

# Barriers to exercise in obese patients with type 2 diabetes

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## Summary

**Background:** Although regular exercise is a critical component of the management of type 2 diabetes, many patients do not meet their exercise targets. Lack of exercise is associated with obesity and adverse cardiovascular outcomes.

**Aim:** We aimed to assess exercise habits in obese Irish patients with type 2 diabetes to determine if patients are adhering to exercise guidelines and to identify perceived barriers to exercise in this group.

**Design:** A cross-sectional study of obese patients with type 2 diabetes attending routine outpatient diabetes clinics at our institution, a public teaching hospital located on the outskirts of Dublin City.

**Methods:** A total of 145 obese patients with type 2 diabetes were administered a questionnaire to

evaluate exercise habits and perceived barriers to exercise. Anthropometric details were measured.

**Results:** About 47.6% ( $n=69$ ) of patients exercised for <150 minutes per week (40% of males, 62% of females;  $P=0.019$ ) and these patients had a higher body mass index than those meeting targets (35 vs. 33.5 kg/m<sup>2</sup>;  $P=0.02$ ). Perceived barriers to exercise were varied, with lack of time and physical discomfort being the most common. Reported barriers to exercise varied with age, gender and marital status.

**Conclusions:** This study highlights the challenges facing clinicians in improving exercise levels in patients, and the need to identify the specific barriers to exercise in the individual to improve health outcomes.

## Introduction

Exercise is an important component of a healthy lifestyle and is integral to the management of patients with type 2 diabetes mellitus (T2DM). Previous studies have established that participation in regular physical activity improves blood glucose control in diabetes patients and can delay the onset of T2DM. Physical activity positively impacts lipid levels, blood pressure, cardiovascular events, mortality and quality of life.<sup>1</sup> The American Diabetes Association recommends that diabetes patients should undertake 150 minutes per week of moderate intensity or 75 minutes per week of vigorous aerobic physical activity or an equivalent combination of the two.<sup>2</sup> Unfortunately, however, exercise remains a neglected aspect of T2DM treatment.<sup>3</sup> Numerous

barriers to exercise in diabetes patients from various socioeconomic and ethnic backgrounds have been offered to explain this phenomenon, including lack of time, physical pain, being overweight and unsafe neighbourhoods.<sup>4–7</sup> We assessed exercise habits in obese Irish patients with T2DM to determine if patients are adhering to exercise guidelines and to identify perceived barriers to exercise in this group. Our study population consists of predominantly Caucasian, middle- to low-income patients and has not been previously studied in this regard.

## Research design and methods

The study was performed in agreement with the principles of Helsinki for human studies. Obese

patients with type 2 diabetes attending our annual diabetes review clinic were recruited [body mass index (BMI)  $>30 \text{ kg/m}^2$ ]. These patients were diagnosed with diabetes mellitus according to American Diabetes Association guidelines, which is standard local practice.<sup>2</sup> A diagnosis of type 2 diabetes was made based on the clinical criteria such as family history, age and BMI at diagnosis, lack of ketosis or acidosis at diagnosis and lack of insulin dependency. Our clinic, in a public teaching hospital on the outskirts of Dublin City, serves a catchment population of both urban and rural dwellers.

Patients were approached following their physician consultation and, after obtaining informed consent, a questionnaire was administered. Data including self-reported estimated hours of exercise and television viewing per week, pet ownership and marital status were collected. Subjects rated potential barriers to exercise on a list (Table 1), assigning a score of zero (not a barrier), one (a slight barrier), two (a moderate barrier) or three (a major barrier) to each suggested barrier. Anthropometric details were obtained from the patient's medical chart. SPSS version 18 (IBM, CA, USA) was used for statistical analysis. Comparisons of categorical variables were made using a chi-squared test. Normally distributed variables were compared using unpaired *t*-test, and results were expressed using mean and standard deviation (mean  $\pm$  SD). Non-normally distributed variables were compared using Mann–Whitney test, and results were expressed using median and inter-quartile range [Med (IQ range)]. Statistically significant differences were accepted when the *P*-value was  $<0.05$ .

## Results

A total of 145 patients were studied, 64.0% ( $n=93$ ) male, mean age 59 years (SD 11.0 years) with

median BMI  $34.0 \text{ kg/m}^2$  (interquartile range:  $32.0\text{--}37.5 \text{ kg/m}^2$ ). Median reported weekly exercise was 180 minutes (interquartile range:  $30\text{--}360$  minutes), but 47.6% ( $n=69$ ) of patients were exercising for  $<150$  minutes per week. Table 1 details the anthropometric and demographic characteristics of included patients.

