

Controlled Diabetes and Lifestyle-Based Intervention in Southeastern Florida

Masahir Halabi

Faculty of General Medicine,
Constanta Medical School (Ovidius University of Constanta)

Abstract

In the current world, diabetes continues to yield stalled progress. The condition affects socio-economic arenas by increasing the mortality rate in children and adults while accounting for the high rate of absenteeism and even retirement from the workplace. The aim of this project was to examine the efficacy of adopting CGM in managing diabetes. Populations in southeastern Florida's Miami region were selected for the collection, analysis and interpretation of data. A theoretical framework, Orem's Self-Care Deficit Theory, was used as a foundation from which the study would be guided while the Settler Model of Evidence-Based Practice aided in designing the steps of data collection and analysis before making inferences. Whereas 75 questionnaires were sent to the respondents, 47 responses were received. Outcomes indicated that CGM adoption in Miami is on an increasing trend but critical challenges such as poor education, unequal access to care (or treatment), low income levels, and cultural drivers continue to stall progress in addressing diabetes. Findings indicated further that CGM adoption is associated with improved patient outcomes but aspects such as community sensitization and state facilitation remain dire. The mixed outcomes necessitate a state facilitation and inclusivity to promote equal access to care, a step that is likely to benefit the multicultural zone in which ethnic minority groups such as the blacks and Hispanics continue to dominate. Overall, CGM adoption was found to depict a positive correlation with improvements in diabetic patient outcomes in Miami. Future studies may focus on the efficacy of CGM adoption in other regions of Florida, the effect of human lifestyle on the success of CGM adoption in Miami, and specific cultural drivers that continue to bar most of Miami's ethnic minority groups from incorporating CGM in their diabetes management practices. In so doing, parity in access to care is likely to be reduced while spearheading technological applications such as CGM in managing diabetes within Miami.

Introduction

In scientific research, efficacy refers to the ability of an intervention to produce the intended or desired results (Battelino, Phillip & Bratina et al., 2011). Changes in the people's lifestyles correlate with changing demands among stakeholders and community needs regarding health care provision. One of the areas that have received health care attention is diabetes, prompting an in-depth analysis. According to Ahmet, Dagenais and Barrowman et al. (2011), diabetes forms a metabolic condition characterized by the body's inability to produce enough or any insulin, causing alterations in the level of blood glucose. Some of the mechanisms adopted in controlling and managing the condition include exercising, choosing healthy foods, taking medicine, regularly checking blood sugar and quitting smoking. Others include regular eye examination, kidney tests, dental examination and other coping skills. Whereas these

conventional health care approaches are critical, continuous glucose monitoring (CGM), if used correctly, forms a significant advance in diabetes technology that is likely to facilitate optimal glucose control (Bergental, Klonoff & Garg et al., 2013). This project examines the efficacy of continuous glucose monitoring in controlled diabetes, focusing on an intervention towards improved patient outcomes in Miami, southeastern Florida. Notably, Orem's Self-Care Deficit Theory will be used as a theoretical framework that provides a foundation for understanding concepts in diabetes management. In addition, the Settler Model of Evidence-Based Practice will be used as a theoretical model to guide a stepwise criterion for collecting, analyzing and interpreting data — to provide valid, reliable and practicable recommendations regarding CGM in diabetes management within Miami. The following section provides the problem statement. In this intervention, the main aim is to examine trends and the impact of adopting CGM in managing diabetes within six months, compared to the use of a traditional self-monitoring process. Other objectives include: to establish probable challenges faced while adopting CGM in managing diabetes within Miami, to find out some of the solutions to the perceived challenges towards better patient outcomes in diabetes management within Miami, and to explore the manner in which CGM intervention accounts for improvements and satisfaction of health-related community needs in Miami.

