insulin is a predictor of diabetes and its relative contribution to diabetes. The results showed that the mean of insulin level significantly increased from normal participants to prediabetics and diabetics. The first part of the objectives was satisfied and in agreement with our previous study.[6]To determine the relative contribution of insulin to diabetes as a predictor, neural network analytics showed that insulin participation to diabetes was about 28%. The efforts of scientists and researchers about diabetes type 2 have revealed that long -acting insulin can be used for 24 hours flat[9–12] importance of the present study is that insulin has been measured for all participants. The results showed that insulin level was increased as the patients close to diabetes type 2.

The importance of our results comes from the main point that diabetes by definition rotates round the axis of diabetes, and measured by glucose. In clinical practice, insulin is not routinely measured. This has made a gap in our knowledge of diabetes. Increased insulin levels may participate in diabetic complications, but further studies are required.[13–16]

Conclusion

The results of the present study showed that insulin is a predictor of diabetes type 2, and its relative contribution to diabetes type 2 was about 28%.

Recommendations: The present study recommends that insulin measurement to be requested as a part of diabetes therapeutic and measurement strategies.

Citation: Alkhatib AJ, Sindiani AM, Alshdaifat EH, et al. Insulin as a predictor of diabetes type 2: a new medical hypothesis. *Adv Obes Weight Manag Control.* 2021;11(1):1–3. DOI: 10.15406/aowmc.2021.11.00328

Acknowledgments

None.

Conflicts of interest

Author declares that there is no conflict of interest.

Funding

None.

References

1. American Diabetes Association. Classification and diagnosis of diabetes: Standards of Medical Care in Diabetes. *Diabetes Care.* 2020;43(Suppl 1):S14–S31.
2. Yang W, Lu J, Weng J, et al. Prevalence of diabetes among men and women in China. *The New England Journal of Medicine.* 2010;362(25): 2425–2426.
3. Xia Z, Wang Z, Cai Q, et al. Prevalence and risk factors of type 2 diabetes in the adults in Haikou city, Hainan island, China. *Iranian Journal of Public Health.* 2013;42(3):222–230.
4. Liu L, Lou Q, Guo XL, et al. Management status and its predictive factors in patients with type 2 diabetes in China: a nationwide multicenter study. *Diabetes/Metabolism Research and Reviews.* 2015;31(8):811–816.
5. Fan Zheng, Suixin Liu, Yuan Liu, et al. Effects of an Outpatient Diabetes Self-Management Education on Patients with Type 2 Diabetes in China: A Randomized ControlledTrial. *Journal of Diabetes Research.* 2019.
6. Ahed J Alkhatib. New Insights of Diabetes: is it Rational to Initiate Insulin Treatment for Diabetes Type 2 Patients. *J Diabetes and Islet Biology.* 2019;2(1).
7. Yu Kuei Lin, Simon J Fisher, Rodica Pop-Busu. Hypoglycemia unawareness and autonomic dysfunction in diabetes: Lessons learned and roles of diabetes technologies. *J Diabetes Investig*. 2020;11(6): 1388–1402.
8. Nathan DM, Genuth S, Lachin J, et al. The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *N Engl J Med.* 1993;329:977–986.
9. UK Prospective. Diabetes Study Group. U.K. prospective diabetes study 16. Overview of 6 years' therapy of type II diabetes: a progressive disease. *Diabetes.* 1995;44:1249–1258.
10. Heise T, Nosek L, Bottcher SG, et al. Ultralong-acting insulin degludec has a flat and stable glucoselowering effect in type 2 diabetes. *Diabetes Obes Metab.* 2012;14:944–950.
11. Home P, Riddle M, Cefalu WT, et al. Insulin therapy in people with type 2 diabetes: opportunities and challenges? *Diabetes Care*. 2014;37:1499–508.
12. Bergenstal RM, Bailey TS, Rodbard D, et al. Comparison of insulin glargine 300 units/mL and 100 units/mL in adults with type 1 diabetes: continuous glucose monitoring profiles and variability using morning or evening injections. *Diabetes Care.* 2017;40:554–560.
13. Chih-Yuan Wang, David L Neil, Philip Home. 2020 vision – An overview of prospects for diabetes management and prevention in the next decade. *Diabetes research and clinical practice.* 2018;143:101–112.
14. Pima Indians Diabetes Database.
15. Nathan DM. The diabetes control and complications trial/ epidemiology of diabetes interventions and complications study at 30 years: overview. *Diabetes Care.* 2014;37: 9–16.
16. Nathan DM, Cleary PA, Backlund JY, et al. Intensive diabetes treatment and cardiovascular disease in patients with type 1 diabetes. *N Engl JM.* 2005;353(25):2643–2653.