

Physical activity among adults with type 2 diabetes mellitus in Jordan: a qualitative study

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Abstract

Background: Type 2 diabetes mellitus is a growing epidemic condition that is expected to reach pandemic levels in the upcoming decades. Physical activity among individuals with type 2 diabetes is beneficial. A deeper understanding of physical activity among adults with type 2 diabetes in Jordan using a qualitative approach is needed.

Aim: This study aimed at exploring physical activity among adults with type 2 diabetes in Jordan.

Design: A constructivist grounded theory methodology guided this study.

Methods: Data were collected using semi-structured and audio-recorded interviews and then analysed simultaneously using coding, constant comparative analysis and writing reflexive memos.

Findings: Two themes emerged including 'The Perception about Physical Activity' and 'Factors Influencing Adherence to Physical Activity'. The first theme included four sub-themes: physical activity definition; importance; duration and types. The second theme included five sub-themes: the belief that diet is superior to physical activity; ageing and presence of diabetes or comorbidities; job and family obligations; social support and weather.

Conclusion: This study provided insights into patients' perceptions and adherence to physical activity including facilitators and barriers. Clinicians and policymakers may consider the findings of this study to develop health promotion programmes and to suggest a suitable environment for individuals with type 2 diabetes to enhance their physical activity.

Keywords: adults, Jordan, physical activity, qualitative, type 2 diabetes mellitus

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Introduction

Diabetes mellitus (DM) is a growing epidemic condition that is expected to reach pandemic levels in the upcoming decades.¹ In Jordan, the prevalence of diabetes has been increasing, the overall prevalence rate increased from 13.0% in 1994 to 23.7% in 2017.² Physical activity (PA) in individuals with DM is beneficial.³ Several meta-analyses reported substantial evidence to support the role of PA in reducing the risk of diabetic retinopathy, neuropathy, hypertension, cardiovascular disease and cancer.⁴⁻⁷ Further, PA was

associated with lower glycated haemoglobin levels among individuals with type 2 DM according to other two meta-analyses.^{8,9} Similar benefits have been reported to reduce the burden of diabetes-related psychosocial consequences such as depression and poor health-related quality of life.^{10,11} Therefore, exploring PA among adults with DM seems essential.

Various determinants of sedentary PA were reported. A recent meta-analysis of 35 studies¹² showed the following significant factors to be

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associated with sedentary PA including 'lack of social support, of physical space, of time, of motivation, of sports skills and of interest in PA, intolerance to activity, being retired, living in a low-income country, laziness, not having a job/studying, low socioeconomic status and level of knowledge about PA, female gender, living in an urban area, negative self-perception of health, using public transportation, being in the oldest age group in the study and perceived physical disability' (p. 1188).¹² Furthermore, personal cognitive factors such as personal perceived self-efficacy and the beliefs of being physically active have been shown to impact individuals' personal motivation of not adopting a sedentary lifestyle.¹³ Such personal beliefs are the main constructs in valid theories that explain health behaviour such as PA.^{14,15} In sum, the intention of individuals to be physically active can be impacted by multiple sociodemographic, personal and environmental factors demonstrating the complexity behind investigating sedentary PA among adults with DM.

Jordan is a country in which the prevalence of DM has been rising.² Adopting a more sedentary lifestyle has been a plausible hypothesis that explains the significant rise in DM prevalence in Jordan. For instance, men showed a higher prevalence of DM than women, and the gap between them has increased dramatically in recent years, this is possibly due to men's current jobs being much more sedentary.² Previous studies from Jordan showed low self-reported PA periods among adults with DM.^{16–18} Only 16%–30% of Jordanians with DM reported engagement in 30 min of PA per week.^{16–18} Factors including age, body mass index, comorbidities, perceived exercise self-efficacy and beliefs about exercise (i.e. exercise milieu, time expenditure, physical exertion and family discouragement) were significantly associated with PA.¹⁷ A focus group qualitative investigation also highlighted the low self-efficacy for PA among Jordanians.¹⁹ Overall, adults with DM in Jordan are inactive due to various reasons, and further research is needed to deepen our understanding of PA among adults with DM. A qualitative approach can address limitations in previously published quantitative research, as it allows a deeper understanding of

PA among individuals with type 2 DM in Jordan by exploring their views on the topic.

