

Type 1 Diabetes and Exercise:

Literature Review

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“The benefits of exercise are wide-ranging. Regular physical activity can help people manage their weight, sleep better, reduce the risk of some diseases...” (“Don’t Sweat It! Exercise and Type 1 Diabetes”, 2014). Exercise, while being considered healthy physically and an effective method of stress relief, can be intimidating for someone diagnosed with Type 1 diabetes. Type 1 diabetes is a disease that has to be managed 24/7 and the management of it can be difficult without the addition of exercise, but with it, it can add stress to the diabetic and lead to hyperglycemia. There is a risk of continuous high glucose that can increase the chance of cardiac problems. It is said that women who suffer from diabetes that do a minimum of four hours a week of physical activity decrease their risk of heart disease by 40% compared to those who didn’t exercise (“The Importance of Exercise When You Have Diabetes - *Harvard Health*”, 2019).

Attitudes and Barriers to Exercise in Adults with a Recent Diagnosis of Type 1 Diabetes: A

Qualitative Study of Participants in the Exercise for Type 1 Diabetes (EXTOD) Study

This article looks at the effects that exercise has on patients with Type 1 Diabetes. 15 patients from the UK were asked about their activity levels before their diagnosis and were then compared to the amount after their diagnosis. The study found a similarity between these participants. These include: “existing attitudes to exercise, feelings about diagnosis, perceptions about exercise consequences, barriers to increasing exercise and confidence in managing blood glucose” (Carter et al, 2016, p. 1). A decline is seen in the amount of current exercise versus exercise prior to diabetes. Many have a big fear of hypoglycemia, which is low blood sugar that is treated with usually 15 grams of carbohydrates. When a chance of low blood sugar is present,

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it is important to check one's glucose 30 minutes after completing a workout ("The Importance of Exercise When You Have Diabetes - *Harvard Health*", 2019). Overall, patients are nervous to begin exercising with the addition of diabetes in their lives.

Key Points

There are many key points in this article, many of which involve the blood sugars of the participant. "Some participants were concerned about blood glucose levels and many were anxious to get optimal glycaemic control" (Carter et al, 2016, p. 4). Diabetics are given a glucose range to stay between and stress can result from the numbers veering outside of those limits. The chance of hypoglycemia has a definite impact on whether or not a patient chooses to exercise. While the purpose of physical activity is to improve one's health, with diabetes it can bring blood sugars down to normal levels but it may cause hypoglycemia, therefore, some participants viewed physical activity as pointless and creating the opposite effects (Carter et al, 2016). Different types of exercise can either increase or decrease glucose levels which can be scary for most participants. Physical activity effects on blood sugar are strictly individually based and are based on trial and error over a period of time. A negative part is patients planning their exercise around their diabetes which can be inconvenient once they are newly diagnosed and used to being able to freely exercise.

Assumptions

This article explains that some doctors don't encourage their patients to exercise which can ultimately have a negative effect on the blood sugar. One participant stated that a doctor told him he shouldn't be going to the gym because he had diabetes (Carter et al, 2016). Once again, this is related to the lack of knowledge leading to little education to the patient about the benefits and

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management of exercise. These participants should feel encouraged by their doctors in the choices they make.

Deficit/Conclusion

Including exercise into the lives of diabetes can play a major role in the control of their diabetes in a positive manner. Although this was the very first study to look at the attitudes of the newly diagnosed diabetics, it does an excellent job of explaining how the participants feel in relation to exercise and diabetes. Diabetes itself is a misunderstood disease with very little public knowledge and diabetes and the effects exercise has on it is unknown by many as well. This causes the participants and other uninformed patients with diabetes to be very timid when thinking about exercising because glucose control is very important. Primary care providers should advise and encourage patients to do the recommended amount of physical exercise.

SKIP (Supporting Kids with Diabetes In Physical activity): Feasibility of a Randomised Controlled Trial of a Digital Intervention for 9-12-Year-Olds With Type 1 Diabetes Mellitus

This article is a study done in the UK where 49 9-12-year-old participants went through an interview process to participate in an online exercise program as well as a self-monitoring curriculum. This is to analyze the usefulness and effectiveness of these tools for better management (Knox et al., 2019). 25 individuals were part of the control group using their usual care while the other 24 partake in the intervention group in which they use STAK-D, a website for physical activity, and a PolarActive watch. Prior to the study, a baseline of the participants' management was documented and reassessed at eight weeks, and again at six months.

