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2nd International Conference on

DIABETES, ENDOCRINOLOGY, NUTRITION AND NURSING MANAGEMENT

June 24-25, 2019 | Philadelphia, USA

DIABETES CONGRESS 2019



KEYNOTE FORUM
DAY 1

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Gerald C Hsu, J Diabetol 2019, Volume 3

Gerald C Hsu

EclaireMD Foundation, USA

BIOGRAPHY

Gerald C Hsu has completed his PhD in Mathematics and has been majored in Engineering at MIT. He has 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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GH-METHOD: METHODOLOGY OF MATH-PHYSICAL MEDICINE USING DIABETES RESEARCH AS AN EXAMPLE

Introduction: This paper describes the math-physical medicine approach (MPM) of medical research utilizing mathematics, physics, engineering models and computer science, instead of the current biochemical medicine approach (BCM) that mainly utilizes biology and chemistry.

Methodology of MPM: Initially, the author spent four years of self-studying six chronic diseases and food nutrition to gain in-depth medical domain knowledge. During 2014, he defined metabolism as a nonlinear, dynamic and organic mathematical system having 10 categories with ~500 elements. Then he applied topology concept with partial differential equation and nonlinear algebra to construct a metabolism equation. Further he defined and calculated two variables, metabolism index and general health status unit. During the past 8.5 years, he has collected and processed 1.5 million data. Since 2015, he developed prediction models, i.e. equations, for both postprandial plasma glucose (PPG) and fasting plasma glucose (FPG). He identified 19 influential factors for PPG and five factors for FPG. Each factor has a different contribution margin to the glucose formation. He developed PPG model using optical physics and signal processing. Furthermore, by using both wave and energy theories, he extended his research into the risk probability of heart attack or stroke. In this risk assessment, he applied structural mechanics concepts, including elasticity, dynamic plastic and fracture mechanics to simulate artery rupture and applied fluid dynamics concepts to simulate artery blockage. He further decomposed 12,000 glucose waveforms with

21,000 data and then re-integrated them into three distinctive PPG waveform types which revealed different personality traits and psychological behaviors of type 2 diabetes patients. For single time-stamped variables, he used traditional time-series analysis. For interactions between two variables, he used spatial analysis. Furthermore, he also applied Fourier Transform to conduct frequency domain analyses to discover some hidden characteristics of glucose waves. He then developed an AI glucometer tool for patients to predict their weight, FPG, PPG and A1C. It uses various computer science tools, including big data analytics, machine learning (self-learning, correction and simplification) and artificial intelligence to achieve very high accuracy (95% to 99%).

Results: In 2010, his average glucose was 280 mg/dL and A1C was >10%. Now, his glucose value is 116 mg/dL and A1C is 6.5%. Since his health condition is stable, he no longer suffers from repetitive cardiovascular episodes.

Conclusion: Instead of utilizing traditional biology, chemistry and statistics, the methodology of GH-Method: math-physical medicine uses advanced mathematics, physics concept, engineering modeling and computer science tools (big data analytics, artificial intelligence), which can be applied to other branches of medical research in order to achieve a higher precision and deeper insight.

Comparison of Methodology	*Bio-Chemical Medicine (BCM)*	*Math-Physical Medicine (MPM)*
Academic Foundation	Based on both Biology and Chemistry, which are both based on Physics and Math	Based on Engineering and Physics, which are both based on Mathematics
Precision and Accuracy of Results	It appears that most likely the results are less precise and less accurate than MPM	Most likely more precise and accurate than BCM due to mathematics and physics
Data Size	It seems that most of the data size is smaller (hundreds to thousands)	Most of the data size are larger (thousands to millions)
Application of Mathematics	It appears that mostly utilizing statistics (an extension of mathematics)	Mostly utilizing mathematical equations, including many branches of mathematics
Distinguish by Importance Level (Weighting Factors)	It appears that mostly no weighting factors are considered before analysis	Figuring out various weighting factors and then assigned to key influential factors (Engineering Concept for approximation)
Data Collection and Cleaning	It seems that most of work spends 50% to 80% on data collection, cleaning, and organization	Spend only 10% to 30% on data collection, cleaning, and organization by utilizing computer technology, including AI

Fig.1. Comparison of MPM vs. BCM

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Eduardo J Simoes, J Diabetol 2019, Volume 3

Eduardo J Simoes

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BIOGRAPHY

Eduardo J Simoes research includes investigating the prevention of infectious, environmental and chronic diseases, health promotion, health care and health informatics. He has published 135 peer-reviewed publications, 11 book chapters and 32 official reports covering topics in public health and medicine. He has made 157 presentations at health-related conferences and serves as a reviewer for 17 peer-reviewed journals. He is the Associate Editor of *International Scholarly Research Network* and *Frontiers in Public Health*.

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THE EFFECT OF HEALTH INFORMATION TECHNOLOGY (HIT) AND STANDARD TREATMENT FOR TYPE 2 DIABETES PATIENTS (T2D) COMBINED AND HIT ALONE ON CARDIOVASCULAR OUTCOMES OF T2D PATIENTS

Background: CVD is the most frequent cause of morbidity and mortality among patients with diabetes. HIT are effective in reducing HbA1c; however, their effect on cardiovascular risk factor management for patients with T2D has not been evaluated. This research identified a common effect of health information technologies (HIT) on the management of cardiovascular disease (CVD) risk factors among people with type 2 diabetes (T2D) across randomized control trials (RCT).

