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A Clinical Perspective on Physical Activity Levels in Type 2 Diabetes in Qatar and the Perceived Impact of COVID 19

(1) DR SHAFaq SHOEB

CONSULTANT FAMILY PHYSICIAN, PRIMARY HEALTH CARE CORPORATION, QATAR
EMAIL: sshoeb@phccc.gov.qa

(2) DR FATHIMA SHEZoon MOHIDEEN

CONSULTANT FAMILY PHYSICIAN, PRIMARY HEALTH CARE CORPORATION, QATAR
EMAIL: fmohideen@phccc.gov.qa

Abstract

Physical inactivity is a risk factor for a variety of non-communicable diseases as well as contributing to 6% of deaths worldwide (World Health Organisation (WHO), 2020). This article highlights the importance of physical activity in patients with Diabetes and how some of the recommended physical activities like walking, aerobic exercises and resistance training help to improve both short and long term glycemic control. It further elaborates how physical inactivity has become a public health concern in Qatar and the impact of the COVID 19 pandemic. Physical Activity targets most of the modifiable risk factors of type 2 diabetes. Promoting physical activity into patients' lives will require a concerted effort at every level of society. The aim would be to encourage patient empowerment, so that they are able to set goals which are SMART (specific, measurable, attainable, relevant and timebound). Exercise needs to be individualised to ensure patient engagement and safety. Patients should be encouraged to increase their levels of physical activity to ensure optimum metabolic health.

Keywords: Physical activity, American Diabetes Association , Hamad Medical Corporation, Type 2 Diabetes, Primary Health Care Corporation.



نبذة مختصرة

النشاط البدني هو عامل خطر لمجموعة متنوعة من الأمراض غير المعدية وكذلك يساهم في 6% من الوفيات في جميع أنحاء العالم (منظمة الصحة العالمية ٢٠٢٠). تسلط هذه المقالة الضوء على أهمية النشاط البدني في مرضى السكري وكيف تساعد بعض الأنشطة البدنية الموصى بها مثل المشي والتمارين الهوائية وتدريب المقاومة على تحسين التحكم في نسبة السكر في الدم على المدى القصير والطويل. كما يوضح بالتفصيل كيف أصبح الخمول البدني مصدر قلق للصحة العامة في قطر وتأثير جائحة COVID 19. يستهدف النشاط البدني معظم عوامل الخطر القابلة للتعديل لمرض السكري من النوع الثاني. يتطلب تعزيز النشاط البدني في حياة المرضى بذل جهود متضافرة على جميع مستويات المجتمع. سيكون الهدف هو تشجيع تمكين المرضى ، حتى يتمكنوا من تحديد أهداف ذكية (محددة وقابلة للقياس ويمكن تحقيقها وذات صلة ومحددة زمنياً). يجب أن تكون التمرينات فردية لضمان مشاركة المريض وسلامته ، ويجب تشجيع المرضى على زيادة مستويات نشاطهم البدني لضمان صحة التمثيل الغذائي المثلى.

الكلمات المفتاحية: النشاط البدني ، الجمعية الأمريكية للسكري ، مؤسسة حمد الطبية ، داء السكري من النوع الثاني، مركز الرعاية الصحية الأولية

Introduction

According to American Diabetes Association (ADA), “Physical activity includes all movements that increase energy use” whereas “exercise is planned structural activity” (Colberg et al., 2016). Therefore it can be assumed that physical activity includes both activities of daily living as well as structured exercise. Prevalence of diabetes is increasing worldwide and is one of the leading causes of morbidity and mortality. In an era of rapidly expanding treatments, the overall cost to healthcare from diabetes is expected to double in the next 25 years (Huang et al., 2009). The traditional triple mode treatment of exercise, diet and pharmacotherapy is widely accepted in multiple reputable guidelines such as ADA and The National Institute for Health and Care Excellence (NICE). American Diabetes Association recommendations for physical activity are as follows (DiPietro et al., 2013):

1. 150 min or more per week of moderate to vigorous intensity aerobic exercise per week, spread over at least 3 days per week with no more than 2 days of non-activity.

