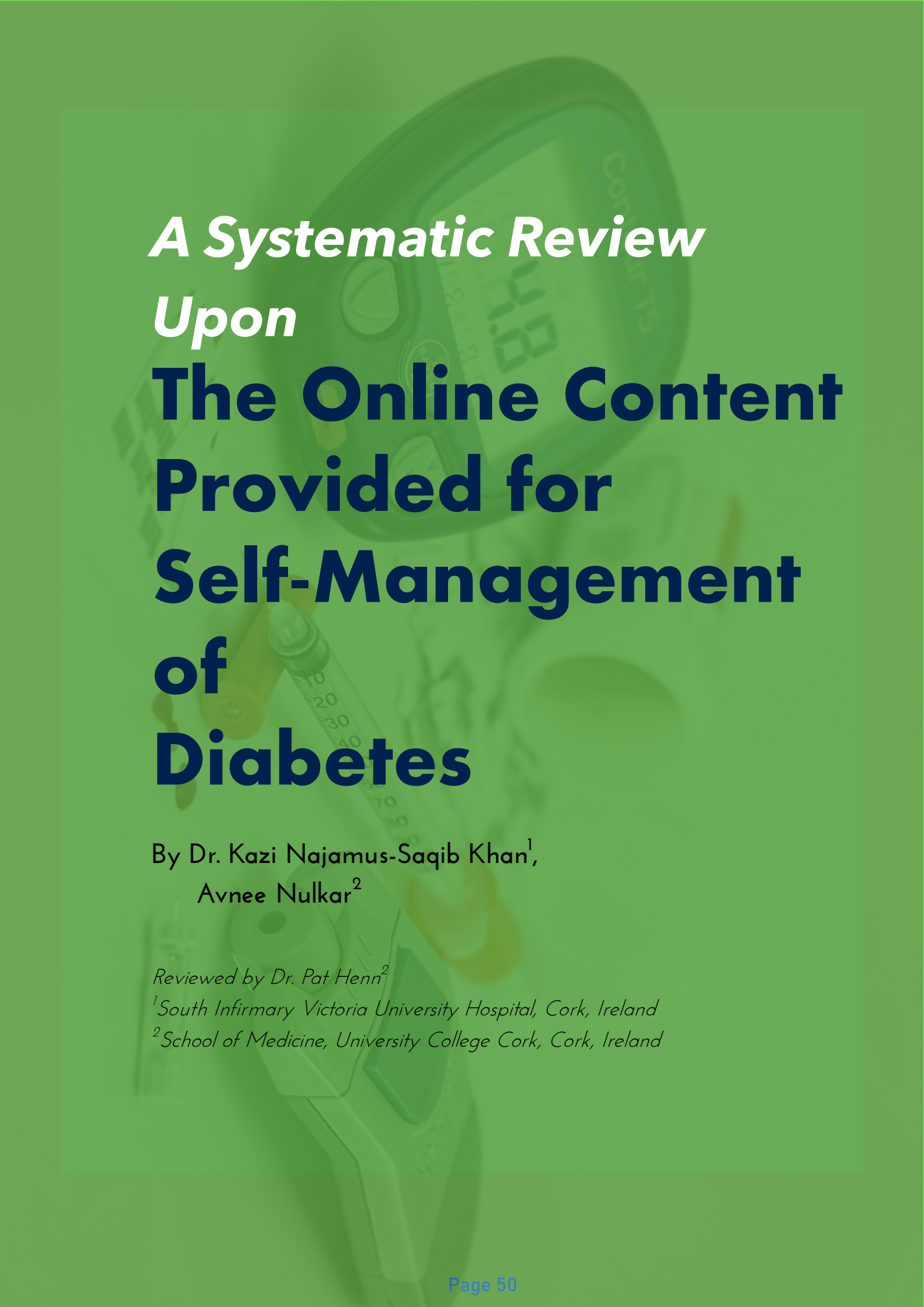
CORA Cork Open Research Archive
Cartlann Taighde Oscailte Chorcaí

Title	A systematic review upon the online content provided for self-management of diabetes
Authors	Najamus-Saqib Khan, Kazi;Nulkar, Avnee
Publication date	2019
Original Citation	Najamus-Saqib Khan, K. and Nulkar, A. (2019) 'A systematic review upon the online content provided for self-management of diabetes', UCC Student Medical Journal, Vol. 1, pp. 50-57. https://doi.org/10.33178/SMJ.2019.1.6
Type of publication	Peer-reviewed Article
Link to publisher's version	https://journals.ucc.ie/index.php/smj/article/view/4298/6464 - 10.33178/SMJ.2019.1.6
Rights	© 2019, the Author(s). This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License. - https://creativecommons.org/licenses/by-nc/4.0
Download date	2026-11-06 18:21:49
Item downloaded from	https://hdl.handle.net/10468/16538



UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh



A Systematic Review Upon
The Online Content Provided for Self-Management of Diabetes

By Dr. Kazi Najamus-Saqib Khan[1],
Avnee Nulkar[2]

Reviewed by Dr. Pat Henn[2]
[1]South Infirmary Victoria University Hospital, Cork, Ireland
[2]School of Medicine, University College Cork, Cork, Ireland

Abstract

Background

Diabetes is a major illness that requires appropriate education in order to increase one's understanding of self- management. With the advancement of the internet, the proliferation of online health-related content in supporting the management of chronic illnesses like diabetes has been ongoing; however, little is understood on the sort of acceptable and/or effective information attainable online.

Objective

The aim of this review is to evaluate the current literature in hindsight of online management in diabetes whilst establishing the effectiveness of online management tools, the quality of the online information, and the methods of obtaining online information.

Methods

A series of systematic searches of onlinedatabases were conducted in accordance with strictly defined inclusion and exclusion criteria relevant to the research question. Additionally, an evidence-based literature (EBL) checklist tool was used to assess the methodological and reporting quality of each study. Each article was peer-reviewed and screened for any biases.

Results

A result of 11 electronic searches were critically appraised using the EBL appraisal checklist tool and all were found to have overall validity. The results indicate an increase use of online technology to empower an understanding of one's own health. Web-based tools like social media were useful in promoting the management of diabetes but were not able to provide quality information.

Conclusion

Current research indicates the need for more investigation and future development of readily accessible and qualitative information in order to support the self-management of diabetes.

Introduction

Diabetes is one of the most renowned illnesses. This chronic illness is characterized with hyperglycemia precipitating a variety of clinical issues. Both T1DM and T2DM contribute to major cardiovascular implications that is the world leading cause of death.

The WHO estimated 422 million people with diabetes in 2015 [2]. In particular, Ireland estimated to have 225,840 people living with diabetes. International Diabetes Federation Diabetes Atlas further estimated that there are 207,490 people with diabetes in Ireland in the 20- 79 age group and could exceed up to 278,850 peopleby 2030 [1]. Management for this critically chronic condition is essential in healthcare and improvement in health awareness about diabetes and disease management should be tailored through continuous efforts via patient education [3].

Given that patients provide the majority of their own diabetes care, patients' self- management training has progressively become recognized as an important strategy to improve quality of care [4]. It has been shown that structured patient education programs reduce the risk of diabetes related complications four-fold [5]. Yet, participation in these self-management programs are low [4]. Interventions like structured patient education programs rely heavily upon patient motivation. The efficacy of these interventions depends on personal motivation of patients, which further speaks to the impact of self-management [4]. This gap has the potential to be bridged through the use of online resources on diabetes.

Online forums and programs have shown to be effective for a number of chronic conditions [6]. Even though there is a proportionate relationship between the use of online content and chronic conditions, information on the effectiveness of the online information specifically in the field of

management in diabetes is less understood. This literature review aims to tackle this by assessing the current literature on the efficacy of online content provided for the management of diabetes. It is hoped that this literature will help identify the gaps in the current online resources and may highlight the need for assistance in the area in the future.

Objectives

The objectives of this review are to analyze the published literature on the type of online content available for the management of diabetes to establish:

1) The effectiveness of the online management tools
2) The quality of online information on diabetes
3) The method in obtaining online information

Methods

An electronic search was carried out on two databases to identify the studies available in answering the research objectives of this review.

Search Strategy

The databases used were PubMed and Cochrane Library.

The search terms used for these databases were:

"Diabetes Online Knowledge Quality"

1) (("diabetes mellitus"[MeSH Terms] OR ("diabetes"[All Fields] AND "mellitus"[All Fields]) OR "diabetes mellitus"[All Fields] OR "diabetes"[All Fields] OR "diabetes insipidus"[MeSH Terms] OR ("diabetes"[All Fields]
   AND
2) "insipidus"[All Fields]) OR "diabetes insipidus"[All Fields])
   AND
3) online[All Fields]
   AND
4) ("knowledge"[MeSH Terms] OR "knowledge"[All Fields]))
   AND
5) ("quality"[MeSH Terms] OR "quality"[All Fields])

