

Exploring the role of the biokineticist in diabetes self-management: a survey of patients' knowledge, attitudes and perceptions about exercise

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Background: Self-management of type 2 diabetes mellitus (T2DM) in South Africa (SA) is sub-optimal, with exercise reported to be the least employed modality of self-management. This study aimed to evaluate the knowledge, attitudes and perceptions of T2DM patients regarding T2DM self-management, and to explore participants' awareness and acceptance of the role of biokineticists in the management of T2DM.

Methods: This cross-sectional, descriptive study was conducted in October 2019 at an urban, district hospital in South Africa. A validated questionnaire was administered to T2DM outpatients. Participants' knowledge was evaluated by true/false questions, and their attitudes and perceptions on a five-point Likert scale.

Results: Reported adherence to prescribed diabetes medication by participants ($n = 150$) was high, at 96%. However, only 60% of participants reported exercising regularly; 47.3% followed a recommended diet for T2DM; and 32.7% took appropriate care of their feet. Responses given by the participants regarding their knowledge and perceptions indicated good insight into the role of exercise in the management of T2DM (94.7%). There was low awareness of the field of biokinetics, with 74% of participants admitting no knowledge of 'biokinetics'. However, after receiving information on the role of the biokineticist in T2DM, 92% of participants were willing to work with a biokineticist to manage their T2DM.

Conclusion: There was low reported adherence to exercise, diet and foot care among participants, despite good knowledge about, and attitudes to, the modalities of T2DM self-management. Majority of participants (92%) expressed a willingness to work with a biokineticist to manage their T2DM. However, there is a need for greater awareness and employment of biokineticists in the multidisciplinary team to help improve the uptake of exercise by patients with T2DM.

Keywords: Type 2 diabetes mellitus, biokineticist, self-management, exercise

Introduction

Diabetes mellitus (DM) is a complex medical condition that requires a lifelong commitment to self-management and care by people living with this condition. Self-management of DM, which is the ability of an individual to manage chronic medical treatment, as well as the required lifestyle changes, includes adherence to medication, following a healthy diet and regular exercise.¹ However, a recent systematic review indicated that self-management of DM in sub-Saharan Africa is poor.² People living with DM in South Africa reportedly have insufficient knowledge regarding the management of their disease, and low levels of adherence to exercise, a balanced diet and medication.^{3–5} Exercise, in particular, was the least-employed component of DM self-management, with between 6% and 35% of DM patients reported to exercise regularly.^{4–7} There is an evident need for local health policy-makers and healthcare providers to identify novel and innovative strategies to improve diabetes self-management, especially the uptake of exercise.

Diabetes mellitus self-management and education (DSME) consists of programmes typically provided by health professionals, which allow patients to meet the challenges of self-management.¹ This is done to address the health beliefs, current knowledge, attitudes and perceptions of patients regarding their condition.³ One area in which DM self-management can potentially be improved is by greater inclusion of exercise therapists in the multidisciplinary team managing DM patients.⁸ A recent systematic study concluded that supervised aerobic and resistance training, in combination, leads to a more pronounced improvement in HbA1C

levels than unsupervised exercise, or aerobic exercise alone.^{9,10} Exercise therapists, such as physiotherapists and biokineticists, are able to provide individualised exercise programmes for DM patients, including those with mobility restrictions, such as post-amputees and those with diabetic foot disease.^{8,11} Unfortunately too few physiotherapists are trained and employed to meet the needs of an increasing number of DM patients. Biokineticists could potentially help address this gap in T2DM self-management. However, there is low public awareness and employment of biokineticists in the public health sector.^{11–13}

The aim of this study was to evaluate the knowledge, attitudes and perceptions of patients with T2DM concerning their self-management. The study also explored the awareness of participants with regard to the role of exercise in the management of T2DM, and the potential benefits of biokinetics for T2DM patients. The results of the study are intended to inform public health strategies to improve the uptake of exercise by T2DM patients.

Methodology

A cross-sectional descriptive survey design was used to evaluate the level of knowledge, attitudes and perceptions of T2DM patients regarding the self-management of DM and the role of biokineticists in the self-management of T2DM.

Study population

A purposive sample of 150 participants was recruited from the outpatients' department at Wentworth Hospital, a district

hospital in eThekweni district in KwaZulu-Natal, South Africa. Participants were type 2 diabetes mellitus (T2DM) patients, older than 18 years, who consented to participate in the study. Participants who were excluded from the study were those who presented with other diabetic conditions such as type 1 diabetes mellitus or gestational diabetes. Participants were also excluded if they presented with an impairment that may have prevented them from answering the questionnaire.