Research on PA in adults with DM in Jordan is limited.^{16–18} There were no qualitative studies that explored the facilitators and barriers of PA among adults with type 2 DM in Jordan. This information is needed to guide future interventions to promote PA. This can assist in future health promotion programs and encourage policy makers to invest in the current infrastructures to promote PA among Jordanians, reducing the burden of DM.

Methodology

Aim

Exploring PA among adults diagnosed with type 2 DM in Jordan.

Methodology

Constructivist grounded theory guided this study.²⁰ This methodology was believed to be the most appropriate because it allows understanding the social realities of participants through the interactions between participants and researchers.²¹ Data were collected and analysed simultaneously. Interviews were conducted by an experienced female assistant professor of nursing (A.M.).

Setting

Adults diagnosed with type 2 DM aged 18 years and above were recruited from the National Center for Diabetes, Endocrinology and Genetics in Amman, Jordan. This centre was chosen because it is the only national and specialised centre in Jordan providing care for individuals with diabetes and other endocrine conditions from all over the country.

Sampling and sample size

Convenient sampling technique²⁰ was used to achieve the aim of the study. In total, 11 participants were interviewed face-to-face. Theoretical saturation determined the sample size.

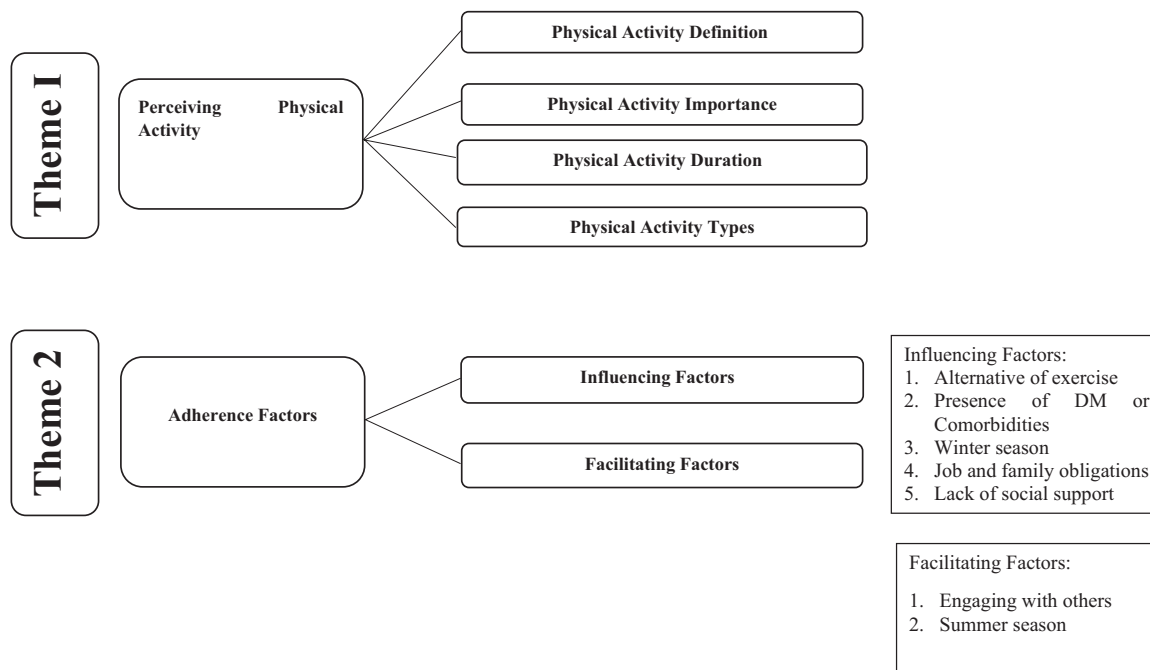


Figure 1. Coding tree.
DM, Diabetes Mellitus.

