Visual dynamic e-module as a tool to fulfill informational needs and care continuum for diabetic patients

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ABSTRACT

Introduction: Diabetes can be envisaged as a lifelong phenomenon having the ominous odds for multisystemic involvement in the duration of disease. The probabilities of the occurrence of these events are influenced by the adopted lifestyle. Hence, information about the disease and lifestyle modification are vital from the perspective of prognostics. This study attempts to explore the potential of a “visual dynamic tool” for imparting knowledge and consequently received acumen by diabetic patients. Objectives: To appraise the effectiveness of a constructed visual dynamic module (encompassing the various dimensions related to and affected by diabetes) by capturing the opinions, perceptions, and experiences of the diabetic patients who underwent intervention through the module. Materials and Methods: A visual e-module with dynamically imposed and animated images in the vernacular (Hindi) was prepared. This module was instituted among the diabetic patients in a logical sequence for consecutive 3 days. All the diabetic patients who underwent this intervention were interviewed in depth in order to ascertain the effectiveness of the module. These interviews were analyzed by thematic and framework analyses. Result: The visual module was perceived by the diabetic patients as an optically engaging tool for receiving, connecting, and synthesizing information about diabetes. They sensed and expressed the ease to connect with the images and labeled the received information as inclusive. Conclusion: Initial evidences suggest that visual e-module is an effective and efficient tool for knowledge management in diabetes. This issue may be further explored at diverse academic and clinical settings for gathering more information for efficacy.

Keywords: Diabetes, module, patient education, self-care

Introduction

India has witnessed the burden of diabetes beyond all projections estimated before; the country’s diabetic patients are currently as high as 62 million and this is estimated to rise further up to 85-100 million in 2030.[1‑3] This disease, along with hypertension and dyslipidemia, is presenting itself as a “modern day epidemic” with catastrophic consequences.[4,5] The disease is a long-running phenomenon and has the potential to affect virtually every organ system, thus adversely affecting the quality of life.[6‑8]

Thus, people living with diabetes have to cope with this unwanted but essentially progressively deteriorating condition throughout their lives. In this process of coping, an individual has to make multiple decisions throughout the day in order to successfully manage his/her blood sugar to prevent complications. Several emotions like depression, anxiety, doubt, stress, and anger are day-to-day challenges to be countered by a person in this process of coping. The complex product of this coping can be thought of in terms of the extent of glycemic control and the aversion of complications in the clinical world. Thus, making a diabetic patient well-informed is valuable as it addresses his/her concerns and focuses on care continuum requirements, which in turn facilitate the process of successful coping.[9‑11] The fulfillment of this informational need about the disease in relation to diet, complications, and self-care may further be agreed upon. It is as decisive as antidiabetic medication to ensure good control of glycemic.[12‑14]

The next step in this process is the translation of this information into actionable knowledge and practicing an approach for good control of glycemic.[15,16] This conversion depends on the ease of processing and connecting the received information. This study explores whether a crafted informative visual interface of images, supported by captions in the vernacular and delivered in a logical and structured manner, can awaken and sustain

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the learners’ (i.e., the patients’) interest and facilitate the entire process of gained wisdom surrounding diabetes from the patients’ perspectives through a qualitative approach.

**Materials and Methods**

This longitudinal educational interventional study was carried out in two phases, the first of which was preparation of visual modules and the second, institution of these modules among diabetic patients. Perceptions of the patients were captured after intervention by in-depth interviews.

The contents of the module were identified after a series of brainstorming sessions among investigators, and this index list was further refined in the light of the opinions received by some eminent clinicians and public health experts. The modular sessions were rearranged into a logical structured sequence and classified under the following: (A) Basics about diabetics, (B) Complications, risks, and genetic inheritance of diabetes, (C) Lifestyle interventions in diabetes, and (D) Self-monitoring of blood glucose.