About 60.3% of males (56 of 93) reported exercising for  $\geq 150$  minutes per week compared with 38.5% of females (20 of 52) ( $P=0.019$ ). Median BMI in patients exercising for  $\geq 150$  minutes per week was  $33.5 \text{ kg/m}^2$  (interquartile range:  $33.0\text{--}39.3$ ) and in those exercising  $<150$  minutes per week was  $35.0 \text{ kg/m}^2$  (interquartile range:  $31.0\text{--}36.0$ ;  $P=0.02$ ). Patients who owned a pet were more likely to exercise  $\geq 150$  minutes per week (53.9% of patients with a pet vs. 29.0% without;  $P=0.004$ ). There was no significant association between exercise hours and age, marital status, urban or rural dwelling or hours of television watched.

Table 2 depicts the frequency at which patients reported each barrier as a major barrier to exercise. The most commonly reported major barriers were: finding exercising boring, tiredness, physical discomfort and lack of time.

We examined for associations between anthropometric data and the reporting of specific barriers to exercise in patients reporting exercising  $<150$  minutes per week (Table 3). Patients reporting physical discomfort as a barrier to exercise were older ( $60.6 \text{ years} \pm 9.9 \text{ years}$  vs.  $54.9 \text{ years} \pm 11.5 \text{ years}$ ;  $P=0.032$ ) and had a higher BMI (median BMI  $36.0 \text{ kg/m}^2$ , interquartile range  $34.0\text{--}40.0 \text{ kg/m}^2$  vs. median BMI  $34.0 \text{ kg/m}^2$ , interquartile range  $32.0\text{--}37.0 \text{ kg/m}^2$ ;  $P=0.021$ ). Patients reporting time as a barrier to exercise were younger ( $52.2 \text{ years} \pm 9.9 \text{ years}$  vs.  $61.9 \text{ years} \pm 9.9 \text{ years}$ ;  $P=0.001$ ). Unmarried patients were more likely to report embarrassment about their appearance as a major barrier to

**Table 1** Anthropometric and demographic characteristics of study patients and association with exercise levels

	Exercising $<150$ minutes per week <i>N</i> = 69	Exercising $\geq 150$ minutes per week <i>N</i> = 76	<i>P</i> -value
Age (years), mean $\pm$ SD	$58.1 \pm 10.9$	$59.0 \pm 11.4$	0.620
Male, <i>n</i> (%)	37 (39.7)	56 (60.3)	0.019
Female, <i>n</i> (%)	32 (61.5)	20 (38.5)	
BMI ( $\text{kg/m}^2$ ), Med (IQ range)	35 (31.0–36.0)	33.5 (33.0–39.3)	0.020
Pet ownership, <i>n</i> (%)	20 (29.0)	41 (53.9)	0.004
Married, <i>n</i> (%)	56 (81.2)	60 (78.9)	0.901
TV (h/week), Med (IQ range)	17.5 (10–28)	14 (10–22)	0.198
Urban dwellers, <i>n</i> (%)	48 (69.6)	55 (73.3)	0.752

**Table 2** Reported major barriers to exercise

Barriers to exercise	Patients reporting as a major barrier <i>n</i> (%)
Physical discomfort	34 (23.4)
Exercise is too boring	30 (20.7)
No time to exercise	29 (20)
Too tired to exercise	23 (15.9)
Weather prevents exercise	17 (11.7)
Dislike of gym	14 (9.7)
Too depressed to exercise	8 (5.5)
Too expensive to exercise	7 (4.8)
Negative past experiences of exercise	6 (4.1)
Embarrassed about physical appearance	6 (4.1)
Nobody to exercise with	5 (3.4)
Roads too dangerous to exercise	4 (2.8)
Transport issues	2 (1.4)
Lack of support from family/friends	1 (0.7)

exercise (23% of unmarried patients vs. 2% married;  $P=0.021$ ), and there was also a trend towards greater reporting of this as a major barrier in female patients (12.5% of female vs. 0% of male;  $P=0.089$ ). Male patients were more likely to report lack of time as a major barrier (38% of males vs. 12% of females;  $P=0.034$ ).

