Volume 2 • Issue 1 • 2020

Research Article

Archives of Nutrition and Public Health

Using GH-Method: Math-Physics Medicine to Predict Fasting Plasma Glucose

Gerald C. Hsu*

EclaireMD Foundation, USA

***Corresponding Author:** Gerald C. Hsu, EclaireMD Foundation, USA.

Received: April 02, 2020; **Published:** April 14, 2020

Introduction

The author spent 8.5 years and 23,000 hours to research his diabetes conditions. He developed his GH-Method: math-physical medicine (MPM) by applying mathematics, physics, engineering modeling, and computer science (big data analytics and AI) to derive the mathematical metabolism model and three prediction tools for weight, FPG, and PPG with >30 input elements. By using MPM, he developed a fasting plasma glucose (FPG) prediction model to improve his type 2 diabetes.

Method

The author examined the correlation coefficients between FPG versus postprandial plasma glucose (PPG), carbs and sugar intake, and exercise amount but found all were very low. Finally, after struggling for nine months, due to his "out-of-box thinking" personality, he accidentally discovered that Weight is the major influential factor of FPG formation.

He applied energy theory of physics, engineering modeling, and statistical tools, such as time-series, spatial analysis, frequency domain, to construct this FPG prediction model.

Results

Based on ~31,000 data of 1,825 days, (1/1/2014 - 12/32/2018), he found 83% correlation between FPG and Weight. In the time series diagram, the FPG curve followed the Weight curve like its "twin". In spatial analysis diagram of BMI vs. FPG (without time factor), there is a "quasi-linear" equation existing between two coordinates of weight and FPG: from point A (165, 98) to point B (185, 148). The stochastic (random) distribution of data has two clear "concentration bands" stretched from lower left corner toward upper right corner. The +/- 10% band covers 65% of total data and the +/- 20% band covers 94% of total data. Only the remaining 6% of total data are influenced by other five secondary factors, see Figure 1.

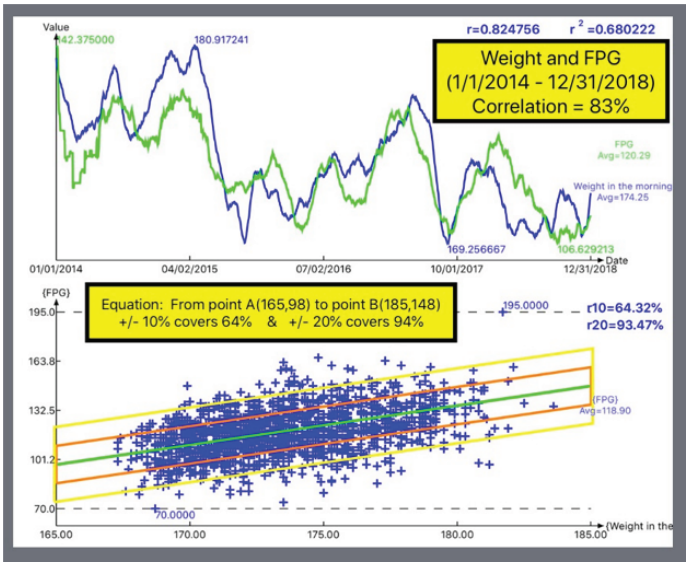

Figure 1: *Weight and FPG.*

After capturing basic characteristics, he then developed a practical tool to predict each day's FPG value based on weight. The final prediction accuracy is 99.99% with 99.6% correlation between predicted and actual FPG values, see Figure 2.

Citation: Gerald C. Hsu. (2020). Using GH-Method: Math-Physics Medicine to Predict Fasting Plasma Glucose. *Archives of Nutrition and Public Health* 2(1).

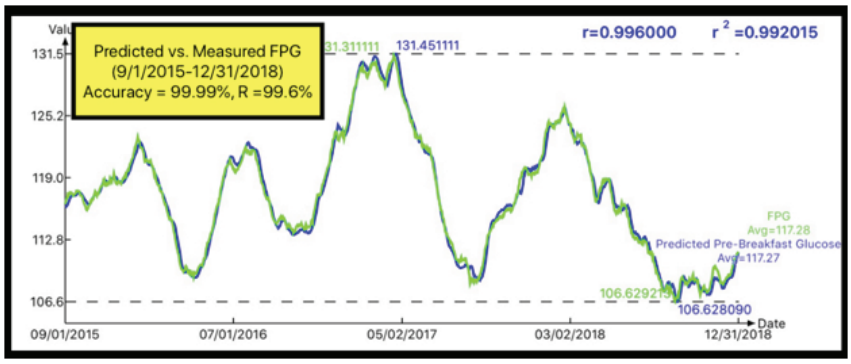

Figure 2: *Predicted FPG vs. Measured FPG.*

Conclusion

Based on his research, the author developed two glucose prediction tools. He was able to reduce his FPG from 142 mg/dL in 2014 to 107 mg/dL in 2018 (with 12 lbs. weight reduction), daily glucose from 279 mg/dL in 2010 to 117 mg/dL in 2018, and A1C from 10% in 2010 to 6.6% in 2018.

References

1. Hsu, Gerald C. (2018). Using Math-Physical Medicine to Control T2D via Metabolism Monitoring and Glucose Predictions. Journal of Endocrinology and Diabetes, 1(1): 1-6.
2. Hsu, Gerald C. (2018). Using Signal Processing Techniques to Predict PPG for T2D. International Journal of Diabetes & Metabolic Disorders, 3(2): 1-3.
3. Hsu, Gerald C. (2018). Using Math-Physical Medicine and Artificial Intelligence Technology to Manage Lifestyle and Control Metabolic Conditions of T2D. International Journal of Diabetes & Its Complications, 2(3): 1-7.
4. Hsu, Gerald C. (2018). Using Math-Physical Medicine to Study the Risk Probability of having a Heart Attack or Stroke Based on Three Approaches, Medical Conditions, Lifestyle Management Details, and Metabolic Index. EC Cardiology, 5(12): 1-9.