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Key Points - key points made about the article

Participants faced many challenges related to the technology of the internet-based program and the watch (Knox et al., 2019). The SKIP study had the purpose of trying to test the effectiveness or lack thereof of a computer-based program of physical activity and self-accountability. For interventions to be effective in a healthcare setting, they have to be adaptable, cost-effective and tailored to suit the participants.

Assumptions - assumptions made about the article

While parental guidance is important, the children being able to start to develop an understanding and a way of self-accountability is vital to them being successful in managing their condition moving forward into adulthood. Using this method of intervention and using technology instead of strictly face to face interaction is perceived as an effective way to get through to youth.

Deficit/Conclusion

The point of this study was to assess the level of management done by the individual with diabetes and to test the effectiveness of a randomized control trial of an internet-based program in enhancing competence and self-accountability for those children who suffer from type 1 diabetes. “Although evidence of long-term effects could not be reported, key elements of feasibility and acceptability were identified. Results demonstrated reasonable demand for SKIP, successful intervention delivery within the desired population, research processes which were practical for participants and staff, and evidence of short-term efficacy in some outcomes” (Knox

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et al., 2019). While there can be conclusions drawn from the outcome, more accurate results would come from doing further testing using the same variables and methods.

Physical Activity and Type 1 Diabetes

Without exercise, a diabetic's "overall blood glucose control is not enhanced without an effective balance of insulin dosing and food intake to maintain euglycemia before, during, and after exercise of all types" (Colberg, Laan, Dassau & Kerr, 2015, p. 609). Diabetes is a juggling act that involves multiple issues. These include the type of physical exercise performed, the amount of insulin already injected, the current glucose, and the amount of time a patient is planning on exercising. It may be difficult to manage all of these but with the help of technology, diabetes can seem easier to handle. The technology associated with diabetes "is the term used to describe the hardware, devices, and software that people with diabetes use to help manage blood glucose levels, stave off diabetes complications, reduce the burden of living with diabetes, and improve quality of life" (Diabetes Technology: Standards of Medical Care in Diabetes—2019", 2019).

Key Points

The first key point included in this article discusses the complications when a person with Type One Diabetes exercises. One complication is the variables involved with exercises such as the kind of exercise, difficulty, and length of physical activity. Insulin pumps, blood testing kits, and continuous glucose monitors embody the second key point of the benefits of current technologies to management and exercise. Lastly, interventions such as calculators for exercise and artificial pancreas systems are key in enhancing blood sugar control at the time of exercise and immediately after (Colberg, Laan, Dassau & Kerr, 2015)

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Assumptions

An assumption made in this article is that diabetics don't exercise as much and their lifestyle choices reflect badly upon their cardiac health. Exercise might be a way to assist those who suffer from diabetes but its impact cannot be as effective without proper dosage of insulin and a good diet. Despite the benefits, the perception is that adults with type 1 diabetes participate in exercise less frequently than adults who do not suffer from it.

Deficit/Conclusion

Future technologies will help those with diabetes to maintain an environment free from harm during physical activity. This will decrease the amount of fear a diabetic has about hypoglycemic episodes but it will not erase it. To add to the fear, there is a lack of education on how to avoid a low and how to control blood sugars during exercise.

Conclusion

Type 1 Diabetes is a very difficult disease to control at any point in time. Exercise can only make it difficult with the fear of hypoglycemia in mind. Although there are negatives associated with physical activity, the negatives are outweighed by the positives. They are enhanced cardiac wellness, increased bone health, and overall prosperity to name a few (Colberg, Laan, Dassau & Kerr, 2015). Trial and error is the only way to fully determine how to handle diabetes and a variety of exercises which can years to conquer. Not only is it vital to encourage those who suffer from type 1 diabetes, but it is also imperative to make sure that those who are

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diagnosed are well-informed about the benefits and also the downfalls that are associated with exercise. Certain exercises like weight lifting can increase blood glucose (Beyond Type 1). Information like that is not well known and is another reason why it is important to make sure those diagnosed are informed. Being knowledgeable of their disease and how to manage it is critical to a diabetics health throughout their life.

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