Inclusion and exclusion criteria

The inclusion criteria were adults with type 2 DM and aged 25–75 years and who are mentally oriented. The exclusion criteria were adults with health conditions that could be a possible impediment against physical and this included cardiovascular diseases; chronic kidney disease; retinopathy; diabetic foot ulcer or related amputations; cancers or stroke.²²

Data collection

Data were collected using semi-structured and audio-recorded interviews. Data were collected from March to October 2023. Potential participants were approached by nurses who were taking their vital signs and history (nurses acted as gatekeepers). If potential participants showed interest in the study, the first author then explained the study, if they agreed to participate, a written consent form was signed. Data were collected in a conversational manner using lay Arabic language (the official spoken language in Jordan), all participants were informed that there were no right or wrong answers, and they were free to share whatever they liked with the researcher. Voluntary participation and anonymity were assured. All interviews were conducted in a

private room at the National Center for Diabetes, Endocrinology and Genetics in Amman, Jordan.

Topic guide

The topic guide was developed based on the available literature. It included the following topics: type, duration, and frequency of PA participants were involved, their experience with PA, their feelings associated with PA, facilitators and barriers of engaging in PA, integrating PA in daily life activities, any decision to stop PA. Furthermore, participants had the chance to explore any other aspects with the researcher based on their experience, they were encouraged at the end of the interview to share anything else based on their own experience.

Data analysis

All interviews were transcribed verbatim. According to Charmaz's approach of constructivist grounded theory methodology, different levels of coding (initial line-by-line; axial; and theoretical coding), see Figure 1, constant comparative analysis, and writing reflective memos²⁰ were all used to analyse the data. Data were coded by two experienced researchers who met regularly to discuss the

coding process and emerging themes. Reflective memos were written regularly and helped in understanding the codes and connecting them to each other. Due to limited resources, only quotes used in this manuscript were translated into English and double-checked by research team members. NVivo 15 was used to manage the data.

Ethical considerations

Ethical approvals were obtained from the institutional review board at the Applied Science Private University (01-21, date: 9 June 2022) and the National Center for Diabetes, Endocrinology and Genetics (1/2022, date: 20 July 2022). Participation was voluntary; written informed consent was obtained prior to data collection; participants had the right to withdraw from the study without explanation; all participants were assured of confidentiality and anonymity.

Trustworthiness

The credibility of this study was enhanced by the following: two experienced researchers were involved in analysing the data; writing critical and reflective memos; and transcribing the interviews.^{23,24} The accuracy of the codes and interpretations was assessed by the remaining members of the research team. Transferability of the findings was ensured by providing sufficient contextual information about the study. The dependability and confirmability were evaluated through regular meetings and discussions by the entire research team.

Findings

The characteristics of the participants is presented in Table 1. The interviews lasted between 20 and 45 min.

The data from the interviews underwent constant comparative analysis, and two themes emerged: 'The Perception about PA' and 'Factors Influencing Adherence to PA'. Each theme has several sub-themes, which will be presented separately below.

The perception of PA

This theme explored adult participants with type 2 DM understanding of PA from four aspects (definition, importance, duration and types of PA).

PA definition. Most of the participants did not have a clear definition of PA although they were aware of the importance of PA. Participant 6 said:

PA for me is walking, it is the most important thing for DM patients . . . I had high HbA1c level, and I was walking to reduce it. (Participant 6, 57 years old, Male)

Many participants described PA as a movement with or without effort. They also described PA as 'movement is a blessing' and in Arabic as '*Alharakha Barakha*'. They provided some examples of their PA and considered conducting household activities, walking from the mosque to their house, using stairs as physical activities.

The most important thing for a DM patient is movement, weather it is with effort or without effort. (Participant 4, 39 years old, Female)

PA importance. All participants talked about the importance of PA to improve their health in general and especially for glycaemic control.

PA improves health, and it reduces the blood sugar levels. (Participant 8, 48 years old, Female)

The majority of the participants believed in the importance of PA, and they loved to be physically active. They stated that PA helped them to reduce idleness. Participant 2 stated that:

I love moving too much, I don't like to stay at one place, if I stayed at one place for long time, I feel I am lazy. (Participant 2, 48 years old, Female)

PA duration. Many participants had received advice on PA, especially walking and using stairs from various healthcare professionals. However, they did not receive any advice regarding the duration of PA when they were asked about its duration:

I was told by the nurse to walk especially after meals, but I don't know for how long. (Participant 4, 39 years old, Female)

I walked every day after the morning prayer for one hour. (Participant 5, 70 years old, Male)

In my duty at school, I was walking and going up and down the stairs for like half an hour everyday. (Participant 3, 46 years old, Female)

Table 1. Participants' characteristics.

