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Impact of digital media on the self care skills of diabetic patients

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Abstract

Diabetes is a lifestyle disorder that needs a combination of medication, diet and exercise for effective glycemic control and to minimize the long term complications associated with the disease. This can be possible through education, which provides the opportunity to develop necessary skills to be self-reliant. Education through digital media would be effective due to its fast reach to all kinds of patients. With this, intention the present paper aimed to assess the impact of digital media on the self care skills of the diabetic patients. Two hundred respondents suffering from type2 diabetes from Guntur district of Andhra Pradesh were selected based on a simple random sampling method. A total of 90 text and 30 voice messages and 8 animated modules were disseminated for two months as a part of digital media education and assessed the post intervention changes in the self care skills of the respondents with a time gap of two months. The major findings of the study revealed that there was a significant improvement among the overall skills of the respondents in all the three areas of information. The improvement in clinical skills was found to be higher with a percent increase of 22.91% compared to the nutrition and management skills (19.08%, 9.85%) respectively. Thus, delivery of SMS mobile-based interventions and animation modules has bridged an effective communication channel to endeavor behavioral change, enhance disease specific self care skills and subsequently improve health outcomes.

Keywords: Diabetes, self care skills, clinical, nutritional, management skills, text, voice messages and animation modules

Introduction

Information is cornerstone for effective self-management of the disease thereby reduces the complexity of the diseases. People with diabetes need to be informed about their condition to prevent them from worrying unnecessarily and to allow them to effectively control their condition. They will need a variety of skills and knowledge to enable them to control their condition, sometimes on a day-to-day basis, and modify their approach when circumstances change. The success of diabetes care relies mainly on patients' daily self-care activities and provider's continuous support. Diabetes, therefore, is a disease in which knowledge and necessary skills from the patient's perspective have an important role to its management.

Digital media has become part and parcel in our daily lives. It plays a vital role in development and economic growth of any country. Information and Communication Technology (ICT) is the mode of education which use information and communication technologies to support, enhance and optimize the delivery of information by processing data, information in any visual format through any multimedia distribution mechanism is considered as part of ICTs.

Animation is one of the ICT enabled educational strategy using different content formats like text, audio, images, animation, video and interactive content commonly used in various sectors like advertisements, art, education, training, entertainment, engineering, medicine, business, journalism, software, mathematical and scientific research etc. The integration of all the multimedia elements in animation increases the quality of presentation, creates interest, retains attention, imparts knowledge and improves the retention capacity creating an effective learning environment. Multimedia acts as a user friendly interface by providing cost effectiveness with greater efficiency. Delivery of SMS mobile-based interventions has bridged an effective communication channel to endeavor behavioral change, enhance disease specific knowledge, skill and attitude and subsequently improve health outcomes. By using these digital media contents like text and voice messages and animation modules, the present paper assessed the impact of digital media content on the self care skills of the diabetic patients.

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Methodology

An exploratory research design with 200 respondents suffering from type2 diabetes hailing from rural and urban areas of the Guntur district of Andhra Pradesh were selected from 3 hospitals based on a simple random sampling method. Data was collected from the respondents by using a pre-structured interview schedule. The present paper consists of three sections.

Section 1 .Development of digital media content

In the present paper different digital media content like text, voice messages and animation modules were developed based on the existing gaps in the skills of the respondents towards clinical, nutrition and management areas of diabetes. Text and voice messages were delivered through bulk messaging package by using mobile phones. By using this package sent messages to all 200 samples at a time in their native or vernacular language for better understanding. A total of 90 text and 30 voice messages were developed. Out of these 23 text messages and 10 voice messages are skill based. The animated videos were developed based on the existing gaps in the knowledge, skills, and attitude of the respondents towards clinical, nutrition and management areas. A total of 8 animated modules were developed. Diabetes, Types of diabetes, Body Mass Index, Dietary guidelines, Diabetes complications, Diagnostic tests, Glycemic index and Exercise were the topics selected for animation based on the existing behaviour domain gaps of the respondents.