PubMed Database:

1) *The initial search prior to any filters brought 272 search results.*
2) *The following filters were added to reduce this field of results to a more specific set: publications within the past 5 years resulted in 168 results.*
3) *Additional limitations of free full text availability yielded 80 search results.*
4) *A filter of species of humans yielded 48 results respectively.*
5) *The remaining articles were reviewed manually by reading the titles and abstracts and a further 38 were found to be irrelevant and subsequently removed. This led to a final 10 relevant articles.*

An additional search was undertaken using Cochrane Library. The search was as follows: ***"quality online information on diabetes"***

1) *Initially, this produced 96 results and were thoroughly reviewed on the basis of the abstract and methodological approach.*
2) *This concluded with a final outcome of 3 studies.*
3) *Two of the data sets were unavailable for free full text access because of the requirement of an accessible login account, which produced one review.*

Filters:

- *Article Type – Research Articles*
- *Years Published – Published between 2013 -2018*
- *Text Availability – Open Access*

Inclusion Criteria:

- *English Language*
- *Adults age greater than or equal to 18*
- *Patients knowledge or education on diabetes assessed in study*

Exclusion Criteria:

- *Studies unavailable in English*
- *Studies that did not involve human participants*
- *Irrelevant or dissimilar methodological approach*

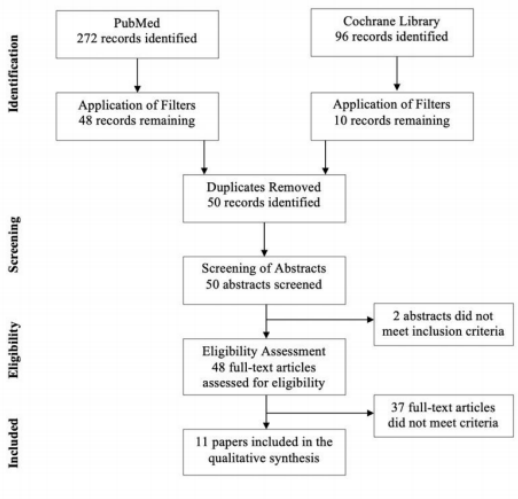
Results

Analysis of the validity of the study design found 10 of 11 studies obtained overall validity (validity score > 75%) [5-12, 14-15]. Only 4 of the 11 studies obtain validity in all subsections [5, 7, 10,16] with the remaining 7 studies having at least 1 subsection that did not achieve validity. This lack of validity was primarily due to restrictions posed by sample population and results achieved, which consistently introduced a lack of sample size or inappropriate subset analysis as a major, rather than minor, focus within the articles. The study instruments, which consisted of questionnaires, are often not validated and not included in the publication. Additionally, consent and ethical approval was often not mentioned in the publication.

Abbreviations Used in Table:

- ***DM:*** *Diabetes Mellitus*
- ***N:*** *Sample Size*
- ***T2DM:*** *Type 2 Diabetes Mellitus*
- ***RCT:*** *Randomised Control Trial*
- ***GDM:*** *Gestational Diabetes Mellitus*
- ***CMHDs:*** *Common Mental Health Disorders*
- ***PA:*** *Patient Activation*
- ***INT:*** *Intervention*
- ***UC:*** *Usual Care*
- ***DOC:*** *Diabetes Online Community*

Figure 1: Study Selection Criteria



Discussion

This review aimed to assess the efficacy of online sources and the manner in which searches were conducted. There were seven studies that attempted to evaluate the effectiveness of online information in diabetes self-management [6, 8, 9, 10, 11,15,16]. The other four studies assessed the behavior online information was obtained [7, 12, 13, 14]. From the studies, seven used a qualitative study design [7, 8, 11, 12, 13, 14, 15,], three with a randomized control trial [6, 10, 16], and one that used a web-based intervention [8].

Effectiveness of Online Tools in Management of Diabetes

From the results obtained above, the overall consensus indicated that web- based online tools proved to be a suitable way in promoting self-management of diabetes; however, online content provided very seldom accurate or readily accessible knowledge on the type of information provided. Studies by Sayakhot et al [8], Sadler et al [9], and Reininger et al [10] examined the knowledge gained from the use of online management tools. These studies indicated that the management of diabetes through an online platform is a good way in aiding self-management of diabetes. For example, Sayakhot designed an intervention using a web-based educational program for women with Gestational Diabetes Mellitus (GDM). The study found that the online program increased women's knowledge about managing their GDM. Though there was not a huge statistical gap of improvement between the intervention and comparison group predominantly due to both groups receiving an educational class beforehand, the online component provided a convenient way in self-learning of GDM for the intervention group and that access to the web-based education program at home proved as a useful source of reference for women with GDM [8]. Sadler et al. further validates this point after the study conducted that "patient referral to online tools is considered to be one key component of initial and ongoing diabetes self-management education and support and is recommended as a way to enhance and extend the reach of in-person diabetes education" [9]. Though the study from Reininger et al also agrees with this consensus, this particular research was based on a multi-ethnic approach and further found that diabetes-related information was less commonly sought online even amongst those at risk [10].