No.	Age (years)	Sex (F/M)	Marital status	Employment status	Educational level	Career	Smoking	DM duration (years)	Treatment
1	56	F	Married	Unemployed	Secondary school	Family	None	15	Diet, exercise and oral tablets
2	75	M	Married	Retired	High education	Family	Past	8	Oral tablets
3	46	F	Married	Employed	Secondary school	Family	None	6	Diet, exercise and oral tablets
4	39	F	Married	Employed	High education	Family	Current (1 pack/2 days for 10 years)	1	Diet, exercise and oral tablets
5	70	M	Married	Retired	High education	Family	None	5	Diet, exercise and oral tablets
6	57	M	Married	Employed	Secondary school	Family	Past	9	Oral tablets and insulin injections
7	63	F	Single	Retired	High education	Alone	None	3	Diet, exercise and insulin injections
8	48	F	Married	Unemployed	Secondary school	Family	None	10	Diet, exercise and oral tablets
9	45	M	Married	Employed	High education	Family	Current (1/2 pack/day for 30 years)	15	Exercise and oral tablets
10	61	F	Married	Retired	High education	Family	None	5	Diet, exercise and oral tablets
11	74	M	Married	Retired	High education	Family	Past	35	Diet, exercise and insulin injections
DM, diabetes mellitus; F, female; M, male.									

All female participants considered household chores as a PA and they were spending lots of time doing that; therefore, they did not want to do extra activities, one participant shared:

I do lots of household chores and I feel this is enough for me because I don't want to have more physical problems, I have DM . . . (Participant 7, 63 years old, Female)

Very few participants were doing PA regularly. These participants were going to the gym, performing cardio activities or swimming. One example was:

I go to the gym every day and I do exercise, and I use the machines. (Participant 8, 48 years old, Female)

Swimming and cardio exercises are very important for DM patients especially if they are conducted every day. (Participant 6, 57 years old, Male)

In addition, a few participants stated that they did not have allocated time for PA but engaged in PA when they had time to do so:

I am not conducting PA everyday . . . it depends on my time . . . sometimes I am walking for half hour and sometimes I am using the stairs. (Participant 5, 70 years old, Male)

PA types. Walking was the most common type of PA amongst the participants. They considered walking as the most convenient PA for individuals with DM. One participant stated:

Walking is good and it fine for anyone, especially DM patient. I like walking especially during Ramadan; it is good to reduce blood sugar levels. (Participant 1, 56 years old, Female)

Using stairs, shopping and household chores were also considered as a PA among many participants. They stated that any activities that moved their bodies were considered as PA which, in turn, could control their blood glucose levels.

Using stairs is important to burn sugar in the blood and control it. (Participant 4, 39 years old, Female)

Shopping and doing house chores are important to control sugar. (Participant 1, 56 years old, Female)

Cardio exercises and swimming were the least common types of PA among the participants. Only two participants talked about the importance of physical effort for glycaemic control and improving health. These participants had increased the PA levels in relation to normal daily activities after being diagnosed with DM:

PA improves health, and I was walking then I was doing exercise gradually until I signed up with a gym and I use machines there. (Participant 8, 48 years old, Female)

Factors influencing adherence to PA

This theme explored the facilitating or preventing factors that the participants faced in terms of engaging in PA on a regular basis.

The belief that diet is superior to PA. Although this study aimed at exploring PA among individuals diagnosed with type 2 DM, all participants talked about alternatives to PA to control blood sugar from their perspectives. These alternatives for PA include healthy diet, following low-sugar and carbohydrate diet and dieting in general to reduce weight. All participants talked about the importance of healthy diet in controlling blood glucose levels. Some participants believed that diet is superior to PA for individuals with type 2 DM. Hence, this theme emerged from the data. This theme focuses on three aspects of healthy diet (following low-sugar and carbohydrate diet, dieting to reduce weight, and eating more fruits and vegetables). Most participants also believed that following a healthy diet is not effective alone unless it is accompanied by PA.