Section 2. Execution of digital media content

For one-month animation modules were disseminated through what's up groups, email and focused group discussion methods to reach all the respondents. For the second one month text and voice messages were sent to all the respondents through bulk message center in the vernacular local language. Everyday 3 text messages and on voice message were sent. A total of two months the information was disseminated through different content formats to educate the patients to bring desirable changes in their behavior domains. After the education programme, post-intervention changes in the skills of the respondents were measured with a time gap of two months.

Section 3. Statistical tests

Means and standard deviations of pre and post intervention

was calculated and based on these values per increase and percent variation of different areas of information was computed. Paired t test was applied to assess the change in self care skills before and after intervention programme.

Results & Discussion

Table 1: Overall skills of the respondents after post intervention

n=200				
S. No.	Area of Information	Pre Intervention mean scores	Post Intervention mean scores	% increase
1.	Clinical	15.2	17.2	22.91%
2.	Nutrition	14.88	16.88	19.08%
3.	Management	16.66	17.66	9.85%

Concerning the overall skills of the respondents in different areas of information, clinical skills scored the highest percent increase of 22.91% followed by nutrition skills 19.08% and management skills with a percent increase of 9.85% after the post-intervention program by using different content formats such as text, voice, and animation to disseminate the information to the respondents. Highest improvement in case of clinical skills may be due to various factors like usage of the maximum number of content formats in different combinations for educating the respondents, individual preferences due to their disease condition, advanced age to take precautions like weight, regular check-up to monitor glycemic control, etc. with respect to nutrition skills the progress was due to usage of different content formats the individuals perceived that including appropriate foods such high fiber foods, low carbohydrate foods, and low glycemic foods help to improve glycemic levels. Improvement among management skills found to relatively less when compared to the above two skills may be due to limited use of content formats and simultaneously there was no special animation module for improving the management skills of the respondents except for the exercise. Andriyanto ^[1] (2019) revealed that the mean of skills increased from 5.51 to 7.13, while the mean of blood glucose decreased from 238.36mg/dl to 231.63mg/dl after the intervention. There were significant differences in knowledge, attitudes, skills ($p=0.001$), and glucose control ($p=0.04$) of type-2 diabetes after the implementation of EMAS interventions (education, nutrition management, physical activities, and stress management).

Table 2: Overall Clinical skills of the respondent's after post intervention

n=200					
S. No	Class Interval	Range	Pre intervention (n)	Post intervention (n)	% variation
1	Poor	10-13	140	76	46%
2	Fair	14-17	32	63	49%
3	Good	18-21	28	61	54%

With regard to the overall clinical skills of the respondent's majority of the respondents had good clinical skills with a percent variation of 54% followed by fair skills (49%) and poor skills (46%) after post-intervention. The improvement in skills may be due to increased awareness of BMI; HbA1c tests the respondents were able to follow weight management and regular monitoring practices. Didarloo *et al.*, (2020) ^[2]

indicated after intervention, there was a significant difference between two groups in terms of the mean scores of knowledge ($P<0.001$), attitude ($P<0.01$), self care ($P<0.001$), and behavior ($P<0.001$). The findings also indicated that there were significant differences between the groups in mean scores of physical, psychological, and social domains of quality of life after intervention ($P<0.001$).