On the contrary, studies reported by Kingshuk [5] and Tang [15] did not have the same consensus. Their results founded only minimal evidence of improvement in diabetes management from the online systems. The RCT systematic review conducted by Kingshuk found that computer-based diabetes self-management interventions had limited evidence supporting their use and was poorly understood. This review also supported the suggestion that mobile phone-delivered interventions may be more effective than interventions delivered over the Internet. Within Tang's study, there was a statistical significance through online management of blood glucose between the interventional and usual care group. However, this statistically significant change had a rapid reduction in population mean Hemoglobin A1C at 6 and 12 months after randomization and was no longer statistically significant at 12 months. This study validates the assertion that diabetes self-management interventions often show evidence of short term benefits that may fade over time [5]. An assertion that should be looked closely into from the quality aspect in management of diabetes.

Quality of Online Information Provided in the Management of Diabetes

Though web-based tools may provide a useful way for the self-management of diabetes, the accessibility and quality of online information has been questioned. Research conducted by Crangle et al and Yu et al provide some indication to this. Crangle et al reported that the 10 open ended questions selected as a representative of patients' concerns about diabetes submitted to top-ranked websites across three countries failed to provide answers in their 2014 assessment. This was conducted again in a 2016 assessment and found only one answer of value for only 1 out of the 10 questions. The results showed that trusted and vetted online websites delivered general or out-of-context information online [7]. Over the course of two time periods in assessing online content, these results demonstrated the lack of quality online information available in answering specific patients questions about their diabetes. Yu et al. further signified this point from the web-based self - management site. Their results showed that participants not only wanted access to accurate knowledge about their condition but also easy-to-find answers about their diabetes care [14]. Both of these studies demonstrate the need of a readily accessible and quality online website in order to answer and promote self-management of diabetes.

Methods in Obtaining Online Information about Diabetes

Additional to evaluating the effectiveness and quality of online management of diabetes, this review aimed to seek the manner that online diabetes information was obtained. Only four studies detailed in this review provided descriptive in-depth analysis. The results from Fergie et al. provided an interesting correlation between young adults varying 18-30 years [13]. This study showed that the young adult population sought online health information varying from search engines to social media sites. This report provides the basis that social media was the primary tool in achieving the immediate distinctive goals for young adults. This research noted that since the widespread adoption of social media, user-generated health-related content has proliferated, particularly around long-term health issues such as diabetes [13]. A report from Magnezi further concluded that participation in an online health-related social network enhanced patients' self efficacy and empowerment, as they are given knowledge and tools to manage their chronic health condition more effectively [11]. On the other hand, Litchman results indicated that adults aged 53-71 in America accessed online information in another type of manner [12]. The diabetes online community was the main tool used by this elderly age group in attaining information. The diabetes online community was a way to discuss owns self-information online in order to increase knowledge with others for diabetes self-management. It was reported by Balkhi [6] that these types of forums had a high level of trust, social support, and knowledge gained. It was interesting to notice that younger adults were more inclined in using up-to-date software for self management compared to the older age group. Though there has been a proliferation of health related social media content, the quality of the information can be arguably lower compared with the diabetes online community.

Limitations & Future Research

There are variable limitations from the outcome of this paper. Pertaining to the articles, biases were screened for via peer-reviewed assessment of each study that met the inclusion criteria. Some of the studies suffered from a poor study population validity which was associated with response and non-response bias. Majority of the studies use web-based questionnaires or interventions as the primary means of data collection. It is unclear if the findings from the studies are truly representative of the population. The process of data collection may have also introduced bias since none of the measurement tools have been validated and the surveys used are often not published with the study. Lastly, because only one researcher was responsible for the evaluation of the papers, error in interpretation hence measurement bias cannot be fully eliminated.

Future research on the quality and quantity of online content for diabetes is required to provide effective information in order to aid self-management. Computer-based self-management interventions have the potential to provide a cost-effective option in reducing the burdens placed on patients and healthcare systems by this long-term condition.