I advise all DM patients to eat healthy diet and to do PA to control they blood sugar. (Participant 4, 39 years old, Female)

All participants believed that diet plays a critical role in controlling DM. Most of the participants believed in reducing sugar and carbohydrate intake to control their blood glucose levels. Resembling this idea, one of the participants said that:

DM leads to many complications. As a DM patient, I need to be careful, and I need to control sugar within the blood. Thus, eating healthy diet such as low sugar and carbohydrate diet could help to

reduce sugar in blood. (Participant 3, 46 years old, Female)

However, some of the participants had difficulty in following the dietary advice given by healthcare professionals in their lives, especially during Ramadan period (the fasting month among Muslims), despite knowing the importance of low sugar diet on their health:

I know that I have to reduce sugar in my food and not to consume a lot of sweets, but it is difficult, especially during Ramadan, I like eating sweets during Ramadan. (Participant 5, 70 years old, Male)

Some participants stated that reducing overall food intake coupled with PA was the most important way to reduce their weights, which would lead to achieve low blood sugar:

After being diagnosed with DM, I was eating small portions of food to reduce my weight and this will help me to control blood sugar, I advise all patient with DM to do so. (Participant 7, 63 years old, Female)

Dieting and PA are very important for glycaemic control. (Participant 6, 57 years old, Male)

One participant shared that eating more fruit and vegetables in order to reduce weight and achieve glycaemic control.

Eating more fruits and vegetables will help DM patients to reduce weight and thus control their blood sugar besides walking. (Participant 3, 46 years old, Female)

Ageing and presence of DM or comorbidities. Participants stated that age, DM and its comorbidities prevented them from performing PA. They mentioned that after PA, they felt tired, lazy and they were short of breath; thus, they were not engaging in PA regularly:

I like doing exercise, but you know because of DM, I can not do regularly. I feel tired, lazy, and I have shortness of breath. (Participant 1, 56 years old, Female)

Age is barrier to walk, also DM affected my ability to do PA. (Participant 11, 74 years old, Male)

Job and family obligations. Some participants stated that their job was a barrier to engage in PA on a regular basis. Others mentioned that their responsibilities within their homes including performing household chores and children's responsibilities did not allow them to engage regularly in PA. According to them they feel tired after these responsibilities; thus, they did not perform PA:

I don't perform PA after coming from my duty. I felt tired so I could not PA. (Participant 6, 57 years old, Male)

I do lots of household activities and I think these are enough, no need to do extra PA. (Participant 3, 46 years old, Female)

Social support. Many participants did not engage in PA regularly because they were not supported by others. They mentioned that walking or performing PA with other people such as friends, children, or neighbours, made them more engaged in PA on a regular basis; however, they did not find people to do PA, thus they were not encouraged to continue PA. Participant 4 said that:

I am not doing exercise every day because no one is walking with me, I like walking with others. (Participant 4, 39 years old, Female)

A few participants who were engaged in PA regularly mentioned that walking or performing PA with other people such as friends, children and neighbours, made them more excited to engage in PA on a regular basis, this shows the social aspect of engaging in PA with others:

I am going every day to club except two days, because I will do PA with other people whom I know, or I don't know. I am enjoying this, and I like to talk to them while doing exercise. (Participant 8, 48 years old, Female)

Walking from the mosque to house for ½ hour every day with my son was helping me to continue walking. (Participant 6, 57 years old, Male)

Weather. Many participants also stated that during the winter, the weather prevented them from engaging in PA on a regular basis. They felt cold and they could not continue walking in the winter season:

I am not walking in winter weather regularly. I felt cold and I could not continue walking. (Participant 5, 70 years old, Male)

Only one participant said that winter season was good for them to engage in PA because it helps her to do activity out of the house.

I feel winter season helpful for the PA because it will not make my body hot and I can walk out of the house. (Participant 19, 61 years old, Female)

In contrary, one participant added that walking in summer season helped him to engaging regularly in PA:

Walking in summer season was effective to continue PA. (Participant 6, 57 years old, Male)

Discussion

This qualitative investigation explored the PA behaviour among Jordanian adults who have type 2 DM. Two main themes emerged that explain participants' perceptions of PA and the factors influencing their adherence.