Table 3: Clinical skills of the respondents from baseline to post intervention

n=200

S. No	Statements	Pre intervention	Post intervention	Mean Absolute Difference (%increase)	Mode of intervention
		Mean±SD	Mean±SD		T+V+A
1	Interpretation of body mass index range	0.985±0.396	1.51± 0.499	0.525 (34.77%)	1+0+1=2
2	Procedure to calculate Body mass index	1.2750±0.446	1.95± 0.217	0.675 (34.62%)	1+1+1=3
3	High HbA _{1c} test results indicates higher the risk of diabetic complications	1.41± 0.491	1.9± 0.287	0.49 (25.79%)	1+0+1=2
4	Get HbA _{1c} test every 3 months to have better control of diabetes	1.115± 0.319	1.49± 0.499	0.375 (25.17%)	1+0+1=2
5	Take medication regularly	1.155± 0.36	1.52± 0.499	0.365 (24.01%)	1+0+1=2
6	Waist circumference & risk associated with diabetes	1.255±0.439	1.56±0.496	0.305 (19.55%)	1+1+0=2
7	Keep cholesterol level under control	1.345± 0.475	1.655±0.475	0.31 (18.73%)	1+0+1=2
8	Check feet regularly for sores & keep nails short	1.195± 0.396	1.335± 0.472	0.14 (10.49%)	1+0+0=1
9	Self monitoring of blood glucose levels monthly	1.31± 0.462	1.43± 0.495	0.12 (8.39%)	0+1+0=1
10	If on insulin test glucose levels frequently before and after exercise	1.22± 0.414	1.315±0.464	0.095 (7.22%)	1+0+0=1

The above Table-3 indicates the clinical skills of the respondents after post-intervention. Highly significant percent improvement was observed in case of interpretation of BMI (34.77%) followed by calculation of BMI (34.62%), able to interpret the results of HbA_{1c} (25.79%), monitoring HbA_{1c} for every three months (25.17%) and take medication regularly (24.01%). After intervention through different content formats, the respondent's awareness towards the maintenance of ideal body weight improved due to repeatedly sent messages about BMI and its calculation. For instance, to impart skill about BMI calculation along with voice message, animation on BMI is developed where it indicates how to calculate BMI in a simple way and at the same time a chart that specify the BMI of individuals according to their height, weight, and age so that the respondents can easily trace their BMI. HbA_{1c} test is another area where the respondent's pre-intervention knowledge and skills were poor hence; more priority was dispensed to diagnostic tests that need to be monitored by the diabetic patients regularly.

Rasoul *et al.*, (2019) [3] revealed the positive effect of weblog based self – management on the quality of life of patients of test and control groups was 56.1 and 49.9 respectively, and the difference between the two groups was significant ($p<0.05$). Further, reduced levels of FBS, BMI as well as

systolic and diastolic blood pressure were also observed, which could be due to increased awareness of patients about their abilities, its risks, as well as the ways to control and treat it.

Abbas *et al.*, (2015) [4] revealed that the results of the study indicated that in addition to significant improvement in patients' knowledge, mean fasting blood glucose level improved from 8.60 ± 3.16 to 7.77 ± 3.11 mmol/L and mean HbA_{1c} decreased from $9.9\% \pm 1.8\%$ to $9.5\% \pm 1.7\%$. Thus mobile phone text messaging increased adherence to diabetes therapy and improved the clinical outcome in Saudi patients with type 2 diabetes.

Considerable improvement was seen among the association of waist circumference and diabetes (19.55%), keep cholesterol (18.73%) was recorded after post-intervention as the respondents received text, voice messages, and animation module on complications where preliminarily addressed the harmful effects of cholesterol for diabetic patients.

Low percent of progress was noted in the case of checking feet (10.49%), self-monitoring of insulin (8.39%), and testing glucose level before and after exercise (7.22%) due to limited respondents on insulin therapy further, educated about these aspects through single content format.

Table 4: Overall nutritional skills of the respondent's after post intervention

n=200

S. No.	Class Interval	Range	Pre intervention (n)	Post intervention (n)	% variation
1	Poor	10-13	123	75	39.02%
2	Fair	14-17	46	81	43.21%
3	Good	18-21	31	44	29.55%

From the findings of the above table (4), it can be observed that the majority of the respondents had fair nutrition skills with a percent variation of 43.21% followed by poor skills with a percent variation of 39.02% and good skills with a percent variation of 29.55%. It was evident from the findings that there was a significant improvement from poor to fair and good skills after the intervention of various nutritional skills like including fiber foods like millets, whole grains rather than polished ones to reduce the carbohydrate content of the

foods, practicing foods with small and frequent intervals and avoiding sugar in beverages so on and so forth. Hailu *et al.*, (2019) [5] revealed that after diabetes self- management education (DSME) the mean diabetes knowledge score was significantly greater in the intervention group ($p=0.044$) compared to control group. Further, the intervention group followed specific dietary recommendations ($p=0.019$), foot care practice ($p=0.009$) for significantly greater number of days.

