

Education Through Social Media. Another Step Towards Improving the Quality of Life for Diabetics?

¹Lucie Cerna, ¹Petra Maresova and ²Jozefína Stefankova

¹University of Hradec Kralove, Faculty of Informatics and Management,
Rokitanskeho 62, Hradec Kralove, Czech Republic

²Diabetologic Ambulance, K Sokolovni 309, Hradec Kralove, Czech Republic

Abstract: Diabetes Mellitus is one of the most widespread chronic diseases. The largest expenditures in this area are mainly related to the complications. Therefore, it is important to prevent the development of complications and follow the recommendations from a physician. For this reason, it is necessary to provide education to the patient. This article describes the phases of diabetic education and how the social media can be involved into education (by sharing experiences, knowledge etc.), because social networks are an ideal platform for potential use in the health sector. The main objective of this paper is to describe a model that includes social media in the classic process of education of diabetics. The one part of this model is also an evaluation system of functionality to confirm that education through Facebook is beneficial option of group education. The model was based on the standards of diabetes self-management education and support and from analyses of already existing social groups.

Key words: Education • Diabetes Mellitus • Social Media • Facebook

INTRODUCTION

Diabetes Mellitus (DM) is a chronic disease characterised by metabolic disorders. The human pancreas cannot produce insulin in the long term or the body is not able to properly use the insulin produced [1].

The prevalence of diabetes across all countries is constantly growing along with the associated treatment costs. The situation needs to be addressed and focus mainly on the control of the disease itself for delaying the complications. With the development of information and communication technologies the entire society undergoes major changes. Modern technology not only saves costs, but health care becomes more accessible, data about the sick population is gathered, it enhances the diagnostic and therapeutic processes. It brings a new opportunity to involve the patients themselves in controlling their own health condition.

According to recent surveys, it is estimated that more than 70% of all Internet users use some kind of social media and 52% of the adult population uses more than one social medium [2]. Taking into account the fact that

currently more than one billion telephones and 100 million tablets are in operation, makes them an ideal platform for potential use in the health sector [3]. Modern social media in health care can be divided according to different purposes: support, education, diagnosing illnesses, treatment management of disease.

Persons suffering diabetes are forced every day to oversee several areas of their health, whether monitoring blood sugar level, body weight, carbohydrate intake or insulin doses. Along with this it is necessary to prevent the complications of diabetes. The collected data provides a complete view of the patient's health condition. However, it is also necessary to analyse the data correctly. Patient education is therefore very important. This can be done individually or in groups. According to a study going on in 1997 and 1999 it showed that group or individual education significantly contributes to the expansion of patients' knowledge with regards to DM, reduced Body Mass Index (BMI), improved quality of life, improved self-management behaviour and last but not least, it showed that education led to the reduction of HbA1c ($8.5 \pm 1.8\%$ to $6.5 \pm 0.8\%$) during six months of the

study in the participants aged 30 to 80 years. Slightly higher improvement in HbA1c was observed in patients who participated in group education compared to individual education [4]. Similar results were found in another study carried out in the Latin American countries. Education had a significant effect on the improvement of the values of fasting blood glucose, weight, systolic blood pressure, cholesterol and also HbA1c (from 9 ± 2.0 to $7.8 \pm 1.6\%$) [5]. It should also be emphasised that the decrease in HbA1c by only 1% leads to a reduction in the occurrence of microvascular complications by up to 37% and specific mortality by 21% [6]. Education contributes significantly to reducing the number of hospitalisations and readmissions, which has an economic impact and reduces the total cost for treatments [7].