Methods

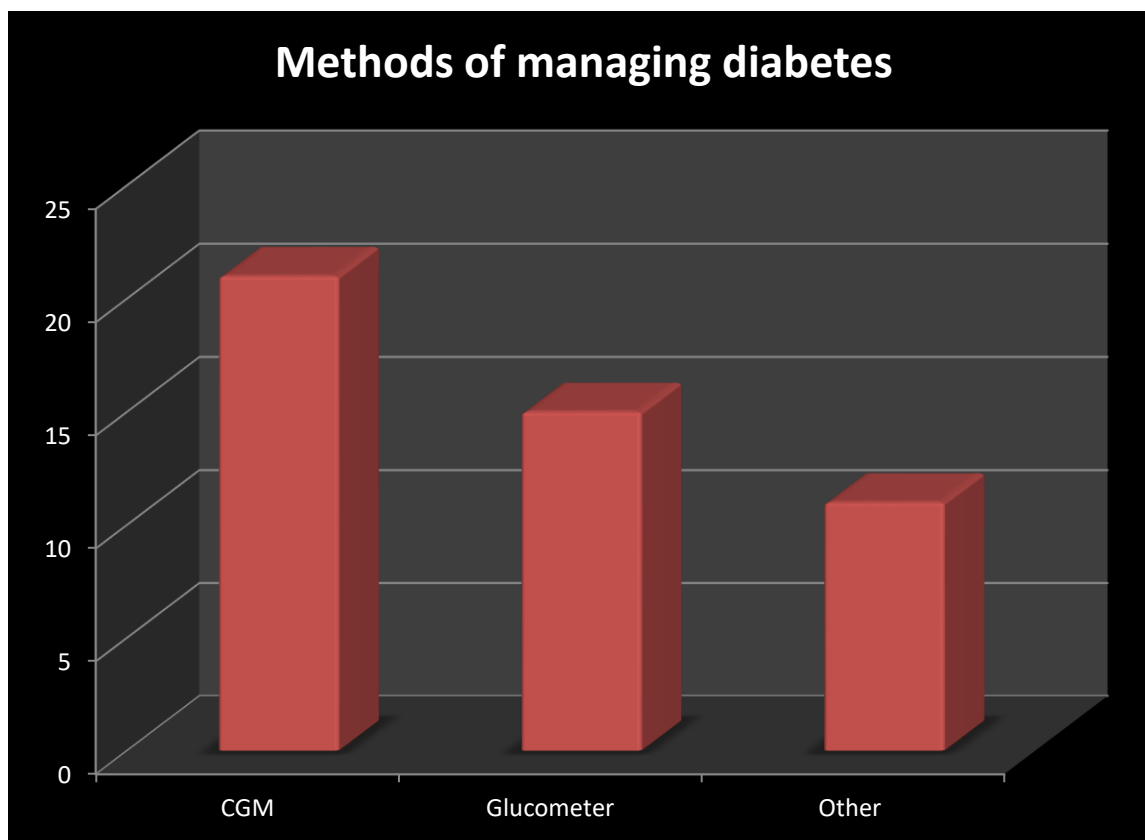
The intervention incorporates qualitative and quantitative data. Specifically, a mixed studies approach is selected as the most appropriating in exploring qualitative and quantitative data on CGM application, upon which integration into the existing research outcomes is likely to sensitize Floridians within Miami on the need to adopt the artificial monitor in managing diabetes. A number of 75 participants are selected. The participants comprise of male and female employees in both public and private health care organizations within Miami. The participants are selected randomly to shun the possibility of a desirability bias; necessitated by the region's multicultural nature. The participants are also expected to have served in Miami's health care sector for a substantial period, as the group is projected to be better placed in providing reliable information on trends, challenges, probable solutions, and the impact of using CGM in diabetes monitoring, management and control. The process of collecting data is chiefly reliant on administering questionnaires. Designed to be objective, the questionnaires are sent to the participants to fill in and return for analysis and interpretation. Participant anonymity is assured by using codes, rather than personal details such as the names of the participants. In addition, consent is sought to ensure that relevant authorities and the participants within Miami support the project without fear of impersonation. In order to discern the effectiveness of the CGM practice in Miami, a t-test is applied. The test seeks to answer the research questions by qualifying the null or substantive assumption. In so doing, the analysis process is projected to give insight into the nature of CGM adoption and some of the recommendations or implementations that can be made towards better patient outcomes, improved quality of life and a better economy, resulting from shunned workplace absenteeism in the region. Some of the limitations facing the project include the researcher's influence on participant responses, desirability bias, misinterpretations, misunderstandings and, cultural and geographic bias. The limitations are addressed by framing the questions (in the questionnaire) clearly and objectively, selecting the participants randomly and the use of 75 respondents — to shun the effect of desirability bias.

Results

Out of 75 questionnaires that were administered, 47 responses were received. Tested at a 0.05 level of significance, the value (47) is considered valuable because it accounts for 62.67% of the total number of questionnaires. Therefore, inferences made from the project outcomes are considered valid and reliable by shunning inherent bias. A descriptive statistics approach was used in the data analysis process, with frequencies aiding in determining data distribution. A t-test was also used for graphical representations to gain inferences regarding the significance of the data obtained. The following table shows the participants' demographic data.

