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RESEARCH ARTICLE

Using GH-Method: Math-Physical Medicine to Predict Postprandial Plasma Glucose

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Introduction

Gerald spent 8.5 years and 23,000 hours to research his diabetes conditions. By using the GH-Method: math-physical medicine approach, he developed a postprandial plasma glucose (PPG) prediction model to evaluate and improve his type 2 diabetes conditions [1,2].

Method

Gerald has examined correlations between PPG and three known major factors, carbs/sugar intake, post-meal exercise, ambient temperature (weather) and other secondary factors, including stress/tension, measurement time delay, traveling, illness, sleep disturbance, etc. A total of 19 influential factors were identified and analyzed with over 1 million data collected.

Gerald have applied optical physics at the front-end and wave theory at the back-end to develop an AI-based PPG prediction model and tool to assist him in controlling his PPG [3,4].

Results

For 1,309 days (from 6/1/2015 to 12/31/2018), he had 3,927 meals and collected ~80,000 PPG-related data. The conclusions were:

1. Average PPG: 119 mg/dL (**Figure 1**);
2. +48% correlation between PPG and carbs and sugar intake (15.0 gram and 38% contribution rate);
3. -66% correlation between PPG and post-meal walking (4,300 steps and 41% contribution rate) (**Figure 2**);
4. Ambient temperature (weather) contributes ~10% of PPF formation;
5. Collectively, the remaining 16 secondary influential factors account for ~10% of PPG formation.

Those PPG values were analyzed using a cloud-stored food database containing ~8 million data. He collected and re-processed 6 million data from the Department of Agriculture, US government (USDA), 1.6 million data of 500 franchised restaurants, and his own collected 4,354 meal phots with ~0.5 million data.

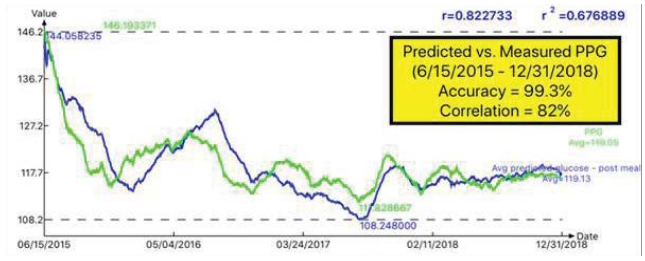

Figure 1: Predicted vs. Measured Postprandial Plasma Glucose (PPG) (6/1/2015-12/31/2018).

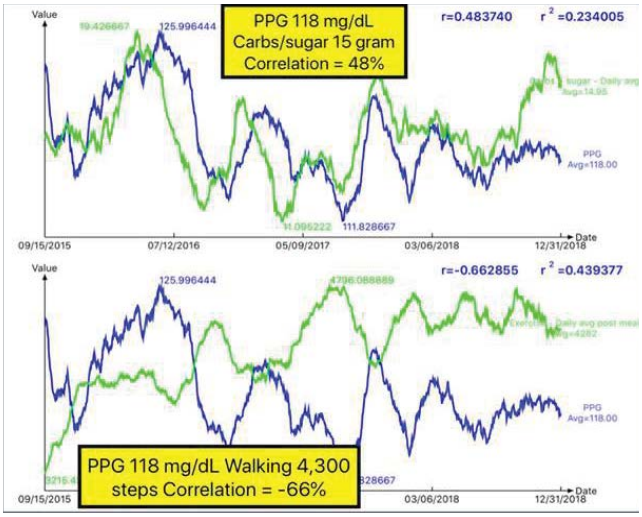

Figure 2: Relationship between Postprandial Plasma Glucose (PPG), carbs/sugar, and exercise.

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Conclusion

The predicted PPG (119.13 mg/dL) vs. measured PPG (119.05 mg/dL) has a 99.3% linear accuracy and 82% correlation coefficient. Based on his developed two glucose prediction tools, Gerald was able to reduce his PPG from 380 mg/dL to 116 mg/dL, daily glucose from 279 mg/dL to 116 mg/dL, and A1C from 10% to 6.5%.

References

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