Comparison of two clinic cases of using big data analytics and spatial analysis to investigate the relationships among weight, glucose, blood pressure (GH-Method: Math-Physical Medicine)

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The author uses math-physical medicine approach to investigate three pairs of relationship between weight vs blood pressure (BP), weight vs glucose (daily averaged glucose, including both FPG and PPG) glucose and BP. There are two clinic cases to be presented here. Case A uses lifestyle management to control his metabolic disorders while Case B uses both medications and partial lifestyle management to control the same three chronic diseases. Both cases selected the same time periods for results comparison: 1,770 days (1/1/2014 - 11/6/2018) with big data of 17,700 metabolic syndrome (weight, BP, glucose) each. This paper utilized two statistical tools, i.e. time-series (x or y vs time, like EKG charts) and spatial analysis (in a two-dimensional x and y space, without "time" factor). In time-series graphs, if the correlation coefficient (R) is greater than 50%, then these two sets of data (or curves) are highly correlated to each other (i.e. strong). If R is smaller than 30%, then considered as weak-correlated. Since R can only be calculated for two sets of data (or curves), therefore, this paper investigated 3 separate sets of pair inter-relationships among these three metabolic elements. In spatial analysis, if the "data cloud" is concentrated within a long and narrow band and skewed with an angle (i.e. slope is obvious and greater than zero), then these two sets of data are highly correlated. On the other hand, if the angle of the plotted point cloud is either flat or vertical, then there is a very weak correlation between them.

Speaker Biography

Gerald C Hsu received an honorable PhD in mathematics and majored in engineering at MIT. He attended different universities over 17 years and studied seven academic disciplines. He has spent 20,000 hours in T2D research. First, he studied six metabolic diseases and food nutrition during 2010-2013, then conducted research during 2014-2018. His approach is "math-physics and quantitative medicine" based on mathematics, physics, engineering modeling, signal processing, computer science, big data analytics, statistics, machine learning, and AI. His main focus is on preventive medicine using prediction tools. He believes that the better the prediction, the more control you have.

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