Data collection

Data were obtained using questionnaires completed during face-to-face interviews. The questionnaire was a modified version of a brief diabetic knowledge and attitude self-care scale developed by the University of Michigan.^{14,15} Modifications included additional questions on biokineticists and exercise therapy, and the modified questionnaire was piloted and refined before commencing the study. Sociodemographic data were collected, including gender, age and level of education. Knowledge of participants was evaluated by true/false questions. Attitudes and perceptions were scored on a five-point Likert scale where 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; and 5 = strongly agree.

Descriptive statistics were calculated using the Statistical Package for the Social Sciences Version 23.3.1 (IBM Corp, Armonk, NY, USA).

Ethical considerations

Ethical approval was obtained from the University of KwaZulu-Natal (UKZN) Biomedical Research Ethics Committee (BE289/19). Gatekeeper's permission was obtained from the Department of Health (DOH) and facility management. Written informed consent was obtained from participants prior to enrolling them in the study.

Results

Sociodemographic characteristics of the participants

The demographic characteristics of the participants are presented in Table 1. Among the 150 participants, the mean age (SD) was 54 ± 9.2 years; 58% were female and 44.7% identified as Indian. Most participants had attended formal schooling, with more than 80% having completed at least some secondary school education. More than half (68%) of the respondents had a positive family history of diabetes mellitus.

Self-management of T2DM

As illustrated in Figure 1, reported adherence to prescribed diabetes medication was high at 96%, as was monitoring of blood sugar (96.7%). However, only 60% of participants reported exercising regularly; 47.3% followed a recommended diet for T2DM; and 32.7% took appropriate care of their feet. There was no correlation between level of education and adherence to self-management methods.

Knowledge of exercise in T2DM self-management

The mean score of participants in the Diabetes Knowledge Test was $80.6\% \pm 12.5\%$. The responses to the questions on the role of exercise are indicated in Figure 2. While almost all (95%) of respondents believed that exercise was safe in T2DM, and they knew that exercise is part of T2DM self-management (89%), only 44% considered that T2DM patients could do strenuous exercise. Furthermore, 62% of participants believed that daily physical activity was the same as physical exercise.

Table 1: Characteristics of participants

| Variables | Frequency (n) | Percentage |
|---|---------------|------------|
| Gender: | | |
| Male | 64 | 42 |
| Female | 86 | 58 |
| Age years (mean age \pm SD =) 54 ± 9.2 years: | | |
| < 40 | 12 | 8.0 |
| 40–49 | 18 | 12.0 |
| 50–59 | 45 | 30.0 |
| 60–69 | 38 | 25.3 |
| > 69 | 37 | 24.7 |
| Ethnicity: | | |
| Black | 33 | 22.0 |
| White | 20 | 13.3 |
| Indian | 67 | 44.7 |
| Coloured | 28 | 18.7 |
| Other | 2 | 1.3 |
| Education: | | |
| No formal education | 4 | 2.7 |
| Some/all primary school | 20 | 13.3 |
| Some secondary school | 69 | 46.0 |
| Completed matric | 42 | 28.0 |
| Degree/diploma | 10 | 6.7 |
| Postgraduate degree/diploma | 5 | 3.3 |
| Family history of diabetes mellitus: | | |
| Yes | 102 | 68.0 |
| No | 43 | 28.7 |
| Not sure | 5 | 3.3 |

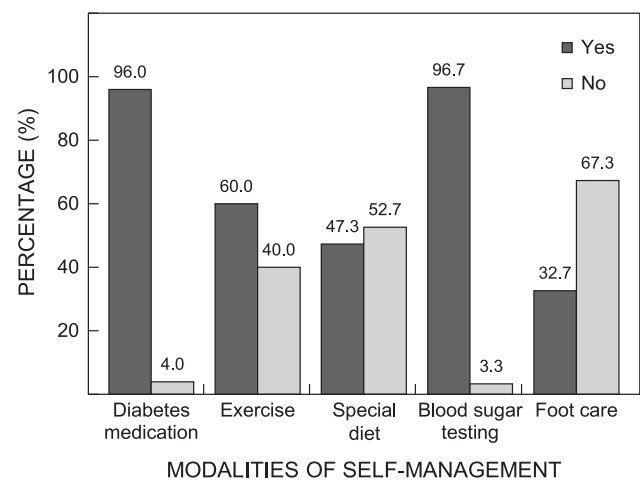


Figure 1: Adherence to modalities of self-management.