Table 5: Nutrition skills of the respondents from baseline to post intervention

n=200

S. No	Statements	Pre intervention	Post intervention	Mean Absolute Difference (% increase)	Mode of intervention T+V+A
		Mean±SD	Mean±SD		
1	Include high fiber in the diet	1.3700± .482	1.74±0.560	0.37(21.26%)	2+0+1=3
2	Glycemic index of foods depends on type of food, rate of absorption	1.3000± .458	1.57± .495	0.27(17.00%)	1+1+1=3
3	Proper portioning of foods should be done to reduce the amount of carbohydrates in the diet	1.3050± .460	1.535±0.498	0.23(14.98%)	1+0+1=2
4	Eat small portions with frequent intervals	1.455± 0.498	1.6700± .556	0.215(12.87%)	1+0+1=2
5	Intake of low amount of fat variation insulin binding	1.3100± .462	1.48± 0.499	0.17(11.49%)	1+0+1=2
6	Avoid sugar in beverages	1.2600± .438	1.4± 0.489	0.14(10.00%)	0+0+1=1
7	Eat plant protein than animal protein	1.4400± .496	1.58±0.493	0.14(8.86%)	1+0+0=1
8	Use different types of oils compared to same type of oil	1.2250± .417	1.3250±.468	0.1(7.55%)	1+0+0=1
9	Eat small portion of sweets with other foods rather than taking alone	1.4000± .489	1.47± 0.499	0.07(4.76%)	1+0+0=1
10	Use artificial sweeteners	1.505± 0.500	1.47± 0.499	0.035(2.33%)	0+1+0=1

The results in the table-5 reveal that the respondents had noteworthy progress in including fiber foods in their daily diets (21.26%), able to understand factors influencing glycemic index of foods (17.00%), proper portioning of food to reduce the high amount of carbohydrate in the diet (14.98%), eating small portions with frequent intervals (12.87%) and low amount of fat to bind insulin (11.49%) after post-intervention. This might be because animation modules through focused group interaction were implemented in educating the respondents where they got the chance for face to face interaction to solve their problems. Particularly the respondents had low pre-intervention knowledge about fiber foods to vegetables and fruits and also have confusion about portion sizes this problem was solved by providing examples of a different combination of foods like roti with rajma curry, consuming millets to reduce carbohydrate, the amount of fruit

portion to be included in the diet so on so forth after the post-intervention. Salahshouri *et al.* (2018) [6] revealed that the mean scores of adherence to a healthy diet in the intervention group had significantly increased compared to those in the control group. There was correspondingly a significant descending trend in the average levels of fasting blood sugar (FBS) and glycated hemoglobin (HbA1c) in the intervention group compared to those obtained in the control group ($p=0.001$).

Even though having adequate knowledge gain the respondents felt difficult to practice certain aspects like avoiding sugar in beverages (10.00%), eating plant protein (8.86%), and usage of different types of oils (7.55%), eat small portions of sweets with other foods (4.76%) and usage of artificial sweeteners (2.33%). Hence relatively less percent improvement when compared to the above nutritional skills.

Table 6: Overall management skills of the respondent's after post intervention

n=200

S. No.	Class Interval	Range	Pre intervention (n)	Post intervention (n)	% variation
1.	Poor	11-14	63	50	20.63%
2.	Fair	15-18	103	92	10.68%
3.	Good	19-22	34	58	41.38%

About management skills of the respondent's majority had good skills with a percent variation of 41.38% followed by poor skills (20.63%) and fair skills (10.68%). This indicates that the percent of poor skills decreased and enhanced good skills by the respondents after the post-intervention education program where, information was disseminated in different content formats like text, voice, and animation. Chawla *et al.*,

(2019) [7] indicated that education on various aspects of diabetes, its drugs, dietary & lifestyle modification along with patient education leaflet showed a significant increase of knowledge, attitude and practice of scores (10.28 ± 1.78 , 3.46 ± 0.93 , 3.14 ± 0.86) respectively at the end of the study compared to controls.