## Discussion

Regular exercise is of paramount importance in the management of type 2 diabetes. This study is the first to examine patterns of physical activity and perceived barriers to exercise in an obese Irish population with T2DM. It is evident from our results that a high proportion of our patients are not meeting their weekly exercise targets, in particular our female patients. Our results in this regard, therefore, are in keeping with those of previous studies. A UK based study in 2004, which studied both type 1 and type 2 diabetes patients, found that only 34% of patients took some form of physical activity within a random 2-week window. The authors

**Table 3** Associations between anthropometric and demographic data and reporting of specific barriers in patients not meeting exercise targets ( $n=69$ )

Physical discomfort	Age, <i>n</i> (mean ± SD) (years)	<i>P</i> -value	
Not a barrier to exercise	30 (54.93 ± 11.46)	0.032	
Barrier to exercise	39 (60.56 ± 9.87)		
Physical discomfort	BMI, <i>n</i> [Med (IQ range)] (kg/m <sup>2</sup> )	<i>P</i> -value	
Not a barrier to exercise	30, 34 (32–37.25)	0.021	
Barrier to exercise	39, 36 (34–40)		
No time	Age, <i>n</i> (mean ± SD) (years)	<i>P</i> -value	
Not a barrier to exercise	42 (61.9 ± 9.86)	0.001	
Barrier to exercise	27 (52.22 ± 9.85)		
No time	Gender, <i>n</i> (%)		<i>P</i> -value
	Male	Female	
Not a barrier to exercise	23 (62.2)	28 (87.5)	0.034
Major barrier to exercise	14 (37.8)	4 (12.5)	
Embarrassed	Marital status, <i>n</i> (%)		<i>P</i> -value
	Married	Single	
Not a barrier to exercise	55 (98.2)	10 (76.9)	0.021
Major barrier to exercise	1 (1.8)	3 (23.1)	

noted a greater propensity for weight gain in inactive patients with type 2 diabetes, but in contrast to the findings from our study, the difference was not statistically significant.<sup>8</sup>

Reported barriers to physical activity were varied in our patients but physical discomfort, the perceived boring nature of exercise and lack of time were the commonest reported major barriers to exercise, and are, therefore, the main issues that need to be overcome when attempting to increase exercise levels in obese Irish patients with T2DM. Similar themes featured in a smaller, qualitative study completed by Mier *et al.* involving Mexican-Americans, which employed six focus groups comprising 39 patients with type 2 diabetes. Frequently described barriers in this study included lack of time, physical pain and depression. However, certain other barriers noted by Mier *et al.*, including lack of transportation and unsafe roads, did not feature strongly in our patient cohort.<sup>6</sup> Dutton *et al.* assessed barriers to physical activity in 109 predominantly low-income African-American patients with type 2 diabetes. The barriers assessed in this study were not frequently reported by participants as significant barriers to exercise but, as was the case in our study, the most common barriers that were reported included pain and lack of time.<sup>7</sup>

The associations we discovered between patient demographics and other patient related factors and the specific barriers to exercise reported were interesting and have the potential to allow for a tailored approach to improving adherence to exercise guidelines. The finding, for instance, that single patients (and, to a lesser extent, female patients) were more likely to report embarrassment about appearance as a barrier to exercise could suggest that group-based exercise programmes, or exercise programmes undertaken in public, are unlikely to be successful in these patients. An interesting finding from our study is the fact that pet ownership was positively associated with meeting exercise targets (53.9% of patients with a pet met their exercise targets vs. 29.0% without;  $P=0.004$ ). While this finding may represent association rather than causation, the link between pet ownership and exercise warrants further exploration.

## Conclusion

The results of our study bring into focus the need for clinicians not only to assess if an individual's exercise targets are being achieved at each clinical

encounter but also to assess the specific barriers to exercise that are present in the patient. The varied barriers reported in our study illustrate that a 'catch-all' approach to improving exercise habits is unlikely to succeed. For instance, where one patient may need prescription of pain relief or advice regarding non-weight bearing exercises, the purchase of a pet or enrolling in a group exercise programme may need to be considered for another patient. The associations we found between some perceived barriers to exercise and patient characteristics may assist in this regard.

The high number of hours spent watching television in our patients (despite the fact that the majority were not meeting exercise targets, and the lack of time was frequently reported as an exercise barrier) is a stark illustration of the challenges facing clinicians in attempting to improve exercise levels in our patients. By providing information regarding common perceived barriers to exercise, along with factors contributing to these barriers, our study may help in overcoming these challenges and thereby help in improving the health of obese patients with T2DM.

*Conflict of interest:* None declared.

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