All the investigators divided themselves into four buzz groups and took the specific responsibility to prepare the assigned part of the module (first draft); as decided during initial interactions, the investigators relied primarily on the visual stimulations generated by dynamic animations and the intelligent imposition of images. This image clustering was further supported by captions written in the vernacular (Hindi) with the aid of Google Input Tools. Available from: http://www.google.com/inputtools/ in open domain. This process of module preparation is explicitly shown by the Venn diagram [Figure 1-Process of module crafting]. A notable point at this juncture is that the investigators did not take the images directly related to diabetes as far as possible; rather, they utilized images apparently unrelated to diabetes by meaningful imposition and approximation, thus conveying the intended message (for example, two boys with friendly gestures were dynamically animated and imposed to emphasize the role of exercise as insulin sensitizer). Real-time comparisons and simplified analogies from real life (break in a brick wall analog with the filtering capability of kidneys) for the endurance of understanding were used. Self-made cartoons and modified images (sharpened/hidden/burred) using Microsoft Paint and Microsoft Picture Manager (Cyber City, DLF Phase III, Gurgaon) were liberally used in order to convey the intended messages [Figure 2-Glimpse of the module]. All the images used in this module were in the open domains and due credits to the original sources were given below the images.

After finalization of module crafting, 25 known diabetic patients from the noncommunicable disease clinic in the vicinity of Urban Health Training Center were registered for the institution of the module on a pilot basis; they were informed about the purpose of the study and their consent for participation

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**Figure 1:** Process of module crafting

**Figure 2:** Glimpse of the diabetic module
was sought. Following the recruitment, the participants were divided into small batches of five. Each batch (consisting of five participants) received three sessions in three subsequent days as per the division of the module using audiovisual (AV) aid. The participants’ concerns were explained to them in between the sessions. A sheet of frequently asked questions (Prashan Jo Apke Mann Me The) was circulated among the participants.

A topic guide was prepared consisting of the questions about the opinions, perceptions, and experiences of the participants about the module. All the participants were interviewed in depth using this topic guide. The interviews were audio recorded. The data so generated were read and re-read for familiarization. This was followed by identification of key issues from the transcripts, in vivo coding, and content analysis. This coding and content analysis were reviewed in order to generate the inclusive list of “final codes.” All the transcripts were assigned these codes. This was followed by categorization of the codes and emergence of the final theme.

**Result**

Codified in-depth interviews were analyzed and categorized for capturing the emerging themes. A thematic analysis is shown depicting the process of the emerging themes from the participants’ interviews [Figure 3-Thematic analysis with emerging themes]. Further, a framework analysis of the verbatim statements was done in order to clearly express the received information and complement the emerging themes [Table 1-Framework matrix endorsing the thematic analysis].

**Discussion**

The prime purpose of any health educational activity (including this) is to change the behavior of the individual.[17,18] This anticipated change in behavior is influenced by the decision to accept and cultivate the behavioral practices. The decision-making process is, in turn, directed by the extent of motivation. An individual becomes motivated and maintains a behavioral practice only when he/she feels the need to adopt/quit/sustain an activity for a desired outcome. This “felt need” is the analytical and synthesized form of the received information. When an unenthusiastic and reluctant individual receives some information about the “necessity” to change and adapt to a healthy behavior, this perceived necessity propels him/her to think and act further. This propulsion converts him/her into a tense, motivated individual.[19,20]

From the above discourse, it is evident that the strategies directed to change the behaviors of persons affected with chronic diseases like diabetes must address the informational gap. Successful coping with diseases like diabetes depends primarily on the access, deliverance, and reception of information about diabetes.[21-24] This information about the disease may assist the

![Figure 3: Thematic analysis of the perceptions and experiences of the participants who underwent educational intervention](image-url)

**Table 1: Framework matrix endorsing the key emerging theme with the verbatim supporting statements of the participants**

