

Original Article

Motivations for physical activity in youth with type 1 diabetes
participating in the ActivPals project: a qualitative study.

Running Title: Motivations for physical activity

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Abstract

Background: Around two thirds of 5-18 year olds fail to meet physical activity (PA) recommendations. Children with Type 1 Diabetes (T1D) tend to be less active and more sedentary than non-diabetic peers. Research into motivations for PA in this population is lacking.

Objective: To investigate motivating factors for PA in youth with T1D participating in a 4 week PA intervention (ActivPals study), to inform the practice of health care professionals promoting PA.

Methods: Semi-structured interviews with participants and their parent (n=16) were carried out between May and July 2016. Following completion of the ActivPals intervention, participants who agreed to interview were recruited to this study. Interviews were recorded, transcribed verbatim and analysed thematically.

Results: Factors contributing to motivation to participate in PA are presented as 6 key themes and 9 sub-themes. The 6 themes were: 'motivators related to health', 'enjoyment', 'self-efficacy', 'family and friends participating', 'contribution of 3rd parties' and 'good weather'.

Conclusion: Enjoyment was key to participation in PA and could be increased by goal setting and the involvement of friends and family. Education and support to manage diabetes for PA is crucial in developing self-efficacy to enable sustained behaviour change and HCPs play a key role in providing this support, as well as having the potential to be a motivating role model. Subjective improvement in blood glucose readings and psychological benefits were also acknowledged to provide motivation for further PA. These motivating factors should be applied in supporting children with T1D to engage in PA.

Key Words:

Type 1 diabetes, physical activity, motivations

Abbreviations

T1D; type 1 diabetes: PA; physical activity: HCP; health care professional: MVPA; moderate to vigorous physical activity

Key Points

- Enjoyment is key to participation in PA and can be increased by multiple factors.
- Active involvement of friends and family is motivating.
- Support to manage blood sugars during PA enabling greater participation will improve self-efficacy to sustain behaviour change.
- Health care professionals play a key role in providing support to manage T1D for PA and can be motivating role models. Therefore there may be a place for specialist PA advisors in diabetes clinics.

Introduction

Type 1 diabetes (T1D) is caused by autoimmune destruction of insulin producing beta cells in the pancreas. The resulting absolute insulin deficiency is treated by injecting exogenous insulin, aiming to maintain healthy blood glucose levels in the context of many other influencing factors, e.g. carbohydrate intake, illness, physical activity (PA), stress etc.

Although evidence that PA improves glycaemic control (measured by HbA1c) is inconsistent²⁻⁶, PA should still be considered a cornerstone of managing T1D^{7,8} as it confers many other benefits in reducing cardiovascular risk^{2,3,9,10}. Furthermore, independent of PA levels, time spent in sedentary behaviours has been shown to be deleterious for child health^{11,12} with excessive sedentary time linked to increased cardiovascular risk even in adequately active individuals⁵.

It is recommended that all 5-18 year olds, participate in 1 hour of moderate to vigorous physical activity (MVPA) daily and minimise prolonged periods of sedentary behaviour¹³ however, around two thirds of adolescents fail to meet this target². With accelerometer measurement, it is seen that children with T1D achieve significantly less daily MVPA and spend more time in sedentary or light activities than their non-diabetic peers². Much work has focussed on the barriers to PA in children with T1D; the most prominent diabetes-specific barrier appearing to be fear of hypoglycaemia^{2,3,7,14}. Interestingly this psychological barrier is not necessarily related to an increase in hypoglycaemic events with PA³, but lack of understanding and difficulty with managing blood sugars for exercise may contribute^{2,3,9}.

While barriers must be minimised, engaging children with T1D also needs a positive approach towards identifying and nurturing their motivations. In developing children's independence to participate in PA, the theoretical importance of self-efficacy, enjoyment and peer support has been noted^{2,3} but research specifically into motivations for this population is lacking³. Our aim was to investigate what motivates children with T1D to be physically

active, to assist the practice of health care professionals (HCPs) in supporting active lifestyles.

Methods

Sampling and Recruitment

Participants were recruited from the ActivPals Pilot Study¹⁵ which aimed to explore the acceptability and feasibility of a 4-week PA intervention for youth with T1D. Following the ActivPals intervention, 16 participants and their parent gave informed consent to be interviewed for this qualitative study on motivations. Ethics approval was granted from NHS Greater Glasgow and Clyde Clinical Research and Development Board.

Interviews

Sixteen semi-structured interviews were carried out at participants' homes, ranging in duration from 25-45 minutes (average 30 minutes). Participants were aware that the interviewer was a GP with T1D undertaking an MSc in Sports Medicine, and not directly involved with ActivPals.

Data handling and analysis

Interviews were recorded, transcribed verbatim and analysed using the six-stage iterative process of thematic analysis described by Braun and Clarke¹⁶. Transcription by the interviewer allowed familiarisation with the data, and codes were then applied to data extracts in an inductive manner as recurring ideas, events or beliefs were identified.