Methods: Researcher's implemented a meta-analysis of the effect of HIT on CVD risk factors using data from randomized clinical trials in the past 30 years. They identified 21 eligible studies (23 estimates) with measurement of SBP, 20 (22 estimates) of DBP, 14 (17 estimates) of HDL, 14 (17 estimates) of LDL, 15 (18 estimates) of triglycerides and 10 (12 estimates) of weight across databases.

Results: They found significant reductions in SBP, DBP, LDL and TG and a significant improvement in HDL associated with HIT.

Conclusions: As adjuvants to standard diabetic treatment, HIT can be effective tools for improving CVD risk factors among patients with T2D, especially in those whose CVD risk factors are not at goal.

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Denise A Pancyrz, J Diabetol 2019, Volume 3

Denise A Pancyrz

Reverse My Diabetes, USA

GIVE YOUR PANCREAS A BREAK AND REVERSE THE EFFECTS OF TYPE 2 DIABETES THROUGH HOLISTIC LIFESTYLE CHANGES

BIOGRAPHY

Denise A Pancyrz is a Coach, Speaker and Author of the book "THE VIRGIN DIABETIC". She was diagnosed with type 1.5 diabetes, prescribed medication along with basal and bolus insulin, she was told her health would deteriorate with age while her drug dosages would increase. Denise stepped away from the typical diabetes management protocol. Holistic lifestyle changes freed her from all medication and insulin. She gained her expertise through personal experience and her training in holistic nutrition and homeopathy. As a Six Sigma Greenbelt and a decade in the laboratory industry, she created a coaching program to get to the root of the problem, help patients gain control of their lives, without focusing on weight loss. Success is driven by focusing on resting the pancreas versus food elimination. She is working on an eLearning program and her next two books.

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Statement of the Problem: Despite the number of Americans prescribed diabetes medication and insulin, type 2 diabetes diagnoses increase annually at an alarming rate. Conventional treatment focuses on medication, dieting and managing this chronic disease. Medication has become the way to mask symptoms, not focus on the root cause for type 2 diabetes. Dieting focuses on caloric intake, carbohydrate counting and food restriction. Teaching to manage diabetes negatively impacts the patient's psychological ability to improve his or her health. Medication and insulin becomes a crutch. The outcome of this line of care appears to generate short-term results with lifetime need for medication and a progression to insulin.

Findings: Shifting the focus to rest the pancreas through holistic lifestyle changes teaches long-term success for improvement. Striving for holistic view of the person focuses on many facts of a person's life versus a narrow focus on the disease. This has far greater effect in putting the patient in control of one's health. A patient that feels in control can improve their attitude, therefore, creating excitement when feeling and seeing the benefit of his or her lifestyle changes. Weight loss, the avoidance, reduction or elimination of medication or insulin and improved A1c, is a result of holistic changes, rather than focusing on a number on a lab test. Data used is from author's personal accomplishments and client cases.

Conclusion & Significance: Physicians, due to time constraints are unable to provide the highest level of insight and direction to a struggling patient. Patients are seeking to reduce and eliminate medication with long-term success. Consistent support and education are key to identify areas that sabotage a patient's efforts in making lifestyle changes to learn to rest the pancreas which in turn helps to reverse the effects of type 2 diabetes.

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COMPARISON OF GLUCOSE DATA AND PHENOMENA FROM TWO DIFFERENT MEASUREMENT METHODS (GH-METHOD: MATH-PHYSICAL MEDICINE)

Introduction: This paper discusses glucose measurement results from two different methods, finger piercing and testing strip (Finger) and Libre's continuous glucose monitoring system (Sensor).

Method: The author has been collecting a total of 9,490 glucose data by finger measurement, including both fasting plasma glucose (FPG) once a day since 1/1/2014 (1,825 days) and postprandial plasma glucose (PPG) three times a day since 1/1/2012 (2,555 days). Recently, he has further collected 17,046 glucose data by applying a sensor on his upper arm to collect his glucose values continuously. This sensor measurement is conducted in parallel with his routine finger measurements. During the period of 5/5/2018 to 12/31/2018 (241 days), he has recorded his sensor glucose values about 71 times per day. The measurement rate is approximately every 15 minutes during the day and every hour during the night. In summary, he has collected a total of 964 waveforms- 241 FPG and 723 PPG. Other waveforms generated between meals or from eating snack/fruit are not included in this analysis.

Results: Sensor's time of peak glucose: 60 minutes after first-bite; PPG rising speed: 33 mg/dL per hour; PPG decaying speed: 20 mg/dL per hour (~60% of rising); Finger's average FPG/PPG: 110/116 mg/dL (as 100% baseline); Sensor's peak PPG & % over finger: 159 mg/dL & 138% (+43 mg/dL); Sensor's average PPG & % over Finger: 135 mg/dL & 117% (+19 mg/dL); FPG (period-from 00:00 to 07:00): Average FPG: 112 mg/dL; Peak (crest): 122 mg/dL; Valley (trough): 106 mg/dL; Period of trough (from 3am to 5am).

Conclusion: In average, PPG peak occurs one hour after first-bite of meal, not two hours after; PPG decaying speed is almost twice as slow than its rising speed; Averaged sensor's PPG is 16% higher (+19 mg/dL) than the Averaged finger's PPG; Peak sensor's PPG is 36% higher (+42 mg/dL) than the Averaged finger's PPG; FPG wave is much calmer than PPG wave and FPG's lowest trough range occurs during the deep sleep stage (from 3am to 5am).

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