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Using GH-Method: Math-Physical Medicine to Conduct Segmentation Analysis to Investigate the Impact of Weight on Fasting Plasma Glucose (No: 66)

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Introduction

The dataset is provided by the author, who uses his own type 2 diabetes (T2D) metabolic conditions control, as a case study via the "math-physical medicine" approach of a non-traditional methodology in medical research.

Math-physical medicine starts with the observation of the human body's physical phenomena (not biological or chemical characteristics), collecting elements of the disease related data (preferring big data), utilizing applicable engineering modeling techniques, developing appropriate mathematical equations (not just statistical analysis), and finally predicting the direction of the development and control mechanism of the disease.

This paper is based on a big data collected from a period of 1,418 days (from 6/1/2015 to 4/19/2019) with 2,836 data of weight and FPG. This dataset is provided by a long-term type-2 diabetes patient under a lifestyle management program.

Method

Initially, the author conducted a time series analysis between weight and FPG, which he found a high correlation (R = 65%) existing between these two curves. Then, he used a trial-and-error method to find two suitable dividing lines of weight at 170 lbs. (BMI 25) and FPG at 107 mg/dL (under pre-diabetes). Using these two dividing lines, he further separate the entire dataset into two categories:

Low Category: Weight: 160-170 lbs. and FPG 50-107 mg/dL

High Category: Weight 170-190 lbs. and FPG 107-200 mg/dL

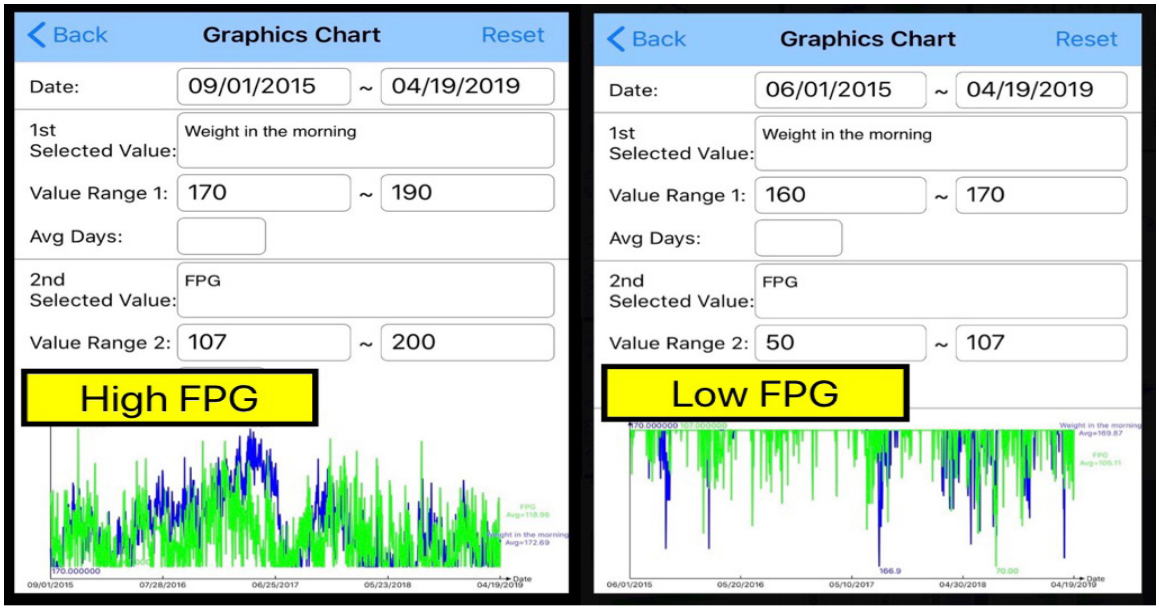

Figure1. *Dividing Line and Data Range of High and Low Comparison between FPG (107 mg/dL) and Weight (170 lbs.)*