Conclusion

Recent research regarding the self-management of diabetes through online platforms indicates that the topic is becoming increasingly characterized; however, when critically appraised, the quality of evidence was of insufficient means to draw a qualitative basis. In terms of the method of obtaining online information, the younger age population was less likely to access online support groups, compared to the elderly. The younger population were therefore the least effective in means of self-managing diabetes, compared to the elderly being more effective with their online community support groups. This review further dictated that web- based online tools proved to be a suitable way in promoting self-management of diabetes; however, online content provided very seldom accurate or readily accessible knowledge. More research should be conducted in order to provide an effective way in delivering readily accessible and quality- type of online information in the promotion of self-management of diabetes.

References

1. Mayo Clinic. (2018). Type 1 diabetes - Symptoms and causes. [online] Available at: https://www.mayoclinic.org/diseases-conditions/type-1- diabetes/symptoms-causes/syc-20353011 [Accessed 25 Jan 2018].

2. Sattar, H. (2017). Fundamentals of pathology. Chicago,Illinois: Pathoma.com, p.167.

3. Who.int. (2018). WHO | Diabetes mellitus. [online] Available at: http://www.who.int/mediacentre/factsheets/fs138/en/ [Accessed 25 Jan. 2018].

4. Almutairi KM. Quality of Diabetes Management in Saudi Arabia: A Review of Existing Barriers. Arch Iran Med. 2015;18(12):816-21

5. Yu CH, Parsons J, Mamdani M, Lebovic G, Shah BR, Bhattacharyya O, et al. Designing and evaluating a web-based self-management site for patients with type 2 diabetes--systematic website development and study protocol. BMC Med Inform Decis Mak. 2012;12:57.

6. Pal K, Eastwood SV, Michie S, Farmer A, Barnard ML, Peacock R, et al. Computer-based interventions to improve self-management in adults with type 2 diabetes: a systematic review and meta-analysis. Diabetes Care. 2014;37(6):1759-66.

7. Balkhi AM, Reid AM, McNamara JP, Geffken GR. The diabetes online community: the importance of forum use in parents of children with type 1 diabetes. Pediatr Diabetes. 2014;15(6):408-15.

8. Crangle CE, Bradley C, Carlin PF, Esterhay RJ, Harper R, Kearney PM, et al. Soliciting and Responding to Patients' Questions about Diabetes Through Online Sources. Diabetes Technol Ther. 2017;19(3):194-9.

9. Sayakhot P, Carolan-Olah M, Steele C. Use of a web-based educational intervention to improve knowledge of healthy diet and lifestyle in women with Gestational Diabetes Mellitus compared to standard clinic-based education. BMC Pregnancy Childbirth. 2016;16(1):208.

10. Sadler MD, Saperstein SL, Carpenter C, Devchand R, Tuncer D, O'Brian C,et al. Community Evaluation of the National Diabetes Education Program's Diabetes HealthSense Website. Diabetes Educ. 2017;43(5):476- 85.

11. Reininger B, Mecca LP, Stine KM, Schultz K, Ling L, Halpern D. A type 2 diabetes prevention website for african americans, Caucasians, and mexican americans: formative evaluation. JMIR Res Protoc. 2013;2(2):e24.

12. Magnezi R, Bergman YS, Grosberg D. Online activity and participation in treatment affects the perceived efficacy of social health networks among patients with chronic illness. J Med Internet Res. 2014;16(1):e12.

13. Litchman ML, Rothwell E, Edelman LS. The diabetes online community: Older adults supporting self-care through peer health. Patient Educ Couns. 2017.

14. Fergie G, Hilton S, Hunt K. Young adults' experiences of seeking online information about diabetes and mental health in the age of socialmedia. Health Expect. 2016;19(6):1324-35.

15. Yu CH, Parsons JA, Hall S, Newton D, Jovicic A, Lottridge D, et al. User centered design of a web-based self-management site for individuals with type 2 diabetes - providing a sense of control and community. BMC Med Inform Decis Mak. 2014;14:60.

16. Tang PC, Overhage JM, Chan AS, Brown NL, Aghighi B, Entwistle MP, et al. Online disease management of diabetes: engaging and motivating patients online with enhanced resources-diabetes (EMPOWER-D), a randomized controlled trial. J Am Med Inform Assoc. 2013;20(3):526-34.

17. Seljan S, Baretic M, Kucis V. Information retrieval and terminology extraction in online resources for patients with diabetes. Coll Antropol. 2014;38(2):705- 10.