2. 2-3 sessions of resistance training per week of resistance exercise on non-consecutive days

3. Decrease in time spent in sedentary behaviour

An observation from the above is that the recommendations are generalised, hence allowing

personalisation for individual patients.

Discussion

There is robust data from the Diabetes Prevention Program, Finnish Diabetes Program and the DaQing Study that lifestyle intervention was effective in reducing the incidence of type 2 diabetes in patients with Impaired Glucose tolerance (IGT) (The Diabetes Prevention Program (DPP), 2002) (Lindstrom et al., 2003) (Li et al., 2008).

The substantial health benefits from structured physical activity were seen from review from the data from the Look AHEAD trial where subjects in the intensive lifestyle intervention group achieved greater sustained percentage of weight loss, greater improvements in treadmill fitness, HbA1c levels, blood pressure, and improvements in levels of HDL lipoprotein cholesterol and triglycerides (DiPietro et al., 2013).

Walking is the most common form of exercise prescribed for type 2 diabetes. Evidence from the Nurses Health Study revealed that walking for at least 2 hrs/week was associated with a 39% lower all-cause mortality rate and 34 % lower cardiovascular mortality rate as compared to controls (Hu et al., 2001). This is backed by a meta-analysis which showed that short term walking significantly reduced HbA1c by 0.5% , reduced BMI and diastolic BP. Interestingly, the addition of supervision or use of motivational techniques led to a more prominent reduction in HbA1c levels (Qiu et al., 2014).

Aerobic exercise works through an independent molecular pathway, bypassing the defect in insulin signalling in type 2 diabetes, allowing muscles to take up glucose by up to 5 fold (Colberg et al., 2016). This offers immediate benefits for controlling postprandial hyperglycemia. Therefore, postprandial exercise can help to reduce spikes in plasma glucose concentrations. (Høstmark et al., 2006).

The mechanism for resistance training in improving glycaemic control is by increasing muscle mass since muscle is the major “sink” for glucose uptake. When compared to aerobic exercise, resistance training is not that well studied.



Evidence from a meta-analysis suggests that structured exercise (aerobic, resistance and combination) was associated with HbA1c reductions of 0.73%, 0.57% and 0.51% respectively. Structured exercise programs of more than 150min or more per week were associated with HbA1c reduction of 0.89% and for exercise durations less than this, the reduction in HbA1c was only 0.36% (Umpierre, 2011).

Data from the ADVANCE trial revealed that moderate to vigorous physical activity was associated with reduced incidence of cardiovascular events, microvascular complications and all-cause mortality. This effect was not seen with mild activity. (Blomster et al., 2013).

Exercise has benefits both in short and long term glycaemic control. Meta-analysis data suggests that short term exercise training (45 minutes of aerobic exercise three times weekly) was associated with 0.6% reduction as compared to controls. Interestingly the effect of exercise was seen to be independent of weight loss (Boulé, et al., 2001). Glycaemic improvements of this nature have shown significant reductions in type 2 diabetes related endpoints and mortality.

There is growing evidence that taking breaks in sedentary behaviour is associated with improved glucose regulation (Boulé, et al., 2001) .More evidence through randomised control trials (RCTs) would certainly assist in refining this. Apart from the benefits mentioned above, exercise is known to reduce depression and improve QOL indicators (Bize,et al., 2007). This finding is important as mental health disorders are common in type 2 diabetic patients.

Exercise is one of the pillars of diabetes management. Clinical evidence is available, however, the size of RCTs have been small. Meta-analyses, however, have clarified some important points. Certainly, encouraging patients to adopt physical activity as a long term goal will lead to substantial physical as well as psychological gains for our patients. At present, the data for other forms of exercise is scanty and certainly more work on the “minimum effective dose” for different forms would be beneficial. The applicability of trial evidence to real life situations is limited as most participants in the trials were fit individuals. Hence, more evidence is required for type of exercise and the benefits in patients with macrovascular complications, different ethnic groups as well as the elderly population.



Physical activity has benefits independent of weight loss and this needs to be impressed upon our patients to highlight the importance of this arm of diabetes management. There is scope for increasing physical activity in everyone and certainly empowering them to initiate and maintain this will have substantial benefits for our patients and the healthcare system.