The present time trend is not only to read the information on the Internet, but to actively participate. The social networks allow people to create, add, comment on content, share experiences or generally communicate with others. The most famous social networks include Facebook, Youtube, Twitter, Pinterest and Skype. Social networks are a phenomenon of the 21st century and according to estimates, more than half of the Internet users older than 65 years have an established Facebook account [2]. This raises the ideal space to get these social networks involved in group education. Facebook offers the option to create sites that are intended mainly for commercial purposes. However, using the same tools to create a physician site, makes sharing necessary information and advice much easier. It happens that a patient makes a mistake in their treatment and doesn't know how to continue to remedy the situation. The easiest way is direct consultation with a physician, who would in time respond to the problem and advice the patient on the follow-up steps to prevent deterioration of the patient's health condition. If a patient asks a question through the site, the physician responds through the media and at the same time they teach more patients, who follow this site. Another tool available for communication and information source is the variant of various social groups bringing together people with the same interest/concern etc. It's a very simple way how a patient can consult their concern with other diabetics. Membership in the group gives the patient a sense of belonging, which has an impact on their psyche. Farmer *et al.* [8] analysed ambient activities of common medical conditions on Facebook. The result discovered that thanks to the Facebook social networking site, there are many interactions through social groups (including groups joining diabetics), which without this platform

could never exist. Among patients with diabetes networking via Facebook [9], the most common discussion thread topics included:

- Sharing personal clinical information,
- Requesting disease-specific guidance,
- Receiving emotional support.

A study of the preferences for online diabetes support found that adults generally prefer professionally moderated discussion[10].

McMahon [11] introduces the resources available to diabetes patients and carers against the backdrop of the limitations that medical practices face in meeting patients' information and support needs. Social media is described, along with ways in which health care providers might leverage digital technology to better support their patients. In the longer term, engaging with patients via social media in the care of diabetes will offer communication efficiencies that promise to deliver a significant return on any investments of time and money. Warshaw [12] states that there are portals to online diabetes communities. The latest research findings can be found there, stay abreast with the newest diabetes devices and technology advances or approvals of new medications. Furthermore, Hilliard *et al.* [13] introduces platforms on which Diabetes Online Community participants interact, to discuss reasons for and risks associated with diabetes-related online activity. The research proved that participation in these blogs brings peer support, advocacy, self-expression, seeking and sharing diabetes information, improving approaches to diabetes data management and humour. Potential risks include access to misinformation and threats to individuals' privacy. The Internet provides opportunities to strengthen communication and support among individuals with diabetes, their families, health care providers, the health care industry, policy makers and the general public.

Given the growth and widespread nature of online support for those with health conditions, relatively little research has explored specific aspects of online use and associated outcomes among patients with chronic illness, including diabetes [14].

The next step is to connect social media with mobile phones through various applications. The applications themselves contribute to improved health condition and self-management. The patients think about their illness, they can immediately see responses to the resulting values and sets their own future goals. Some studies have

already shown a reduction in glycated haemoglobin in connection with the use of mobile applications and overall better adherence [15]. Mobile applications can be included in the field of telemedicine [16-17]. Izquierdo *et al.* [18], based on the study, stated that improvement through education was not significantly different from the education in person or via telemedicine. Telemedicine contributes to improving the health side as well as the psyche. Nobis *et al.* [19] confirmed the efficacy of a guided web-based intervention in reducing depression in adults with type 1 and type 2 diabetes.

The main objective of this paper is to include social media in the classic process of education for diabetics. To create an evaluation system of functionality to confirm that education through social media is another option of group education, which itself contributes significantly to improvements in the health condition of diabetics.

MATERIALS AND METHODS

First, a literature review was conducted of the available publications dealing with education of diabetics, social media in healthcare, educating through social media. Available publications were found through the database of the National Centre for Biotechnology Information (NCBI), ScienceDirect or the American Diabetes Association (ADA) database. The terms of "social media", "education of diabetics", "Facebook", or "standard procedure of diabetes education" and the combination of these key terms were used to search the publications. Each study was analysed and using analogies they sought the common features which would confirm the importance of patients' education and its impact on improving various aspects of the health of diabetics.

The creation of the model for the involvement of social networking in education was based on the standards of diabetes self-management education and support (DSME/S) obtained from several publications [7, 20, 21] Then the activities of an already established social group on Facebook called "The Club of Mothers of Diabetic Children" or "Diabetes Mellitus type 1" were analysed. Subsequently, the resulting model was consulted with the diabetologist. It was Facebook that became crucial for the model, since it is the most widespread network across age groups [2]. It is also certain that other social networks such as YouTube, are widely used in the group education of patients, however, the model does not include this option.

