Incorporating Integrated Personalised Diabetes Management (iPDM) in Treatment Strategy: A Pragmatic Approach

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Abstract

Diabetes is a global public health concern. Vigilant monitoring and effective management of glycaemic variations are essential to prevent complications of diabetes. Effectively incorporating monitoring strategies in management of diabetes is a serious challenge. Patient-centered approach is necessary to customise monitoring and therapy of diabetes. This has been made possible by integrating technology with personalised therapeutic strategy. The integrated personalised diabetes management (iPDM) is a holistic, patient-centered approach that focuses on personalising diabetes management to streamline therapy and improve outcome. iPDM helps strengthen the care process, facilitates communication between patients and their healthcare team, and integrates digital tools that visualise and analyse data. The five E’s which includes enthusiasm, education, expertise, empathy and engagement are the key pillars of a strong foundation for the iPDM model. iPDM model is a convenient and easily accessible tool that shifts the management paradigm from an “algorithmic” to “personalized” care to optimise treatment outcomes. Structured self-monitoring of blood glucose (SMBG) should be available as part of the self-management process for people with sub-optimally controlled type 2 diabetes, including those not on insulin therapies. Different SMBG regimens should be followed based on factors such as diabetes type, treatment approach (diet, oral antidiabetic medication, or insulin), glycaemic control, available resources, and patient’s level of education.

Keywords: Blood glucose monitoring, communication, diabetes management, iPDM, patient education, patient empowerment, personalised care, structured SMBG

Introduction

Emerging as one of the major public health concerns, diabetes has affected nearly half a billion people worldwide. This number is projected to escalate to 578 million by 2030 and 700 million by 2045.1,2 India has 77 million people with diabetes (PWD) according to the International Diabetes Federation (IDF) 2020. Real world evidence reveals that 76.6% of the patients have glycated haemoglobin (HbA1c) above the target range.2,3 Fluctuation in plasma glucose values over long term, can damage the vital organs, leading to disabling and life-threatening health complications such as cardiovascular diseases (CVD), neuropathy, nephropathy and retinopathy.4

Despite the continuous evolution of new therapies and technologies, many PWD are not able to achieve their diabetes management goals. Attaining optimal glycaemic control while reducing the risk of hypoglycaemia remains a critical hurdle. Significant challenges associated with chronic medical disorders are:

- Therapeutic inertia
- Therapeutic non-adherence
- Non-compliance with guidelines.

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The causes of clinical inertia or non-adherence could be many including lack of insight or acceptance of the disease, health illiteracy, cost and adverse effects of medications, poor doctor–patient communication and even distrust in the doctor. Instead of a “one-size-fits-all” approach, personalization is imperative, balancing the benefits of optimizing glycaemic control with its potential risks such as hypoglycaemia or other preexisting conditions. Doctor and patient collaboration with an individualised patient-centered therapy plan has evolved as a key approach to improve outcomes and optimise the care process.

Integrated personalised diabetes management (iPDM) approach combines structured self-monitoring of blood glucose (SMBG) with the aid of newer generation connected glucometers, use of diabetes data management software, collaborative patient–physician communication, and support of therapeutic decision-making in a structured intervention process. This has been depicted in Figure 1.

The iPDM concept involves six recurring steps.

1. Initial step involves imparting education and training on “Structured Testing”. Is given to the patient.
2. SMBG is carried out by the patient with respect to a particular testing regimen as prescribed by the health care professional.
3. Electronic devices or software tools collect and store the blood glucose data from the blood glucose meter wirelessly.
4. Graphical presentation of the data in a simpler format ensure effective analysis for well-informed decisions.
5. Therapy adjustments are done based on the characteristics of the patient and his/her SMBG profile to achieve personalised treatment goals.
6. Treatment efficacy should be regularly assessed, approximately 3–6 months after the initial change in therapy.

Thus, personalised diabetes management (PDM) becomes a continuous revolving circle which is repeated in every patient, at varying time periods.

Kulzer B et al. demonstrated that iPDM led to a greater reduction in HbA1c after 12 months versus usual care (−0.5%, \( P < 0.0001 \) vs. −0.3%, \( P < 0.0001 \)), (Diff. 0.2%, \( P = 0.0324 \)). Majorly the HbA1c reduction occurred after 3 months and remained stable afterwards. The percentage of patients with therapy adjustments, patient adherence was greater in the iPDM group. Patient treatment satisfaction and physician satisfaction were more in the iPDM group [Table 1].