Table 7: Management skills of the respondents from baseline to post intervention

n=200

S. No	Statements	Pre intervention	Post intervention	Mean Absolute Difference (% increase)	Mode of intervention T+V+A
		Mean±SD	Mean±SD		
1	Exercise at least 3-4 times per week	1.05± 0.477	1.5850± 0.492	0.935(47.1%)	1+1+1=3
2	Drink water after the exercise to prevent dehydration	1.375± 0.156	1.4250± 0.494	0.55(28.48%)	1+0+1=2
3	Include plenty of green leafy vegetables, salads & fruits in the menu	1.245± 0.361	1.6000± 0.489	0.355(22.19%)	1+0+1=2
4	Regular follow up visits	1.569 ±0.489	1.8450± 0.361	0.276(14.96%)	1+0+0=1
5	Management of diabetic foot ulcers	1.5100± 0.499	1.625±0.468	0.285(14.92%)	0+1+0=1
6	Reduced of intake of fried snacks	1.051± 0.499	1.3250± 0.468	0.074(6.58%)	0+1+0=1
7	Cook foods on steaming method rather than frying	1.22± 0.414	1.3± 0.458	0.08(6.15%)	1+0+0=1

8	Maintain blood pressure to avoid hypertension	1.3250± 0.4684	1.375± 0.484	0.05(3.64%)	0+1+0=1
9	Follow the dietary recommendations prescribed by doctor	1.3250± 0.4684	1.375± 0.484	0.05(3.64%)	0+1+0=1
10	Follow a certain time for meal consumption	1.0425± 0.4943	1.3750± 0.484	0.0325(3.02%)	0+0+1=1

From the table- 7 it can be inferred among management skills of the respondent's high significant improvement was found in doing exercise at least three times a day (47.1%) followed by drink water after exercise to prevent dehydration (28.48%), including plenty of green leafy vegetables, salads & fruits in the diet (22.19%), regular follow up visits (14.96%) and management of diabetic foot ulcers (14.92%). This remarkable improvement in these aspects was achieved by using different content formats like text, voice, and animation after post-intervention. To fortify the practice the same messages were repeated in text and voice formats to limit the odds of not reaching the information. Further, an animation module completely on exercise was developed and disseminated which includes the role of exercise in controlling the blood glucose levels; types of various exercises based on individual preferences were explained through focused group discussion. Low cost, high fiber foods such as green leafy vegetables, guava, apples, and oranges were coated as examples in messages and animations to encourage the respondents to include at least one green leafy vegetable and one fruit every day in their diet. Saleh *et al* (2017) [8] revealed that after the intervention about 67.7%, 85.2%, 82.8% & 92.1% of the patients monitored their blood glucose, did exercises, practice foot care and withdrew smoking respectively, compared with 8.3%, 69.2%, 25.8% and 86.7% at the present. Further 25.5% of the patients

followed the dietary advice of the dieticians, which was only 5.2% before the intervention. The differences in following the certain time & weighing food before taking between pretest and post test rates were significant.

The average percent increase was observed in case of minimizing fried snacks by quoting examples like having boiled green gram, chana, sprouts, and fruits as snacks (6.58%) and motivated steamed foods like (6.15%) idly, dhokla, grilled sandwich, curries in the form of gravies rather than fries through text messages as the respondents acquire easily because most of the examples are based on local food and cooking practices. Buis *et al.* (2013) [9] indicated that SMS have positive perception and bring positive behaviour change. The respondents in study agreed that messages were clear and easy to understand. Messages had brought behaviour changes related to diet. 78 % strongly agreed to replace sugary drinks, such as juice or soda, with water. The majority of respondents (74.2%) indicated to have a piece of fresh fruit instead of desserts, 76.1% preferred to buy healthier foods and 75.5% indicated to eat more grilled, baked or broiled foods instead of fried.