RESULTS

Backgrounds of the Model - Standard Diabetes Self-management Education and Support (DSME/S):

Education can include such activities that enhance the knowledge, experience and skills important for diabetes self-care.[22-23] It is possible to define four critical stages of education (Fig. 1). The first of these is the Diagnosis of the disease. This phase should mainly take place individually. The patients should be familiar with basic information that should be focused on the treatment goals, self-monitoring, method of treatment, detection of hyperglycaemia and hypoglycaemia, dietary measures and basic regimen measures. Psychological intervention is also an essential part. The patient must accept the disease and not underestimate it. The first phase lasts several weeks or months. It is important to also involve family members in the education, who like the patient must have basic knowledge and skills related to DM. The next step is the annual assessment of education, nutrient and emotional needs. There is already a comprehensive education. Basic knowledge should include the adoption and access to the more specific questions and then evaluation whether the established procedure and approach to disease correspond to specific recommendations. At this stage it is appropriate to involve group education. Patients can share their experiences that can broaden the knowledge, change the approach to the disease and motivate each other. Another advantage is that the information is communicated to a greater number of patients. An important part of group education is involving practical demonstrations, provision of a sufficient number of educational materials.

Another critical factor for the education is the case when there is a complication associated with diabetes. First, it is necessary to re-educate the diabetics and then to focus on the psychological aspect of the patient. The patients may have the impression that they have failed. Patient' motivation and improvement of their mental side contribute significantly to improving the health status of the patient. The last critical phase are situations related to hospitalisation or placement in special facilities where there is a change in the lifestyle and the routine to which the patient has been used to. Education should copy the situation and respond to it adequately.

Social networks can contribute significantly to the first three critical points (At Diagnosis, Annual Assessment of Education, Diabetes-related Complications). In all these phases it provides patients

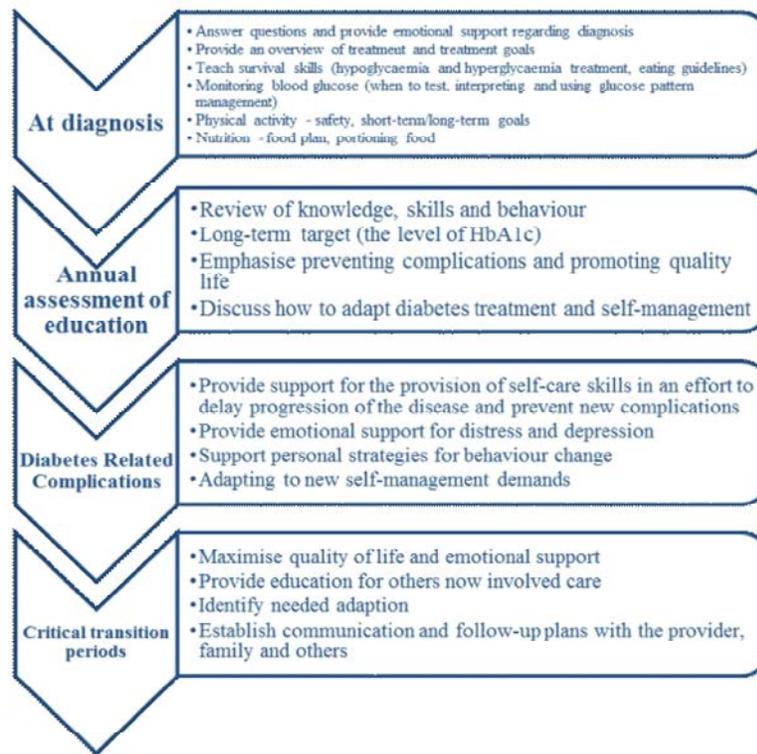


Fig. 1: Diabetes self-management education and support: Four critical times to assess, provide and adjust diabetes self-management education and support (Source: custom processing according to Powers *et al.* [7])

with psychological support as well as the source of information. In the first two points it can also significantly contribute to the expansion of knowledge and learning from other patients by sharing personal experiences.

