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The saga of glucose monitoring: Facts, questions, history and trends

Since introduction of the first blood glucose meter by Bayer, about 36 years ago (1981), trillions of glucose measurements have been conducted by hundreds of millions of people. Yet, no clear answers can be established from different users and medical experts in regard to glucose monitoring. Simple and basic questions such as how often, when, what to do with the numbers, which device, what's the accuracy and so on, will produce full scale of answers, not rarely even contradicting ones. No wonder, though, that the diabetes community (general practitioners, diabetologists, endocrinologists) and mainly people with diabetes are confused and frustrated in this matter, which lead to many questions, doubts, uncertainty, insufficient utility in monitoring and reduced adherence in treating the disease. A question should be asked what's the source for this confusion, and more importantly, how can these disputes be resolved, in order to achieve consistent answers, directions and guidelines to the users, as well as to the caregivers.

Method: A deep research scanned the history of the development of glucose monitoring technologies, techniques and devices, analyzed the difficulties, potential causes and reasons for different approaches, variety of ways to read and understand results, as well as using and comparing the numbers. Meaning of accuracy assessments and subjective understandings, methods, clinical and statistical tools were also analyzed. New devices and trends were studied as well.

Results & Discussion: The analysis shows a clear view of an expanded variety of parameters which directly lead to confusion in all the subject matters. Different types of measurements lead to different results, varied time of measurement lead to variation in readings. Availability of more
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data allows better understanding of the readings and how to use them. Different assessment methods lead to diversity of accuracy levels. Alternative methodologies and conduction of clinical trials cause altered results and understanding of devices' behavior. Comparing levels of other components (for example, blood vs. ISF) lead to inconsistent results. Poor maintenance of the measuring devices and disposables, as well as human factors has major impact on the results. Lack of education reduces the confident and trust in the results, thus the utilization of glucose monitoring decreased.

Conclusions: Deep understanding of glucose levels' measurement and monitoring is a crucial parameter in achieving better utilization and adherence of treatment diabetes (and pre-diabetes). Such a comprehensive briefing is an important step to achieve better appreciation of the complexity of the subject, which may (and should) lead to improved handling and managing diabetes, as well as treating and preventing pre-diabetes progression

Biography

Avner Gal serves as CEO of Iridium Consultancy and Technologies. Prior to founding Iridium, he founded Integrity Applications in 2001, which developed non-invasive glucose monitoring device. Before integrity, he served as CEO of an Israeli measurement company, which engaged in development of radar and ultra-sonic technologies. From 1999, he served as the Manager of Engineering Department at Comverse Network Systems. Since 1996, he managed a profit center in MTI Engineering Ltd., high-tech consulting company. Prior to entering the private sector, he served for 23 years in various roles in the Israeli Navy, from which he retired as Naval Commander (1995). He received his BSc in Electrical Engineering from the Technion, Israel Institute of Technology, Israel (1982), MSc in Electrical Engineering from Naval Postgraduate School in Monterey, California (1988) and Master of Business Administration in Marketing Management from the University of Derby's Israeli Branch (2000).

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