**“5Es” – Key Pillars**

The essential components of iPDM can be summarised as “5Es”, as illustrated in Figure 2 and elaborated further in this article.

**Therapeutic Patient Education**

As per the WHO, therapeutic patient education (TPE) involves training patients to help them learn and maintain all the essential skills required to optimally self-manage their daily living with a chronic disease. For diabetes, education has been expressed as a systematic intervention demanding active patient participation both in self-monitoring and decision-making.
making.[9] One of the central elements for the management of diabetes is TPE.

Several reports have demonstrated the efficacy of TPE and it has been adapted to other chronic disorders such as bronchial asthma, chronic obstructive pulmonary disease (COPD), CVD, etc., (ref). TPE has also shown to benefit individuals with diabetes. A significant improvement in several lifestyle, clinical and psycho-social outcomes in PWD have been attributed to structured TPE.[9] Enrichment of patients’ quality of life (QOL) is an early outcome of TPE. Health care providers (HCPs) often tend to focus on therapeutic compliance, preventing complications and issues about QOL that can remain addressed.

TPE in addition to enhancing the persons’ skills also targets to modify their behaviour. A critical pre-requisite for effectively imparting TPE is information about the recipient, including their opinion, knowledge and perception of the medical condition. An insight of the patients’ understanding and beliefs, enables the care-giver to integrate the medical and emotional needs while planning the therapy.[10]

Lack of time is the usual hurdle for delivering TPE. A study by Pétré et al.[11] demonstrated that a patient-centered approach and collaborative care can improve health outcomes without prolonging patient visits. A patient-centered approach to diabetes self-management education (DSME) should begin at diagnosis, and provides an appropriate foundation for current and future decisions.[12]

The model for education has progressed from an information-based to more proactive and focused approach addressing the daily experiences of living with a disease.[13] TPE programmes can change the attitude of the HCP which in turn helps in strengthening the educative practices.[12] TPE plays a significant role in reducing mortality, morbidity, and disability if administered consistently in the clinic.[9]

**ENTHUSIASM**

Chronic non-communicable diseases such as CVD, cancer, diabetes, and pulmonary chronic disorders are responsible for major proportion of death and disability worldwide. The importance of patient-centered management and personal engagement in the treatment pathway is fundamental to not only improve outcomes but also can reduce the cost.

The person-centered Chronic Care Model (CCM), that includes informed, empowered patient as an essential constituent, is recognised as an effective organizational system to ensure optimal results. Funnell et al.[14] defined empowerment as the discovery and development of one’s inherent ability to be responsible for one’s own diabetes.

Among PWD, those with higher levels of motivation tend to be more actively engaged in self-management and have better glycaemic outcomes. The challenge for healthcare systems is to provide DSME and support to teach the interplay between healthy lifestyle, medications, emotional/physical stress, and behaviour-change strategies. It will teach PWD to respond appropriately and continually to the factors regulating optimal metabolic control. Evidence shows that patient education yields positive results, reaffirming a potential impact on public health if it is implemented throughout health care systems.

In spite of this evidence, few PWD receive adequate education and support that can help to self-manage critical aspects of diabetes.

Ten years after the first diabetes attitudes, wishes and needs (DAWN) study,[15] the diabetes attitudes, wishes and needs second (DAWN2) study was conducted in 17 countries. The results revealed a lack of self-management education, as well as critical resources, particularly skill, time, and adequate referral sources for delivering appropriate self-management support.[16] Qualitative analyses of testimonials from the global DAWN2 study has highlighted the importance of PWD feeling able to manage their own disease.[17] The integration of patient educational programmes in the local care system and community services can increase access to DMSE and enhance optimal care delivery.

Empowerment is a measure of centrality of the patient and represents the core of cultural and organizational changes diabetes care is expected to undergo in the coming years. Data from the BENCH-D study suggests that empowerment, as measured by the Diabetes Empowerment Scale-Short Form (DES-SF), can conveniently be measured in the routine clinical practice. The study also provided innovative information about the interaction between empowerment and a wide range of factors regulating diabetes. The findings reconfirm the role of DSME programmes in improving quality of diabetes care and QOL.[18]

**EXPERTISE**

The application of SMBG requires PWD to be competent to carry out glucose testing and interpret its results, to guide regarding lifestyle choices and therapy. SMBG instructions can be offered in a variety of settings by a wide array of HCPs. However, PWD often do not receive formal SMBG training.[19,20]

The two skills sets are required to successfully integrate SMBG into diabetes management.