The first theme provides information about how Jordanian adults with type 2 DM understand PA and how they define it. Interestingly, some of the participants considered performing some routine daily life activities as intentional PA, which may help them to be healthier adults. A previous qualitative study from Pakistan found almost similar beliefs.²⁵ One of these study themes 'I do enough already' illustrates how individuals with DM perceive activities such as washing dishes or even Islamic prayer as substantial PA.²⁵ Such beliefs can be detrimental as those people may substitute the recommended aerobic PA (i.e. having from 75 to 300 min of moderate or vigorous intensity per week) with their routine activities.²⁶ Healthcare providers in Jordan and globally must increase the awareness of Jordanians who have type 2 DM about the recommended PA and not rely on daily activities to control their DM and to reduce its related complications.

Although some of the study participants were not aware of how PA should be, our qualitative assessment found that many participants understand that PA is essential to control their condition and to improve their overall health. A previous quantitative study showed that beliefs can be a factor

that can motivate individuals to be engaged in PA.²⁷ Realising the importance of performing an essential behaviour such as PA is a reliable predictor for decades of research and it has been an important construct in health promotion theories such as the health belief model.²⁸ A previous study from Jordan also found that knowledge was significantly associated with performing PA.²⁹ However, another study from Jordan too found that having knowledge or specific belief is a not significant predictor of health behaviour.³⁰ Health promotion by increasing individuals' knowledge about PA might help but clinicians in Jordan need to consider other multiple personal or environmental factors that contribute to PA.

The first theme has also provided an estimation of the levels and types of the performed PA that Jordanians with type 2 DM usually perform. Again, it seems that most participants did not show intentional or regular PA as most of them reported lifestyle-related PA such as walking, shopping or household chores while a few of them stated that they are usually engaged in regular PA including exercising in gyms or swimming. A previous quantitative research from Jordan that assessed PA among individuals with DM reported similar to our findings in which routine activity such as walking was reported as 45% of the performed PA.¹⁷ Likewise, another Jordanian study revealed that among individuals with type 2 DM, engaging in a specific exercise session including walking, swimming and biking, apart from their usual household tasks, was the least often performed self-care activity per week. Furthermore, exercising was the most important predictor of their poor glycaemic control ($p < 0.001$).¹⁹ Therefore, the current available evidence from Jordan suggests increasing the awareness of people with type 2 DM about the need to be engaged in moderate to high intensity PA that includes aerobic and muscle strengthening exercises rather than relying on daily life activities, which appears the common practice in the present time among Jordanians with type 2 DM.

The second theme provides a comprehensive information about PA among Jordanians with type 2 DM. Substituting diet with PA was a common practice as most of the study participants almost convinced that no need to perform PA to control blood sugar or to reduce weight as these outcomes can be achieved by eating a low carbohydrate/sugar diet. It appears that those participants lack

knowledge about the importance of performing routine PA in which diet alone could not substitute it. Two previous quantitative investigations from Jordan demonstrated that knowledgeable people who were aware of the recommendations and benefits of exercise were more likely to be engaged in PA.^{17,29} Health promotion is needed to increase awareness about the importance of PA in line with the healthy diet among individuals with type 2 DM in Jordan.

Other factors such as age and presence of comorbidities, social support and weather were reported as factors influencing adherence to PA. Previous investigations from Jordan reported similar factors that influence adherence to PA and another behaviour such as adherence to treatment.^{17,31,32} Both clinicians and stockholders in Jordan need to consider the aforementioned factors to enhance PA among Jordanians with DM. This may include prescribing suitable PA (i.e. moderated intensity aerobics such as 30 min of walking per day),³³ for elderly people, or those with DM complications such as cardiovascular disease, neuropathy and retinopathy. Also, encouraging individuals with DM to be engaged with family members, relatives or friends to help them to stay motivated and to adhere to PA. Lastly, stakeholders in Jordan need to think about solutions such as building closed infrastructure for elderly people and those with chronic conditions that facilitate performing PA in the winter seasons. Clinicians may also encourage those elderly with type 2 DM or those who have related comorbidities to join indoor gyms that can help them perform PA in a suitable environment.