Less percent increase was seen concerning certain aspects like maintaining blood pressure to avoid hypertension (3.64%) followed by dietary recommendations prescribed by a doctor (3.64%) and following regular meal consumption timings (3.02%).

Table 8: Change in overall skills of the respondents after post intervention

Mean Post Intervention	Mean Pre intervention	Difference (% increase)	Paired t-test result p-value
17.24667	14.28	2.9667(17.20%)	0.0444

From the paired t-test results after post-intervention (Table-), it was apparent that there was a significant difference of 2.96 in the skills of the respondent's pre and post-intervention as t value was found significant at < 0.05 level of probability. Thus, the null hypothesis was rejected and the empirical hypothesis may be accepted. The results are in confirmation with the results of Farahani *et al.*, (2016) [10] revealed that a self care multimedia based intervention programme was conducted for the experimental group and after eight months of intervention programme remarkable progress in self care behaviour of the respondents was observed and no changes in control group.

Conclusion

The inference drawn from the above findings is that there was a significant improvement among the overall skills of the respondents when the information is disseminated by using different content formats like text, voice messages and animation modules after post intervention compared to pre intervention. Further, the respondents had a remarkable improvement among clinical skills due to the usage of more number of digital media contents compared to nutrition and management skills. From the above findings it was clear that animation, text and voice messages played a significant role in improvement of skills of the diabetic patients and enabling them to take self control of their own condition and integrate effective self-management into their daily lives.

References

- Andriyanto A, Rekawati E, Rahmadiyah DC. Increasing Knowledge, Attitudes, Skills, and Glucose Control in Type-2 Diabetic Patients through EMAS Interventions. *Nurse Media Journal of Nursing*. 2019; 9(2):141-150.
- Didarloo A, Shojaeizadeh D, Alizadeh M. Impact of educational intervention based on interactive approaches on beliefs, behavior, hemoglobin A1c, and quality of life in diabetic women. *International journal of preventive medicine*, 2016, 7.
- Rasoul AM, Jalali R, Abdi A, Salari N, Rahimi M, Mohammadi M. The effect of self-management education through weblogs on the quality of life of diabetic patients. *BMC medical informatics and decision making*. 2019; 19(1):205.
- Abbas BB, Al Fares A, Jabbari M, El Dali A, Al Orifi F. Effect of mobile phone short text messages on glycemic control in type 2 diabetes. *International journal of endocrinology and metabolism*, 2015, 13(1).
- Hailu FB, Moen A, Hjortdahl P. Diabetes Self-Management Education (DSME)—Effect on Knowledge, Self-Care Behavior, and Self-Efficacy among Type 2 Diabetes Patients in Ethiopia: A Controlled Clinical Trial. *Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy*. 2019; 12:2489.
- Salahshouri A, Alavijeh FZ, Mahaki B, Mostafavi F. Effectiveness of educational intervention based on psychological factors on achieving health outcomes in

- patients with type 2 diabetes. *Diabetology & metabolic syndrome*. 2018; 10(1):67.
7. Chawla SPS, Kaur S, Bharti A, Garg R, Kaur M, Sooin D, Pal R. Impact of health education on knowledge, attitude, practices and glycemic control in type 2 diabetes mellitus. *Journal of family medicine and primary care*. 2019; 8(1):261.
 8. Saleh F, Afnan F, Ara F, Mumu SJ, Khan A. Diabetes education, knowledge improvement, attitudes and self-care activities among patients with Type 2 Diabetes in Bangladesh. *Jundishapur Health Science*. 2017; 9:36058.
 9. Buis LR, Hirzel L, Turske SA, Des Jardins TR, Yarandi H, Bondurant P. Use of a text message program to raise type 2 diabetes risk awareness and promote health behavior change (part I): assessment of participant reach and adoption. *Journal of medical Internet research*. 2013; 15(12):e281.
 10. Farahani MF, Purfarzad Z, Ghorbani M, Zare ZG, Ghorbani F. The impact of multimedia software support on the knowledge and self-care behaviors of patients with type 2 diabetes: A Randomized Clinical Trial. *Journal of caring sciences*. 2016; 5(2):111.