Group Education Phases Through the Facebook Social Network: Based on the interview with a physician and analysing current activities on social networks, a model was designed which is shown in Figure 2. This is a simple process of introducing the Facebook social network into group education. Facebook tools are available only for users of the social network and hence it is necessary to create a physician profile. In this section, the emphasis is put on the information that will be accessible to other users. The physician has to separate personal life with work.

A page of diabetes care/counselling is created for sharing the information related to DM and the patients themselves. Patients can find basic information (opening hours, address, contact). This page allows direct communication with the people who follow this page. The physician may share interesting articles, videos, possibly photos that are directly or indirectly related to DM. The content should correspond with the content

of group education organised in a conventional manner. It should provide basic information on how to set the objectives of the treatment, fundamentals of self-monitoring, treatments for diabetes, symptoms of hyperglycaemia or hypoglycaemia, diet and basic regimen measures. The information is needed to be shared gradually so the followers have time to spot it and possibly express their opinion.

Another potential tool for communication between patients themselves is a social group. On Facebook you can create several types: public, private and confidential. The difference in the various types is in the possibility of accession to the groups. For the purpose of education a private group is formed, i.e. the administrator allows membership in the group. The administrator of the group is only the physician who expresses their views on outpatient care through the site. This way the patient finds that the advice is from a specialist and at the same time the physician maintain their privacy. Part of the education through social group is open debate on a certain situation which the patient could come across (forgetting to take medication, diet mistake, flu treatment, etc.). With concern to finding a Facebook page and social group, the patients will be informed via e-mail and during a regular visit to the clinic.

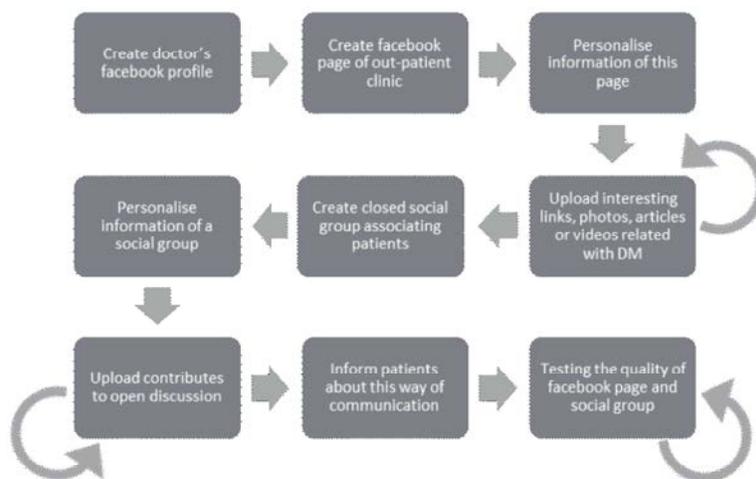


Fig. 2: The phases of introducing the Facebook social network into group education (Source: custom processing)

Great emphasis is also placed on the page quality testing. It will be implemented in elementary intervals, i.e. 3 months, 6 months and 12 months after the introduction. The interval is based on the patients' visits to an out-patient facility. The patient usually visits the physician once every three months, once a year complete blood tests are carried out and the patients undergo a visit to an eye doctor. Facebook activity assessment of the site will be based on the diagram [24]:

- Number of Contributions - photos, links, videos and status, comparison of different types of posts (percentage in the monitored period).
- Increase in the number of followers, comparing the number of followers in different reporting periods.
- Indicator of users' engagement, comparing the number of active followers and a number of likes.
- Quality indicators of support, comparison of the number of quality and correct answers to the followers' questions.

