The most effective way to educate adult patients about diabetes in order to prevent complications

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Abstract

The aim of this qualitative review of literature was to evaluate articles published on the most effective ways to educate adult patients to reduce HbA1 c levels, change in lifestyles and other attributes of good self-management of diabetes. Databases of CINAHL, PubMed and Medline were searched using Boolean combinations of search terms. Only English sources with abstract published during 2009-2019 were selected. After a systematic filtering process, 14 articles were found usable in this paper and they were discussed under appropriate section heads.

Findings from the review were as follows. Education delivered on an ongoing basis is more effective at promoting self-management compared to an initial education session. Whether inpatient or outpatient education is superior is not clear, as no comparison study was available. Digital platforms including video games may be suitable for younger adults or those who are more visual or practical learners, or for any diabetic patient who finds the classroom setting less effective for learning and would likely benefit from greater engagement.

Many findings failed to give clear post-education advantage in terms of more than just reduction of HbA1c levels. Effects on lifestyle changes, physical activities or diet control were less conclusive and evidence on these were inadequate. It is unclear whether personalised one-on-one education is more effective than group sessions.

Requirement of newer researches on comparison of digital and other methods of education, absence of demonstration of age effects in the methods of education, comparison of personalised against group sessions and inpatient against outpatient settings were suggested.

In conclusion, the overall available evidence suggests a session in the transition stage of inpatient to outpatient stage and ongoing follow-up sessions using whatever methods and monitoring of adherence to self-management guidelines to be most promising line of diabetes education.

Keywords: Diabetes, Patient Education, Complications, Review

Introduction

Diabetes includes a group of conditions that cause the body to be unable to maintain a healthy level of glucose within the bloodstream, which can often be due to insufficient insulin production or insulin sensitivity. Approximately 1.7 million Australians have diabetes, with many people living undiagnosed. This chronic condition is one of the leading healthcare challenges worldwide (Diabetes Australia 2015). Individuals with diabetes have a significantly higher risk of developing complications and other comorbidities, such as heart disease, retinopathy, nephropathy, blindness, skin conditions and stroke. Additionally, as a result of poor management and complications, diabetic foot ulcers are common, and these can often lead to amputations (Diabetes Australia 2015). Such complications and comorbidities can be avoided, and the risk of developing such complications reduced, when the condition is managed effectively by an individual, including monitoring and appropriately controlling blood glucose levels (Gregg et al. 2014). In order to ensure a diabetic individual can sufficiently monitor the condition, it is

important that education regarding self-management is provided and that such education is effective (Diabetes Australia 2015).

The purpose of this literature review is to evaluate articles to determine the most effective way to educate adult patients about diabetes in order to prevent complications. A search strategy is provided, along with a discussion of the different ways that education can be undertaken, including individual, group, inpatient and via video. Finally, recommendations for practice will be provided.

Methodology

In order to locate appropriate articles for review, a database search was undertaken and included CINAHL, PubMed and Medline. The search terms used included a combination of 'diabetes', 'education', 'instruction', 'learning', 'selfcare', 'self-management' and 'complications'. Boolean operators were used to appropriately combine search terms. Articles were included for review only if they were published in English, were published between 2009-2019 and were likely to be relevant to the topic. Quantitative, qualitative and mixed-method studies were all included for review. Articles were excluded if only the abstract was available or if the article was published prior to 2009. Article abstracts were read to determine suitability, and the final selected articles were read in full.

Results and Discussion

Duration of Education

It is common for newly-diagnosed diabetic individuals to receive one-on-one education from a nurse or diabetes specialist, although many nurses will also provide self-education to diabetic patients over time and when they present with additional symptoms. Additionally, group sessions are a common method for delivery of diabetes education and such sessions can be individual and/or ongoing. Khunti et al. (2012) conducted a randomised controlled study to determine the effectiveness of a single education session for improving diabetes self-management and HbA1c levels; the intervention group attended a single six-hour education session while the control group received no education. The results of the study indicate that a single education session can help to reduce HbA1c levels after three years' follow-up; however, the education session did not produce any improvement to lifestyle or other biomedical outcomes (Khunti et al. 2012).

Steinsbekk et al. (2012) assessed the effectiveness of group education sessions for diabetic patients through systemic review and determined that group-based diabetic self-management education result in significant improvements to diabetes knowledge, lifestyle outcomes, management of symptoms and reduction in complications. Debussche et al. (2018) evaluated the effectiveness of a one-year, long-term group self-management program that was conducted in an outpatient community care setting. This was a randomised controlled trial and included an intervention group that received long-term education, as well as a control group that received only one initial education session. The study primarily measured HbA1c levels, and the results indicate that a structured, peer-led, one-year program can lead to significant improvements in HbA1c levels when compared with baseline levels and with the group that only received an initial education session (Debussche et al. 2018). These findings indicate that education delivered on an ongoing basis is more effective at promoting self-management compared to an initial education session.

Inpatient Education

An alternative method of receiving individualised or community group education for diabetes self-management includes receiving such education through an inpatient facility. Healy et al. (2013) conducted a study to determine the effectiveness of inpatient diabetes education for reducing rates of hospital readmission among patients who had poorly-controlled diabetes and associated complications. The results indicate that patients who receive inpatient diabetes education experience a lower incidence of hospital readmission when compared to patients who do not receive any education. Healy et al. (2013) recorded readmission rates of 11% for educated patients and 16% for non-educated patients. Additionally, Healy et al. (2013) demonstrated that, among patients who received inpatient education, HbA1c levels increased after follow-up; higher HbA1c levels are associated with lower rates of hospital readmission. This phenomenon was found only in the group that received inpatient education. Akimoto et al. (2014) found that diabetic patients who received inpatient education were less likely to relapse and experience worsening glycaemic control compared with patients who received no education in the inpatient setting.