1. Operational skills
2. Interpretive skills.

SMBG provides instant feedback that help PWD to assess how their food choices, physical activities, and medications affect glycaemic control. SMBG results can aid PWD in evaluating their current diabetes management efforts. During DSME, it is important for the HCPs to assess both of these skill sets to reveal the obstacles to using the glucometer and SMBG data.

**Operational skills**

During training sessions it is important that trainers explain the method of performing a blood glucose test and then ask participants to demonstrate it back.
Continuous training on the art and science of communication to the HCPs should be encouraged. Engagement has emerged as a useful adjunct over the recent years. It provides opportunity to PWD residing in remote areas, to connect to HCPs far away. Telemedicine and telemonitoring has been used efficiently for management of diabetes during the coronavirus disease 2019 (COVID-19) pandemic. Rapid growth in technology has made it possible to transmit relevant data via audio, video and other telecommunication technologies to ensure timely intervention.

Telemonitoring has witnessed remarkable advancement in modern times. The continued rise in the number of PWD across the globe and growing need for universal access to healthcare have fostered the growth of alternate ways of communication, such as telemedicine.

**Empathy**

Empathy remains the corner-stone of physician–patient relationship. Empathy refers to care that incorporates:

- Understanding of the patient’s perspective
- Shared decision-making between the HCP and the patient
- Consideration of the broad context in which illness is experienced.

Empathy and reflection of the patient’s perspective empowers, encourages, and motivates the patient for self-management and improve adherence to treatment, diet and exercise. Empathy also improves patient satisfaction, which is independently associated with better outcomes and enhanced QOL.

Effective communication, empathy and following a treatment plan can ultimately translate to better glycaemic control and reduced complications. A cohort study by Dambha-Miller et al. suggested that demonstration of empathy by HCP early in the course of type 2 diabetes mellitus was associated with favourable long-term clinical outcomes. Findings from this study provides the rationale for including more empathetic, personalised medicine into treatment strategy.

Different SMBG regimens should be followed based on factors such as diabetes type, treatment approach (diet, oral antidiabetic medication, or insulin), glycaemic control, available resources, and patient’s level of education.

**Conclusion**

Diabetes has consistently been a cause of increasing morbidity and mortality all over the globe. The role of patient

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**Table 1: Four C’s of iPDM**

| Title          | Description                                                                 |
|----------------|----------------------------------------------------------------------------|
| Characteristics| Patient centred approach  
Real time communication of data between patient and provider  
Accurate and time-efficient interpretation of glucose data  
Data security and privacy ensured  
Collaboration and shared decision-making |
| Confidence     | More informed treatment decisions  
Improved treatment adherence  
Better treatment satisfaction for patient and provider  
Greater patient understanding and empowerment  
Reduced therapeutic inertia  
Improved glycaemic control and clinical outcomes  
Better monitoring of clinical data  
Earlier identification of hypoglycaemia and hyperglycaemia  
Fills void between patient and provider |
| Caveats        | Lack of enthusiasm  
Insufficient literacy and skills  
Lack of adequate training  
Fear to use technology  
Non-compliant patients  
All E’s need to be established |
| Contraindications| Patient refuses to consent  
Poor numeracy skills |
self-management has been identified as a key parameter in overall management of diabetes mellitus. The iPDM is a holistic, patient-centered approach that focuses on personalizing diabetes management to streamline therapy and improve outcome. iPDM helps strengthen the care process, facilitates communication between patients and their healthcare team, and integrates digital tools that visualise and analyse data. The five E’s are the key pillars of a strong foundation for the iPDM model which can assist in shifting the management paradigm from an “algorithmic” to “personalised” care to optimise treatment outcomes.

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Conflicts of interest
Roche Diabetes Care uses the term “iPDM” (Integrated Personalised Diabetes Management) in its internal and external communications. The authors have received honorarium and speaker fees from Roche Diabetes Care in the past for various events but have not received any honorarium for writing of this manuscript.

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