Frequency		%
Gender		
Female	24	51.06
Male	23	48.94
Total	47	100.0
Age in years		
Below 20	0	0.00
21-30	9	19.15
31-40	7	14.89
41-50	17	36.17
51-60	8	17.02
Over 60	6	12.77
Work experience		
Less than a year	4	6.67
2-4 years	19	31.67
5-9 years	15	25.00
10 years and above	17	28.33

From the demographic data, male participants were recorded at 48.94% while female participants accounted for 51.06% of the responses received. In addition, majority of the respondents were aged between 41-50 years, accounting for 36.17% of the questionnaires received while the section on the length of time working with diabetic patients had those who had worked between 2-4 years taking up the majority number of health care providers and practitioners, recorded at 31.67% of the responses received. The participants were also requested to select techniques that are frequently used by diabetic patients to monitor glucose levels within Miami. Available options were: self-monitoring through traditional glucometers, the use of CGM, and other modes. Outcomes suggested that the use of CGM was on an increasing trend, attributed to the changing user needs and demands, as well as the need for technological incorporation in health care service provision. Those who reported a widespread use of CGM were 21 while those who concurred that traditional glucometers continue to receive a widespread use in Miami were 15. The rest of the participants, recorded at 11, indicated that most of the patients served use other modes, including conventional approaches such as glucose sensing bio-implants, urine testing and HHbA1c measurement. In summary, CGM adoption in Miami rates at 44.68% while the use of glucometers rates at 31.91%. Other techniques accounted for 23.40% of the outcomes received. The figure below shows a summary of the outcomes.



From the data outcomes, CGM is gaining an increasing trend of adoption. However, aspects such as challenges faced and probable solutions are yet to be addressed fully. This depiction was particularly evident when most of the participants indicated that the preceding year had seen a significant number of patients report incidents of unacceptably high levels of blood glucose — on a frequent basis. A similar trend was recorded in a case where patients had reported

the cases of unacceptably low levels of blood glucose. The participants were also requested to comment on their perception regarding the convenience of the methods adopted by patients in monitoring diabetes within Miami, as well as the level of satisfaction expressed among the health care practitioners. Mixed outcomes were received. Whereas those who had indicated that their patients utilize CGM expressed satisfaction and found the approach to be convenient, those who had indicated that their patients utilize glucometers and other techniques expressed dissatisfaction, attributing the responses to the inconvenience and low level of effectiveness in adopting the devices. Notably, the group that reported a widespread use of CGM in their facilities recommended the use of a similar technique in other facilities (on a widely basis), with some of the challenges faced cited to include poor education, unequal access to care (or treatment), low income levels and cultural drivers among ethnic minority groups of Miami, southeastern Florida. The following table shows a summary of the outcomes regarding the convenience, flexibility and satisfaction in the respective methods adopted to monitor glucose levels.

Conclusion

In conclusion, the project aimed at examining the efficacy of CGM adoption in monitoring and controlling diabetes within Miami, southeastern Florida. A mixed studies approach was adopted in which qualitative and quantitative data aspects were used to gain insight into the nature of CGM adoption and the application's potentiality in addressing diabetes at a regional level. Findings indicate that CGM adoption is on an increasing trend, and the most of the care providers continue to express satisfaction regarding the effectiveness and flexibility of CGM. Despite the promising outcomes, populations in Miami continue to be characterized by frequent cases of unacceptably high and unacceptably low levels of blood glucose. Some of the factors responsible for this form of underutilization (of CGM) include poor education, poverty and unequal access to care, as well as low income levels and cultural drivers. Therefore, it is recommended that health care organizations in Miami should engage in sensitization programs in which communities would be exposed to information regarding the CGM technology towards adversity reduction. In addition, Miami's education sector should foster community-based programs in which issues such as trends, causes and probable solutions to diabetes, as well as benefits accruing from CGM adoption could be addressed. In so doing, it is projected that the frequency of diabetes will decline, with management and control processes perceived to be successful through the use of CGM. Given that obesity has been associated with diabetes, and that Miami forms one of the leading regions in the U.S. (with obese populations), health care groups should address the drawback by advising diagnosed and undiagnosed groups on the need for better lifestyles through practices such as proper dieting and exercising. It is further recommended that cultural drivers are addressed through inclusivity, as Miami is a multicultural zone in which ethnic minority groups such as the black and Hispanics account for predispositions and vulnerability top the condition. In so doing, benefits of CGM adoption are likely to be felt, leading to significant reductions in the adversity as the project has found the project to be highly correlated with improved patient outcomes.

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