Around 80 codes were initially identified which were broadly grouped as per Appendix 2. Codes were sorted into potential themes and sub-themes with multiple reviews of the whole data set. All data extracts were collated for each potential theme to ensure consistency within themes; this resulted in further amendments to produce 6 final themes and 9 sub-themes presented in Table 1. Member checking was employed on two transcripts (12.5%) by the

researcher managing the study who was familiar with the data collected and in reviewing every stage of theme generation.

Results

Seven male and nine female participants and their parent were interviewed with a mean age of 11.6 ± 2.5 years. Age at diagnosis ranged from 1 to 13 years (mean 7.8 ± 4.0 years) while duration of diagnosis ranged from 3 months to 12 years (3.8 ± 4.3 years). Seven participants were relatively newly diagnosed (≤ 6 months). 10 were treated with insulin injections, while 6 were pump users.

Themes and sub-themes were arranged to reflect a social-ecological model where intervention at multiple levels (individual, social and environmental) is needed to affect behaviour change ¹⁷.

Key motivators for the individual were ‘Motivators related to health’, ‘Enjoyment’ and ‘Self-efficacy’.

- **Motivators related to health**

Diabetes related

With an effort to increase PA levels over 4 weeks, around two thirds of participants noticed some improvement in blood glucose levels e.g. general lowering of readings or a flattening of post-meal spikes. Four participants observed that exercise could be used as a direct method of lowering an acutely high blood sugar.

“...when he has really high glucose late evening, we have 2 options: either extra jag or go for a walk and of course now he says ‘ok let’s go for a walk’...after 15-20 minutes come back and sugar is fine.” (Dad of P9, M; 8)

All participants were aware of the potential for exercise to cause hypos but very few felt it had actually happened more frequently with increased PA levels.

General physical and psychological health

Many children were aware of the importance of exercise to be *'healthy'* but were unable to further qualify this.

A few participants, including boys, made reference to the positive effects of exercise on weight management or appearance as a reason for participation e.g. *"doesn't make me fat"* (P16, M; 13), *"I'll get a 6-pack when I'm older"* (P2, M; 10), *"losing weight"* (P3, F; 13), *"Grows muscles"* (P10, F; 16).

At least half of our participants alluded to the psychological benefits of PA, with several feeling *"happy"* or *"amazing"* after exercise. Others noted benefits in stress management and concentration.

"If you were angry during the day, it helps you to like run off things." (P12, F; 13)

"[Exercise] clears my mind to help with studying" (P10, F; 16)

- **Enjoyment**

All but two participants made reference to enjoyment being part of their reason for doing activities. Sub-themes were related to 'goals and competition', participation in PA becoming 'self-perpetuating' and other 'individual preferences'. Particularly for younger ones, enjoyment was felt to be important in sustaining an activity.

Goals and Competition

Having goals and competition was motivating for the majority of our participants and related to feelings of achievement.

“I liked walking because I met my goals” (P4, F; 13)

Self-perpetuating

About half of our subjects alluded to participation becoming more enjoyable and self-perpetuating after experiencing positive effects.

“The more you do it the more it’s fun... it makes me want to do more” (P7, F; 13)

- **Self-Efficacy**

Some participants described a process of experimentation with carbohydrate intake for PA, and appeared to be developing confidence in their regime which contributed to feelings of independence and control.

“I’ve kind of got a little bit more control over what I’ve been doing. Sometimes I have hypos but then afterwards I kind of feel more like I can manage my blood sugars.”

(P8, F; 12)

At the social level, key themes were ‘Family and friends participating’ and ‘Contribution of 3rd parties’.

- **Family and friends participating**

All participants found some benefit in family and/or friends being involved in the PA intervention. Verbal encouragement alone was motivating for some, however most found active participation of a family member and spending time together valuable. Having company for activities was largely perceived to make them more fun and for some introduced competition which contributed to enjoyment.

“...because it’s funner with other people, like you can keep motivated, but you can also have a laugh while you’re doing it...” (P12, F; 13)

“Some of my friends have [a pedometer] so we’d have like competitions to see who could get the most.” (P3, F; 13)

Those whose friends were less active expressed that it could be motivating if they did more activity.

“I think maybe if more of my friends did stuff then I’d be more inclined to do it...but they’re not really into it” (P10, F; 16)

- **Contribution of 3rd parties**

Professional input and role model

It was evident that some parents and participants valued the input of a professional in providing PA advice and felt that this had more influence than parental input alone.

“It was great to have someone independent than a parent because FM was really good at explaining all the different things she does...Whereas if one of us said something like that, you know, there’s a wall! So I thought that was brilliant.” (Mum of P10, F; 16)

It was acknowledged that an active individual giving PA advice provided a positive and motivating role model.

“...telling me stuff that she did as well was kind of motivating to make you do it...like she’s training for a marathon and that makes me want to do it.” (P7, F; 13)

Peer support with T1D

There was mixed opinion on whether contact with peers with T1D was useful to help with motivation for participation in PA. However, potential benefits of peer support were acknowledged, even from those who did not want it at the time. The main benefits recognised were understanding and reducing isolation, *'so it's not just me'*, as well as being able to share experiences and learning which may be beneficial for parents too.