Along with quality testing of the sites, feedback from the patients themselves will be monitored. Members of the social network will be asked a few basic questions: whether through the social group they have changed their bad habits in treatment, whether there has been an improvement in some indicators of good glycaemic control (HbA1c, self-monitoring, BMI, etc.), whether they have broadened their knowledge and whether they feel that sharing their experience has contributed to an improved mental state and understanding of the disease. Through the social network, an invitation to an event of the group education will be sent and later it will be compared whether interest in group education has

increased or not. The testing will be conducted at the same intervals as quality testing of the sites and social groups, i.e. after 3, 6 and 12 months after the involvement to the social network as part of the group education.

DISSCUSION AND CONCLUSION

The topics related to diabetes education, social media or social media involvement in education have appeared in many publications, but their involvement in healthcare is still in its infancy. Based on the analogy of several studies, common features have been found, confirming the importance of education for diabetics regarding the quality of the patient's health condition. The aim was to identify the individual issues of diabetes (complications of the disease, patients' education, patient sociology, social media, etc.). To point out the benefits that social media brings and also to confirm why this possibility should be taken into account. The sharing of experience among diabetics is very important for group education. Patients learn from the mistakes of others and vice versa, they learn how to solve the situation if they were in the same place. Moreover, there is still the feeling of anonymity, which may have an impact on the openness of queries and admit to some things that they would not share with the physician in person.

However, social networks cannot replace group or individual education, but they may extend this activity outside the premises of an out-patient clinic [25]. They allow response to current situations, they support the patient/family in real time while sharing successes in treatment (improvement of HbA1c, deployment of pump, awards in sport despite DM, etc.), which contribute to reduction of depression associated with DM. The paper

pointed out the possibility of involving Facebook and introduced the basic model of integration of this network into education. Along with that a process how to test the quality of education through this medium was created. First, in terms of quality of the page itself and then also from the perspective of the health of patients.

In the next phase it is necessary to assess whether the social networks really give what is expected from them. The biggest obstacle is the fact whether the patients themselves accede to this method of communication, or whether they prefer classical form. It is also necessary to find a balance between what information is appropriate to share on social networks and which information should be dealt with only in group or individual education at the out-patient setting. At this time we cannot answer these questions, as they will take effect later in practical use.

ACKNOWLEDGMENTS

This study is supported by internal project Investment under concept Industry 4.0 at Faculty of Informatics and Management, University Hradec Kralove, Czech Republic.