There is a lack of research that compares the effectiveness of inpatient diabetes education to outpatient diabetes education; however, studies have demonstrated that it is effective to transition a patient to outpatient education following the completion of an inpatient program. This transition from inpatient to outpatient education helps to ensure patients follow up with education and ongoing instruction to promote self-management. Cook et al. (2009) found that there is a need to implement a post-discharge plan to continue ongoing education for diabetic patients who have received inpatient education, as this helps to promote effective self-management. Shah et al. (2013) found that patients who were provided with ongoing outpatient education following inpatient education showed greater adherence to medication instructions when compared to the control group that received no follow-up outpatient education (55.2% adherence compared to 34.8%). Additionally, diabetic patients who received ongoing outpatient education were more likely to attend follow-up appointments to monitor symptoms and complications (60.5% compared to 43.9% among the control group) (Shah et al. 2013). These findings clearly demonstrate that there is a need for ongoing education to ensure effective self-management.

Video or Online Education

Interactive methods, including video games, apps and other online platforms, have been used on a trial basis to gauge their rates of success for providing education and improving diabetes self-management (Lieberman 2012). Brown et al. (2009) conducted a randomised controlled trial to determine the effectiveness of an educational video game for improving blood glucose monitoring. The results indicate that the group that played the video game (the intervention group) showed significantly improved diabetes-related self-efficacy, self-care behaviours and communication with others about diabetes compared with a group that played a video game without diabetes education (the control group) (Brown et al. 2009). These findings were supported by Grey et al. (2013) in a similar study that also reviewed video game education. Grey et al. (2013) found that the completion of a video game education program significantly improved patients' self-management behaviours and HbA1c levels.

Lorig et al. (2010) conducted a study to assess the effectiveness of an online diabetes self-management program. This study was a randomised controlled trial that included an intervention

group that participated in an online educational and self-management program and a control group that did not have access to the program. After six months, all participants were assessed for diabetic symptoms and complications, HbA1c levels, exercise and self-efficacy. The results of this study indicate that patients who engaged with the online program had reduced HbA1c levels, though it was unclear whether there were many improvements to the other assessment areas (Lorig et al. 2010). Dyson, Beatty and Matthews (2010) assessed the effectiveness of education delivered through video games among older adults with a mean age of 60.8 years. The findings indicate that video game intervention can improve physical activity, low-density lipoprotein and total cholesterol, as well as overall knowledge about diabetes and self-care (Dyson, Beatty & Matthews 2010). This study also indicates that video games may be an effective method of education delivery among older adults, and that digital platforms that provide education in an interactive manner can be effective at improving diabetes self-management. These types of digital platforms may be suitable for younger adults or those who are more visual or practical learners, or for any diabetic patient who finds the classroom setting less effective for learning and would likely benefit from greater engagement.

Strengths, Limitations and Recommendations for Practice

Many of the studies included in this literature review incorporated the highest levels of evidence, including systemic review and randomised controlled trials. The benefit of including systemic review studies is that these contain a high volume of evidence to show an intervention's effectiveness. Additionally, randomised controlled trials are beneficial as they directly show the effectiveness of an intervention as compared with a control group, clearly showing whether the educational intervention works.

There are some limitations among the reviewed studies, including a lack of studies that were conducted to assess the effectiveness of individual long-term sessions compared to ongoing group sessions, so it remains unclear whether personalised one-on-one education may be more effective than group sessions. This may be an area for future research. Additionally, some of the included studies are more than five years old, so there may be a need to review the interventions to determine their relevance within contemporary health care. However, given the nature of the interventions, education, it is likely the findings are still relevant. Furthermore, many of the studies that reviewed the effectiveness of video game education included children and adolescents, and it remains unclear whether this method is equally effective at promoting self-management among an adult population. Finally, there was a lack of studies that compared the success of digital or online education programs to education sessions conducted in person. Future research should consider the benefits of educating people in a face-to-face manner versus providing patients with their own online management system for educational purposes; this may help to assess the effectiveness of different delivery models.

The evidence demonstrates that providing education to patients is a more effective method of promoting self-management than not delivering education. It is clear from the research that ongoing long-term educational programs are significantly more effective at improving self-efficacy, knowledge and self-management compared with short-term or single education sessions (Steinsbekk et al. 2012). It is not clear, however, whether such group programs are more effective in an inpatient or a community setting, though the research suggests that, as long as some form of ongoing group education is provided, self-management of diabetes should improve and thus complication rates should decline (Debussche et al. 2018). It is evident that patients who receive inpatient education should have a post-discharge plan in place in order to ensure that

education is continued in an outpatient setting for more effective self-management and a reduction in rates of complications. Furthermore, online or video education modules have been shown to be effective at promoting self-management; however, it is not clear whether these are more or less effective than group or face-to-face educational sessions. It is likely that these types of educational delivery models would be most effective in combination with group and face-to-face sessions and would be effective for people who find an online delivery system more useful or convenient.

Conclusion

Complications arising from poor self-management of diabetes are of significant concern in the healthcare industry, though effective education can help promote self-management and reduce such complications. The goal of this literature review was to determine the most effective way to educate adult patients about diabetes in order to prevent complications. Based on the literature, it is evident that the most effective way to educate adult patients about diabetes in order to prevent complications is to provide group face-to-face educational sessions in a community setting on an ongoing or long-term basis. Follow-up sessions should be provided to ensure adherence and effectiveness of the provided education. Video or online educational tools should be used in combination with group and face-to-face sessions and are appropriate for people who prefer or require an online education environment. These education methods demonstrate the greatest level of effectiveness for promoting self-management among diabetic patients.

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