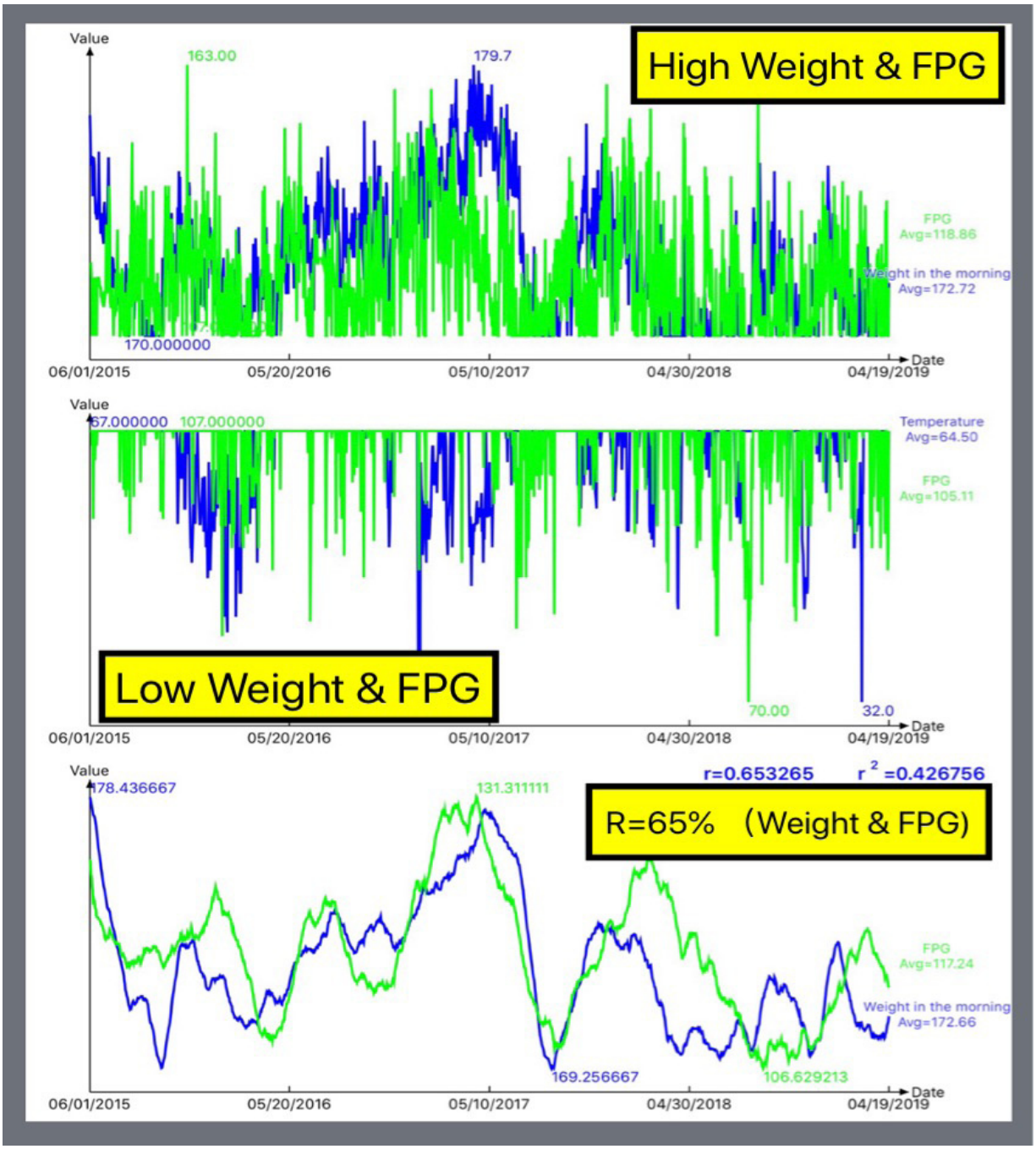

Figure2. *High and Low FPG vs. Weight*

Results

By visual observation of these two graphs, it is obvious that weight vs. FPG are correlated with each other in both high category and low category. This was also comparable with the author's discoveries in his earlier publications. This particular T2D patient needs to keep his weight under 170 lbs. (BMI 25), so that his FPG will be kept below 107 mg/dL. This can be a very simple and useful guideline for other T2D patients.

Conclusion

By using the GH-Method: math-physical medicine, the author investigated the impact of FPG by segmented weight analysis. He has also developed a simple and useful guideline for other T2D patients' FPG control.

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