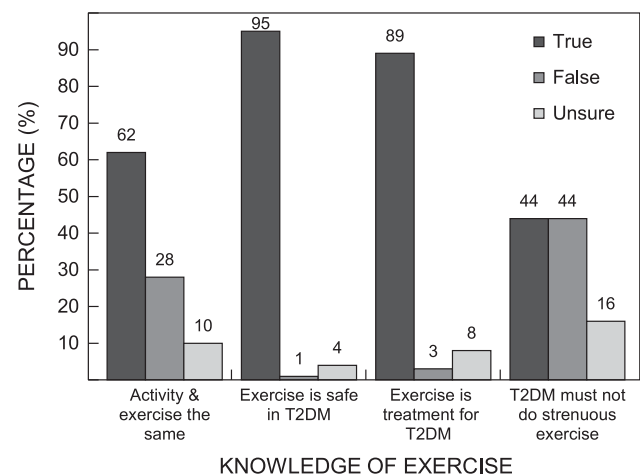


Figure 2: Participants' knowledge of T2DM and exercise.

There was a significant correlation between higher levels of participant education and improved levels of knowledge (Figure 3). There was also a significant relationship between knowledge of the role of exercise in T2DM self-management and having a family history of the condition.

Attitudes and perceptions about exercise in T2DM self-management

Figure 4 illustrates participants' attitudes and perceptions about exercise. The five-point Likert scale was collapsed into three categories with agree and strongly agree categorised as 'agree', neutral as 'unsure', and disagree and strongly disagree as 'disagree'.

As illustrated in Figure 4, 96% of participants acknowledged that both exercise and diet were important in the self-management of T2DM, and that exercise is as effective as medication in managing certain illnesses (65%). A significant proportion (92%) were willing to engage in exercise to improve their health, and 89% were willing to use exercises prescribed by a professional. Furthermore, 70% of participants indicated that they did not have any concerns about performing exercise as a T2DM patient. The 30% ($n = 45$) of participants who reported concerns about exercise were further questioned on their specific concerns. The most frequently reported concern was lower limb disease (31%), which included amputations, peripheral

neuropathy symptoms and wounds. Poor vision and fear of falling were cited by 24% ($n = 11$) of respondents, and fatigue by 13% ($n = 6$).

Knowledge of, attitudes to and perceptions about the role of biokinetics in T2DM self-management

The survey of participants' knowledge of biokinetics in T2DM self-management revealed that 74% had not heard the term 'biokinetics' before; 88.7% did not know what a biokineticist is or does; and 88.7% did not know what patients biokineticists work with.

A significant correlation was noted between a good knowledge of biokinetics and having tertiary education (degree/diploma).

After being provided with information on the scope of practice of a biokineticist, 92% of participants ($n = 135$) reported that they would be willing to work with a biokineticist to manage their T2DM.

Discussion

In this study looking at T2DM self-management, the majority of participants demonstrated good knowledge of type 2 diabetes mellitus and the role of exercise in T2DM self-management. This could be attributed to the higher levels of education and urban location of the participants. Public awareness of T2DM is high in the eThekweni district due to the high prevalence of T2DM in the area. In addition, the finding that more than half of the participants in this study had a family history of diabetes highlights the familial trend in T2DM.

Reported adherence to T2DM self-management methods was variable. Although almost all participants reported adherence to medication and blood glucose testing, only 60% utilised exercise, and 47.3% followed a special diet. Less than a third of participants undertook the recommended foot care. The low reported adherence to foot care is of concern as an alarming number of amputations are performed annually in the province for diabetic foot disease.^{16,17} The sub-optimal levels of adherence to diet and exercise were also concerning.

Despite the higher level of adherence to exercise reported in this study, compared with elsewhere in the country, the utilisation of exercise is still sub-optimal.^{4,6} A significant gap also exists between participants' understanding and willingness to engage in exercise for their health, and the actual number

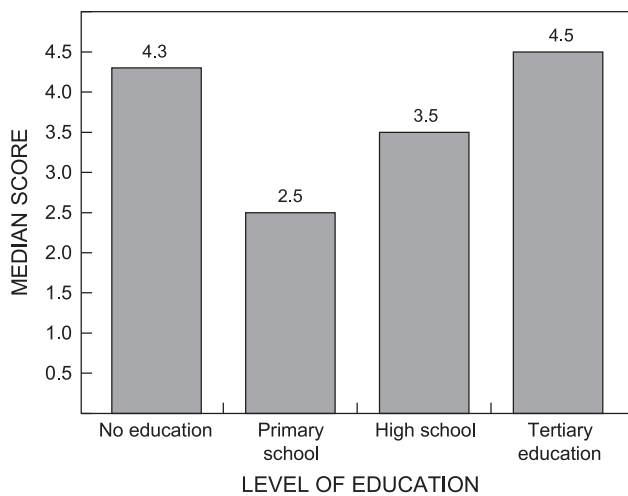


Figure 3: Diabetes knowledge in relation to level of education.