Clinical Perspective In Qatar

“Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (World Health Organisation (WHO), 2019). WHO estimates that the prevalence of physical inactivity in Qatar is 41.6% (males 33.4% vs. females 49.7%). For adolescents, the percentage of this age group that were insufficiently active (not achieving a total of 60 minutes daily activity five or more days per week) was 85% (males 80.1% vs females 89.8%) (Country Fact sheet, 2015). Type 2 diabetes is a major concern for Qatar as research suggests that its “prevalence in Qatar will soar from 17% in 2012 to at least 24% by 2050” (Weill Cornell Medicine Qatar, 2018).

Qatar has experienced rapid rates of urbanisation. The adoption of western lifestyle has led to an efficient lifestyle however this system is not compatible with maintaining physical activity. In Qatar, alarmingly, “deaths attributable to chronic non-communicable diseases (NCD) collectively ranked as the number one cause of death in the last 10 years” (The State of Qatar National Physical activity Guideline, 2014). The health as well as psychological benefits of exercise are well documented but despite this, uptake of physical activity in Qatar remains low. Vast majority of the population lives in the capital, Doha, and lead a sedentary lifestyle with little exercise. For the percentage that do exercise, the extreme hot and humid summer months with long working hours make it difficult to avail the world class facilities provided by the state.

Ramadan is an important time of the year where muslims devote an entire month to religious activities. During Ramadan, much emphasis is placed on food preparation and family commitments, hence physical activity is rarely undertaken. For Qatar, physical inactivity is a public health concern.



Walking is the most accepted form of exercise for most patients with evidence for improvement in glycaemic control and cardiovascular risk factors (Tudor-Locke et al., 2003). Walking is likely to have less barriers than other forms of exercise initially. Luckily for Qatar, there is increased uptake of this following easy access to various tracks which are present in local communities.

In Qatar, identification of groups less likely or to take up physical activity need to be identified early such as women, elderly or are high risk for e.g. patients with known ischaemic heart disease. Women are less likely to prioritise their health before their family's needs. There are also cultural barriers that they face. Offering community support with other women may improve uptake in this extremely important group. Elderly patients as well as high risk patients may feel more confident in exercising after being supported by a risk assessment followed by exercises that are acceptable and safe for them. The emphasis should be to find an activity that the patient will enjoy because if it makes them feel good they are more likely to continue.

Qatar's population have access to health professionals within Primary Health Care Center (PHCC) for risk assessments as part of the SMART clinic screening initiative with onward referrals to wellness centres. This ensures safety and confidence within patients to exercise.

Based on the patient's preferences, access to local structured education programs such as DESMOND will increase patient awareness and accountability. Qatar has made great achievements in incorporating the DESMOND programme with Hamad Medical Corporation (HMC) secondary care services and this programme is currently delivered across 2 sites allowing ease of access for patients. Since starting in 2018, the programme has delivered structured education to over 300 patients and the evidence shows the benefits for patients from such activities. These programmes allow a cost effective approach whilst utilising available health resources. Some patients however may not feel comfortable with group settings in which alternate solutions through digital interfaces may help. More recently, HMC has introduced the Droobi application which allows dietary as well as physical activity tracking with access to health counsellors. This again, is a novel idea to ensure patient engagement.



Change in the set up of the “environment” such as easy accessibility to stairs in shopping malls, walking /jogging tracks in public parks and cycling tracks alongside roads has encouraged people to adopt a more active lifestyle. More recently, various local community parks, which are free, have been set up to encourage the local population to engage in physical activity. Local exercise initiatives in schools, workplace and community help to provoke a “herd response” as well as encourage both internal and external competition. Engagement of communities through setting up of various walking, cycling groups may help support people in the long run and at the same time may assist with motivation. Supporting this is Qatar’s celebration of Sports day which is celebrated with great enthusiasm every year. Pre covid, there was access to multiple activities which were free to all on this day.

Technology is a powerful medium for mass influence. The use of various digital as well as social media platforms to promote Physical activity campaigns, promotions, and share success stories can be a powerful catalyst for change. Endorsement by national leaders, famous celebrities alike will increase interest in this field. Qatar has led the way to using technology to help spread this important public health message.