| Key information and summative nature | Participant 1 | Participant 2 | Participant 3 | Participant 4 | Participant 5 |
|--------------------------------------|---------------|---------------|---------------|---------------|---------------|
| This information is in much detailed than I received earlier (pg1/bhfa) | I started taking medication as doctor told (pg2/bhfa) | I tried to contact some people in village … I could not get much information. You have told everything I needed. (pg1/mezw) | …I tried to contact some people in village … I could not get much information. You have told everything I needed. (pg1/mezw) | …told me about vision problem in Diabetes. I have similar complaint… (pg2/sati) | The information about foot-care and eye is very important for me… (pg2/palw) |
| Inventive tailored to requirement | The information about diet, exercise and injury prevention … (pg2/bhfa) | …now I understand the diet control about foot care… (pg2/hald) | I will stop bidi and will not take those fruits which raise sugar. (pg2/mezw) | …my target is to curtail the medicine… this will help me… difficult (pg2/sati) | …I did not know that this may affect my foot and eye (pg2/palw) |
| Visually attractive | I could manage my focus to images …like (pg3/bhfa) | This was simple… as if I was watching a movie. (pg2/hald) | I am not literate still I received through moving pictures (pg2/mezw) | …I could connect the issues like Gangrene through these visual clips. I am the witness of such events (pg3/sati) | …the photos are good and I could understand exactly what to do. (pg2/palw) |
| Holistic and recapitulation value | I had the information … but this session will help me to remember the facts (pg3/bhfa) | …you told everything, don’t think you missed something. (pg3/mezw) | • you told everything, don’t think you missed something. (pg3/mezw) | …why waking, diet and medicine are equally important in Diabetes; I understand it now so I will stick to them (pg3/sati) | …it’s very stirring that how a disease can affect the whole body… it should be taught to every Diabetes patient. (pg4/palw) |
patient in understanding the disease in totality. This information will equip the patient to logically connect the issues related to medication, lifestyle changes, and associated actions so as to arrest the complications. In the context of diabetes, it is even more important for preclusion/early identification of complications and adherence to medication.[23‑26]

Although this module principally delivers information and facilitates learning through visual stimulation, its uniqueness lies in the fact that it provides a learning stimulus to all three types of learners, namely, visual, auditory, and kinesthetic.[27‑29]

For visual dominant learners, this module offers dynamic graphics, captions, animations, and imposed images. This module primarily illustrates concepts in pictures. The facilitator, in the process of delivering information, offers explanation of each slide, uses verbal analogies to real-time scenarios encountered in daily life, and assembles the information by mnemonics. These explanations, analogies, and mnemonics cater to the need of auditory learners. Simultaneously, these sessions offer the “do it yourself” activities for diabetic patients like body mass index calculation, calorie counting, foot care demonstration, and inclusion of role play. These activities may be substantial learning stimuli for kinesthetic learners.

The contents and organization of the module, in accordance with all types of learners, seem to be the first reason why this module was perceived as “innovative” by the participants. The second reason behind its uniqueness lies in “open resources utilization.” “Diabetic education resources are already well developed by the academicians, physicians and organizations.”[16,31] A question may be asked, namely, “Is it simply a duplication of efforts?” The strength of this tool lies in skilful and judicious utilization of technical modalities and resources in open domains for the enhancement of learning (image imposition, simulations, analogies with apparently unrelated objects encountered in daily life, and dynamic image interface) without much developmental cost implication. From this perspective, this tool indeed promotes and advocates “open access policy” for worldwide web resources.[32,33] The role of this module can also be explored in “telecounseling,” in which these tools can be accessed through drop box on a web-based interface. Easy understandability, user friendliness, and email services are some attributes that may ensure the success of this module as a telecounseling tool.[34]

This argument is further reinforced by the fact that this tool was perceived as “concise, summative yet holistic” by the participants. The reason for this statement may be positioned in the logical arrangement of the module and its coaching in an ordered manner. This could help participants to logically connect the learning. One of the participants said, “Ye jaankari to humne pahle bhi lene kii koshish kii thi, par yaha se aab hum samjhne bai ki hume bha kya hai, aage kya bo sakta hai aur use bachiya kaise hai (We tried to retrieve this information before as well, but it is only now that we know what we are suffering from, what can happen in the future, and how to forestall that).” Evidences also support that when a complex phenomenon is broken into logically structured and connected segments, the probability to comprehend and store the new facts become manifold.[35,36]

The early evidences generated through this study have motivated the authors to expand this module both in a synchronous and asynchronous manner in the future. The ultimate vision of this exercise is to establish a cadre of informed peer support groups for diabetic patients and to delegate the customary routine care from a single person (physician) to other well-informed and motivated persons, making possible the decentralization of health care.

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