Limitations

All participants in this study lived in cities; however, participants in rural areas may have different perspectives on PA that we could not address in this study.

Conclusion

This study provided insights on patients' perceptions of PA including its definition and importance. It also provided information about types and durations of the usually performed PA by patients with diabetes in addition to the factors that impact their adherence. Clinicians and policy makers may consider the findings of this study to plan health promotions programmes to individuals

with type 2 DM, as well as, improving the environment that will help individuals to be more physically active across the country.

Declarations

Ethics approval and consent to participate

Ethical approvals were obtained from the institutional review board at the Applied Science Private University (01-21, date: 9 June 2022) and the National Center for Diabetes, Endocrinology and Genetics (1/2022, date: 20 June 2022). Written consent forms were obtained prior to data collection.

Consent for publication

All participants were assured anonymity.

Author contributions

Aaliyah Momani: Conceptualisation; Data curation; Formal analysis; Writing – original draft; Writing – review & editing.

Zalikhha Al-Marzouqi: Formal analysis.

Amani Abu-Shhadeh: Formal analysis.

Kamel Ajlouni: Conceptualisation.

Mohammed ALBashtawy: Writing – original draft.

Maysa H. Almomani: Formal analysis.

Samiha Jarrah: Conceptualisation.

Shaikha Ali AlQahtani: Conceptualisation; Writing – original draft.

Anas Ababneh: Conceptualisation; Formal analysis; Writing – original draft.

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Competing interests

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Availability of data and materials

All data included in this article.

Declaration of generative AI and AI-assisted technologies

None.

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References

1. Cho N, Shaw J, Karuranga S, et al. IDF Diabetes Atlas: global estimates of diabetes prevalence for 2017 and projections for 2045. *Diabetes Res Clin Pract* 2018; 138: 271–281.
2. Ajlouni K, Batieha A, Jaddou H, et al. Time trends in diabetes mellitus in Jordan between 1994 and 2017. *Diabet Med* 2019; 36(9): 1176–1182.
3. Sigal RJ, Armstrong MJ, Bacon SL, et al. Physical activity and diabetes. *Can J Diabetes* 2018; 42: S54–S63.
4. Bullard T, Ji M, An R, et al. A systematic review and meta-analysis of adherence to physical activity interventions among three chronic conditions: cancer, cardiovascular disease, and diabetes. *BMC Public Health* 2019; 19(1): 1–11.
5. Ren C, Liu W, Li J, et al. Physical activity and risk of diabetic retinopathy: a systematic review and meta-analysis. *Acta Diabetol* 2019; 56(8): 823–837.
6. Cai Z, Yang Y and Zhang J. Effects of physical activity on the progression of diabetic nephropathy: a meta-analysis. *Biosci Rep* 2021; 41(1): BSR20203624.
7. Lynette TKH. *A systematic review and meta-analysis on the effectiveness of low to moderate physical activities on community dwelling older adults with hypertension, diabetes mellitus and hyperlipidemia*. Thesis, National University of Singapore, 2021. <https://scholarbank.nus.edu.sg/entities/publication/d09f0c60-e767-48ca-9e8a-0216404399b1>
8. Umpierre D, Ribeiro PA, Kramer CK, et al. Physical activity advice only or structured exercise training and association with HbA1c levels in type 2 diabetes: a systematic review and meta-analysis. *JAMA* 2011; 305(17): 1790–1799.
9. Boniol M, Dragomir M, Autier P, et al. Physical activity and change in fasting glucose and HbA1c: a quantitative meta-analysis of randomized trials. *Acta Diabetol* 2017; 54(11): 983–991.
10. Conn VS, Hafdahl AR and Brown LM. Meta-analysis of quality-of-life outcomes from physical activity interventions. *Nurs Res* 2009; 58(3): 175.
11. Narita Z, Inagawa T, Stickley A, et al. Physical activity for diabetes-related depression: a systematic review and meta-analysis. *J Psychiatr Res* 2019; 113: 100–107.
12. Martins LCG, Lopes MVdO, Diniz CM, et al. The factors related to a sedentary lifestyle: a meta-analysis review. *J Adv Nurs* 2021; 77(3): 1188–1205.
13. Lee L-L, Arthur A and Avis M. Using self-efficacy theory to develop interventions that help older people overcome psychological barriers to physical activity: a discussion paper. *Int J Nurs Stud* 2008; 45(11): 1690–1699.
14. Bandura A. Health promotion from the perspective of social cognitive theory. *Psychol Health* 1998; 13(4): 623–649.
15. Champion VL and Skinner CS. The health belief model. In: Glanz K, Rimer BK and Viswanath K (Eds.), *Health behavior and health education: theory, research, and practice*. Jossey-Bass, 2008, vol. 4, pp.45–65.
16. Khattab M, Khader YS, Al-Khawaldeh A, et al. Factors associated with poor glycemic control among patients with type 2 diabetes. *J Diabetes Complications* 2010; 24(2): 84–89.
17. Al-Amer RM, Sobeh MM, Zayed AA, et al. Depression among adults with diabetes in Jordan: risk factors and relationship to blood sugar control. *J Diabetes Complications* 2011; 25(4): 247–252.
18. Darawad MW, Mosleh S, Khalil AA, et al. Investigating physical exercise among Jordanians with diabetes mellitus. *Health* 2016; 8(2): 181.
19. Almomani MH and Al-Tawalbeh S Glycemic control and its relationship with diabetes self-care behaviors among patients with type 2 diabetes in Northern Jordan: a cross-sectional study. *Patient Prefer Adher* 2022; 16: 449–465.
20. Charmaz K. *Constructing grounded theory*. 2nd ed. London: Sage, 2014.
21. Denzin N and Lincoln Y. *Handbook of qualitative research*. London: Sage, 1994.
22. Jarab AS, Mukattash TL, Al-Azayzih A, et al. A focus group study of patient's perspective and experiences of type 2 diabetes and its management in Jordan. *Saudi Pharm J* 2018; 26(3): 301–305.
23. Birks M and Mills J. *Grounded theory: a practical guide*. 2nd ed. London: Sage, 2015.
24. Whittemore R, Chase SK and Mandle CL. Validity in qualitative research. *Qual Health Res* 2001; 11: 522–537.