There was only one motivating environmental factor identified: 'Good weather'.

- **Good weather**

Although bad weather has previously been identified as a barrier to PA ^{9,18,19}, as the interviews were conducted in spring/summer, weather was more often cited as a motivating factor to be active outdoors, than a barrier.

"You were going to play the Wii lots weren't you? But it's been not bad weather wise so he's been outside more." (Dad of P6, M; 7)

Discussion

Our age range encompasses an important transition period of parental to child self-management and a period when PA levels are seen to reduce significantly^{19,20}. Adolescence is a key time for targeting behaviour change¹² and as longer duration of diabetes correlates with lower PA levels⁸, adopting a more active lifestyle as early as possible will make PA habits more likely to track into adulthood²¹. We have identified several motivating factors which supported increasing PA levels and subsequently confidence in managing blood sugars for exercise improved.

In line with perceptions of parents and HCPs, in our sample enjoyment was seen as key to participation and sustaining activity¹⁸. Individualised community based PA interventions have been successful in increasing levels of MVPA in youth with T1D²² and our data would suggest that accounting for an individual's ability, willingness to try new activities and preference for team or individual sports will foster enjoyment and encourage engagement.

Goal-based strategies have been recommended over competition-based which may be off-putting to those with lesser sporting ability or fitness¹⁹. Nearly all of our participants felt that having goals encouraged their participation, with most in favour of competition, however we acknowledge that many of our participants were already relatively active.

Many social factors contributed to motivation in our study and in agreement with other work, we found that having active friends was motivating to this population^{3,19} and made PA more enjoyable. This has implications at policy level in promoting PA to all youth.

Family support has been shown to contribute to improved glycaemic control, increased PA levels and improved self-efficacy^{20,22,23}. We found motivating elements of family involvement to include competition, increased enjoyment, and valued family time. However parent's knowledge of PA recommendations has been found to be limited, with a lack of

recognition of the contribution of daily activities and a focus on structured exercise¹⁸. Also, the importance of long term regular PA for cardiovascular health aside from glycaemic control was notably only acknowledged in one of our interviews. There is therefore a need to involve parents and families in education around PA with T1D.

Peer support is perceived by parents and professionals to be important in supporting PA behaviour change¹⁸ and having successful social models can improve self-efficacy²⁴.

Although not all participants were keen to utilise peer support currently, it should be facilitated where appropriate.

It is clear from our data and that of others, that professional input is highly valued by participants and parents³ particularly if the individual is a physically active person. A study of UK adults with T1D identified ‘advice and encouragement around managing diabetes for exercise’ as a key facilitator of PA⁹. However, Macmillan et al found that HCPs did not consider themselves to be influential¹⁸, and have reported feeling inadequately trained to deliver PA advice, thus tending to focus on other aspects of diabetes management³. The current inconsistent evidence for improved HbA1c with exercise may be partially attributable to excessive carbohydrate consumption or over-aggressive insulin reductions to avoid hypoglycaemia resulting in periods of hyperglycaemia⁴ therefore educating children and families in how to manage their diabetes during PA, will help to improve self-efficacy and enable sustained behaviour change^{25 24} while maximising benefits for glycaemic control. As has been proposed previously, there may be a role for specialist PA advisors in diabetes clinics¹⁸ to achieve this.

There is a trend for higher HbA1c levels in winter months in Scottish children²⁶ and bad weather has frequently been implicated as a barrier to PA^{9,18,19}. It is encouraging to find that the converse appears to be true, and good weather can be motivating. The impact of this

environmental factor must therefore be accepted, and patients given seasonally appropriate advice and appealing indoor alternatives e.g. exercise DVDs or active console games, when the weather may limit motivation for outdoor activities ¹⁹.

This study was limited by recruitment from only one Glasgow based paediatric clinic. Around half of the participants had recently (≤ 6 months) been diagnosed or switched treatment between pump and injections, which is likely to have influenced their glycaemic control during the study period. Many children recruited were already participating in some PA and it is recognised that the study may have appealed more to active children. Due to our small sample size, it is not possible to comment on differences between boys and girls. It may also have been relevant to assess parental attitudes and PA levels as a potential influencing factor. While our sample may not be representative of other geographical areas or the least active children, the principles will be broadly applicable to youth with T1D.

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Table 1. Themes and Sub-themes organised according to the social-ecological model.

Social		
Ecological		
Model	Themes	Sub-themes
Individual	Motivators related to health	Diabetes related
		General physical and psychological health
	Enjoyment	Goals and competition
		Participation self-perpetuating
		Individual preferences: ability, variety, teams
Self-efficacy	Increased awareness of PA	
	Self-monitoring and self-motivating techniques and devices	
Social	Family and friends participating	
		Contribution of 3rd parties
		Professional advice and role model
		Peer support with T1D
Environment	Good weather	