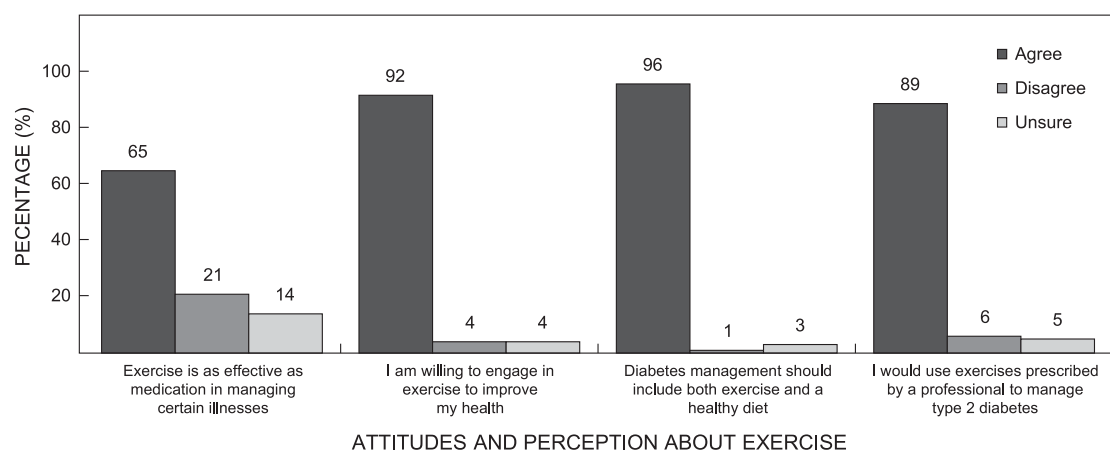


Figure 4: Attitudes and perceptions regarding exercise.

who do so. This could be related to a lack of information and guidance on how to effectively utilise exercise to manage T2DM. There were many misperceptions identified around exercise, such as participants' opinion that daily activity was synonymous with physical exercise and that people with T2DM could not engage in strenuous exercise like weightlifting, cycling and running. This suggests that, even among those participants who reported exercising regularly, the effectiveness of exercise in controlling their T2DM could be minimal due to incorrect frequency, duration and intensity of the exercise. Physical limitations such as lower limb pathology, visual impairment and lack of physical fitness further inhibited efforts to exercise.

The low utilisation of exercise, despite good knowledge, attitudes and perceptions regarding exercise, highlights the importance of targeted education and behavioural change counselling. Health professionals have a key role in motivating and advising patients to exercise appropriately. However, there are few data on health professionals' understanding and prescription of exercise in the sub-Saharan African context. A study in Uganda revealed that health professionals in general had limited knowledge concerning exercise prescription.¹⁸ Another study in South Africa reported that staff at a diabetic clinic had deficits in their knowledge of T2DM self-care and identified a need for education of health professionals on T2DM self-management and behavioural change.¹⁹ Greater inclusion of exercise therapists in the multidisciplinary team that manages patients with T2DM would specifically address the role of exercise in T2DM self-management.

The majority of study participants had no knowledge or awareness of the field of biokinetics, or the role of the biokineticist in T2DM self-management. In South Africa, biokineticists work exclusively in the private and academic sectors and are not currently employed in the public health sector.¹³ Hence, most of the participants who access healthcare in the public sector would have little or no exposure to this health profession. However, there was a general willingness of participants to work with a qualified exercise therapist, such as a biokineticist, to manage their T2DM.

Biokineticists, whose scope of practice is to improve physical functioning and health through exercise, could help address the poor uptake of exercise by people living with T2DM. Inclusion of biokineticists in the health team would help ensure that T2DM patients receive detailed and targeted information to improve the effectiveness of exercise interventions. Furthermore, misperceptions and inhibitions about exercise could be addressed on an individual basis.

Diabetes self-management and education (DSME) alone have been shown to improve the prognosis and outcomes of T2DM.¹ However, the multidisciplinary team delivering patient care must include exercise therapists to ensure that there is comprehensive and sustained engagement with exercise therapy.

Conclusion

This study provides valuable information on the knowledge, attitudes and perceptions of people living with T2DM, regarding DSME. Participants reported good adherence to medication and blood sugar monitoring. However, there was sub-optimal adherence to exercise, diet and foot care. The majority of participants expressed a willingness to work with biokineticists to manage their T2DM. Nonetheless, there is a need for greater

awareness and employment of biokineticists in the multidisciplinary team to help improve the uptake of exercise by patients with T2DM.

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