25. Lawton J, Ahmad N, Hanna L, et al. 'I can't do any serious exercise': barriers to physical activity amongst people of Pakistani and Indian origin with type 2 diabetes. *Health Educ Res* 2006; 21(1): 43–54.
26. Bull FC, Al-Ansari SS, Biddle S, et al. World Health Organization 2020 guidelines on physical activity and sedentary behaviour. *Br J Sports Med* 2020; 54(24): 1451–1462.
27. Ehrlich-Jones L, Lee J, Semanik P, et al. Relationship between beliefs, motivation, and worries about physical activity and physical activity participation in persons with rheumatoid arthritis. *Arthritis Care Res* 2011; 63(12): 1700–1705.
28. Harvey J. and Lawson V. The importance of health belief models in determining self-care behaviour in diabetes. *Diabet Med* 2009; 26(1): 5–13.
29. Barghouti F, AbuRmaileh NN, Jallad DG, et al. Leisure time physical activity in Jordan: knowledge and sociodemographic determinants. *Int Med J* 2015; 22(4): 283.
30. Ababneh A, Finlayson K, Edwards H, et al. Factors associated with adherence to using removable cast walker treatment among patients with diabetes-related foot ulcers. *BMJ Open Diabetes Res Care* 2022; 10(1).
31. Ababneh A, Edwards H, Lazzarini P, et al. A qualitative exploration of adherence to wearing removable cast walkers in patients with diabetic foot ulcers. *J Wound Care* 2023; 32(7): 456–466.
32. Ababneh A, Finlayson K, Edwards H, et al. Differences in adherence to using removable cast walker treatment during daytime and nighttime weight-bearing activities in people with diabetes-related foot ulcers. *Ther Adv Endocrinol Metab* 2023; 14: 20420188221142457.
33. Nelson ME, Rejeski WJ, Blair SN, et al. Physical activity and public health in older adults: recommendation from the American College of Sports Medicine and the American Heart Association. *Circulation* 2007; 116(9): 1094.

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