REFERENCES

1. International Diabetes Federation, 2013. IDF Diabetes Atlas Sixth edition. Retrieved from: http://www.idf.org/sites/default/files/EN_6E_Atlas_Full_0.pdf.
2. Duggan, M., N.B. Ellison, C. Lampe, A. Lenhart and M. Madden, 2015. Social Media Update 2014. Pew Research Center. Retrieved from: <http://www.pewinternet.org/2015/01/09/social-media-update-2014/>.
3. Martínez-Pérez, B., I. De la Torre-Díez and M. López-Coronado, 2013. Mobile Health Applications for the Most Prevalent Conditions by the World Health Organization: Review and Analysis. *Journal of Medical Internet Research*, 15(6): 120.
4. Rickheim, P.L., *et al.*, 2002. Assessment of group versus individual diabetes education a randomized study. *Diabetes Care*, 25(2): 269-274.
5. Gagliardino, J.J. and G. Etchegoyen, 2001. A Model Educational Program for People with Type 2 Diabetes A cooperative Latin American implementation study (PEDNID-LA). *Diabetes Care*, 24(6): 1001-1007.
6. Stratton, I.M., A.I. Adler, *et al.*, 2000. Association of glycaemia with macrovascular and microvascular complications of type 2 diabetes (UKPDS 35): prospective observational study. *British Medical Journal*, 321: 405-412.
7. Powers, M.A., J. Bardsley, M.Cypress, P. Duker, M.M. Funnell, A.H. Fischl and E. Vivian, 2015. Diabetes Self-management Education and Support in Type 2 Diabetes A Joint Position Statement of the American Diabetes Association, the American Association of Diabetes Educators and the Academy of Nutrition and Dietetics. *The Diabetes Educator*, 41(4): 417-430.
8. Farmer, A., C. Bruckner, M. Cook and S. Hearing, 2009. Social networking sites: a novel portal for communication. *Postgraduate Medical Journal*, 85: 455-9.
9. Greene, J. and J.H. Hibbard, 2012. Why Does Patient Activation Matter? An Examination of the Relationships between Patient Activation and Health-Related Outcomes. *Journal of General Internal Medicine*, 27(5): 520-526.
10. Zrebiec, J.F., 2005. Internet Communities Do They Improve Coping With Diabetes?. *The Diabetes Educator*, 31(6): 825-836.
11. McMahon, K.L., 2013. Power and pitfalls of social media in diabetes care. *Diabetes Spectrum*, 26(4): 232-235.
12. Warsaw, H., 2010. Top Seven Diabetes Blogs/Social Networking Sites. Retrieved from: <http://www.hopewarshaw.com/blog/top-seven-diabetes-blogsocial-networking-sites>.
13. Hilliard, M.E., K.M. Sparling, J. Hitchcock, T.K. Oser and K.K. Hood, 2015. The emerging diabetes online community. *Current Diabetes Reviews*, 11(4): 261.
14. Peyrot, M., R.R. Rubin, T. Lauritzen, F.J. Snoek, D.R. Matthews and S.E. Skovlund, 2005. Psychosocial problems and barriers to improved diabetes management: results of the Cross-National Diabetes Attitudes, Wishes and Needs (DAWN) Study. *Diabet Med.*, 22(10): 1379-1385.
15. Arnhold, M., 2014. Mobile Applications for Diabetics: A Systematic Review and Expert-Based Usability Evaluation Considering the Special Requirements of Diabetes Patients Age 50 Years or Older. *Journal of Medical Inter-net Research*, 16(4): 104.
16. Singh, P.K., P.K. Panda and O.P. Sangwan, 2015. A Critical Analysis on Software Fault Prediction Techniques. *World Applied Sciences Journal*, 33(3): 371-379.
17. Zainol, N., Z. Zakaria, *et al.*, 2015. Comparative Study of Antenna Designs with Harmonic Suppression for Wireless Power Transfer. *World Applied Sciences Journal*, 33(3): 380-392.

18. Izquierdo, R.E., P.E. Knudson, S. Meyer, J. Kearns, R. Ploutz-Snyder and R.S. Weinstock, 2003. A comparison of diabetes education administered through telemedicine versus in person. *Diabetes Care*, 26(4): 1002-1007.
19. Nobis, S., D. Lehr, D.D. Ebert, H. Baumeister, F. Snoek, H. Riper and M. Ber-king, 2015. Efficacy of a web-based intervention with mobile phone support in treating depressive symptoms in adults with type 1 and type 2 diabetes: a randomized controlled trial. *Diabetes Care*, 38(5): 776-783.
20. Èeská Diabetická Spoleènost 2012. Doporuèení k edukaci diabetika. [Recommendations for diabetic education]. Retrieved from: <http://www.diab.cz/standardy>.
21. Haas, L., M. Maryniuk, J. Beck, C.E. Cox, P. Duker, L. Edwards and S. McLaughlin, 2014. National Standards for Diabetes Self-Management Education and support. *Diabetes Care*, 37(1): 144.
22. Gopal, J., A.K. Sangaiah and A. Basu, 2015. Integrating Knowledge, Team, Technology and Organizational Factors: Mediating the Role of Knowledge Transfer Effectiveness with Reference to GSD Project Outcome. *World Applied Sciences Journal*, 33(1): 14-26.
23. Ariffin, Z.Z. and N. Saad, 2016. Entrepreneurship Education at Institutions of Higher Learning: Recommendations of Academics and Students in Malaysia. *World Applied Sciences Journal*, 34(12): 1770-1773.
24. Maresova, P., B. Klimova and V. Tucek, 2015. Use of social networks in banking: a study in the Czech Republic, *Applied Economics*, 47(57): 6155-6169.
25. Long, C.H.S., T.O. Kowang, *et al.*, 2016. Importance of Knowledge Management on Total Quality Management: A Review. *World Applied Sciences Journal*, 34(12): 1829-1833.