Use of pedometers has been shown to be successful in initiating physical activity behaviour change in diabetic patients (Tudor-Locke et al., 2003). Pedometers offer a cheap and simple way of monitoring walking. There are multiple apps now available which offer both real time monitoring, goal setting and access to coaches if needed. Being able to track progress through apps offering gratification will help patients maintain physical activity and prevent relapse to sedentary behaviour. Immediate feedback from wearable technology after exercise will enhance motivation. The use of such devices is varied within Qatar depending on health literacy, finances and awareness amongst patients.

Impact on physical Activity During the COVID 19 Pandemic

WHO declared SARS-Cov-2 virus a pandemic in March 2020. Qatar’s first case was confirmed on 29th February 2020. Qatar’s response to the pandemic was swift, effective and clinical with restrictions put in place depending on case numbers. Within a few weeks into the pandemic, health services had been restructured to provide telephonic consultations as



well as home delivery of medications, schools had moved to online learning and a cap was introduced on the maximum occupancy within the workplace. Significant proportion of employees were working from home. The public service message of “Stay home, Stay safe” was embraced by all and the population played its part to ensure safety of the county. This helped to curb large spikes in infection rates.

Playgrounds, gyms and physical activity classes were also suspended. Establishments moved to remote learning both for academic as well as sports teaching. With teaching moving to online, one could argue that children and adolescents have more time for physical activity at home. However, there are disparities in access based on accommodation size, digital access and finances. The same argument holds true for adults within the population as there is variation in health literacy as well as conflicting personal commitments. In the last few months, the ease in restrictions has been warmly welcomed due to concerns that such short term behaviours may risk becoming entrenched hence leading to higher rates of obesity, diabetes and other chronic disease within the state.

Conclusion

On a clinical level, clinicians need to ascertain the reason why patients might be more inclined to undertake and maintain physical activity. The reason for changing behaviours is embedded in the patient’s values, choices, relationships and their goals. Use of motivational interviewing to tease out these details and establishing how physical activity could help them to achieve their goals is the only way to achieve and maintain behaviour change to ensure the legacy of health. There is a need for a major shift in attitude. When patients have the right personal reason to exercise along with support, they are less likely to revert back to old habits. Evidence shows that people maintain exercise when they feel good doing it.

Clinicians should guide patients to set goals for themselves which are SMART (specific, measurable, attainable, relevant and timebound). Evidence has shown that this approach leads to success. Patients require support to understand that exercise is a process and that small incremental contributions on a daily basis which are incorporated into daily routine will ensure long term success. Managing expectations and building on day to day successes will ensure that patients receive gratification from the activity and hence maintain it long term. Personal diary/reminders can help patients continue on this rewarding journey.



Active promotion of physical activity and support from the entire healthcare team will help patients to reflect on their own lifestyle more and make positive changes. Focus and encouragement on their success will encourage confidence and patient empowerment. Incorporating a screening tool for high risk patients prior to undertaking physical activity, will ensure patient safety. Making exercise a habit for the entire population, with constant reminders and building on success is key.

The community is a strong stimulus for change. Pre covid, Qatar led the way in terms of organising community walks, public awareness projects within the workplace, schools and entertainment venues as these encourage patients to become more active. Awareness campaigns highlighting the medical as well as the psychological benefits of exercise is key and these were deployed.

Our environment is an aspect that we can control unlike genetics and physiology. It is everyone's responsibility hence forth to encourage and make better lifestyle choices on a day to day basis. Success in this area needs to be set by behaviours at an individual as well as community level. The behaviours that we will embrace for our personal goals are the same that will help us achieve our health goals as well. Physical activity has more beneficial effects when compared to medication for type 2 diabetes with fewer side effects and this needs to be impressed upon our patients.

The impact of the restrictions during the Covid 19 pandemic are yet to be understood in this crucial arm of diabetes care. With life now beginning to return to normal, physical activity needs to become a priority and part of cultural fabric hence allowing integration into the lives of people to ensure we tackle this public health concern successfully. Adopting a culture of movement will have a positive impact on personal motivation. There is good evidence for physical activity. We just need to believe and embrace it as a population.

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