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RESEARCH ARTICLE

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The influence of the disclosure of diabetes on the cognitive, physical ability and diabetes self-management in diabetic employed adults in Saudi Arabia

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Abstract

Background: Diabetes is a serious medical condition that may cause blindness, renal failure and amputation of the lower limbs, stroke and myocardial infarction. The global incidence of diabetes increases continuously. The self-management of diabetes can be problematic and burdensome, especially if employed individuals choose not to reveal their illness. The workplace has been highlighted as an important element that may impact how employed individuals, diagnosed with diabetes and managed their illness.

Aim: To describe the influence of diabetes disclosure on the cognitive, physical ability and diabetes self-management of employed adults with diabetes in Saudi Arabia.

Design: A descriptive correlational study.

Methods: This study used a self-administered questionnaire, including the Checklist Individual Strength and Perceived Diabetes Self-Management Scale, for data collection. The sample size was 250 employed adults with diabetes. The data were analysed using descriptive statistics, Spearman's correlation coefficient and bivariate analysis.

Results: A significant correlation was found between diabetes self-management and support from co-workers ($r = .55$, $p < .05$), and the employees who received more support from their co-workers were able to perform diabetes self-management. The results also indicate that employees who received support at their workplace reported improved concentration, motivation and activity ($r = .41$, $p < .05$).

Conclusion: It is essential for top management and policymakers to implement supportive programmes in the workplace, and considering a constant, not rotating, work schedule.

KEYWORDS

diabetes, diabetic employed adults, disclosure cognitive, physical ability, self-management

1 | INTRODUCTION

Diabetes mellitus (DM) is a life-long metabolic disorder, with a group of aetiologies, affecting individuals of all ages. It occurs due to the inability of the pancreas to produce enough insulin (type 1 diabetes) or due to the inability of the body to use the insulin effectively (type 2 diabetes). It has a significant influence on individuals, families and societies globally (Saeedi et al., 2019). According to the World Health Organization (WHO) Global Report on Diabetes in 2016 (World Health Organization, 2016), 422 million people worldwide were living with the disease, an increase of 3.8% since 1980 and expected to increase in future. DM is a serious medical issue and considered as a major cause of blindness, kidney failure, lower limb amputation, stroke and myocardial infarction. In 2012, DM was the main cause of 1.5 million deaths (Bose, 2013) and is considered the seventh leading cause of death in the Unites States (Li et al., 2019).

The prevalence of DM has steadily increased globally; it is estimated that the total number of diabetic individuals will reach up to 700 million in 2045 (The International Diabetes Federation, 2021). In congruence with the global rates, and because of the region's fast economic development, urbanization and changes in lifestyle habits, the Middle East and North Africa are expected to have the highest DM incidence overall (Alotaibi et al., 2017). Saudi Arabia has a significantly high prevalence of diabetes and is considered the seventh highest rate of DM incidence globally (Bani, 2015). It is more prevalent in females, older children and adolescent girls, as well as in metropolitan regions. According to the estimate, more over 3 million adult people have been diagnosed with diabetes, indicating that diabetes affects more than 24% of the Saudi Arabian adult population (Bani, 2015). Several variables, including an increased rate of obesity and an ageing population, are contributing to the rising diabetes burden.

Diabetes is a life-long condition that requires several daily self-management decisions and personal care activities, within the context and limits of their daily lives, including their workday (Adu et al., 2019; Alotaibi et al., 2017). Many factors have been identified as difficult and challenging in managing the diabetes. For employed adults with diabetes, the workplace has been identified as an essential factor that could influence the way in which they manage their diabetes (Adu et al., 2019; Markowitz & Laffel, 2012). The self-management of DM can be a challenge and burden, especially if the employed adult choose not to disclose the condition. Studies indicated that compared with other chronic illnesses, employed adults with diabetes are less likely to disclose their condition in their workplace (Hakkarainen et al., 2017). Diabetes disclosure at work refers to sharing information about diabetes with the manager or supervisor, colleagues or Occupational Health Department.

A review of literature revealed that disclosure of diabetes in the workplace was associated with improved self-management behaviour at work (Sato & Yamazaki, 2012). Employed adults who disclosed their diabetes were more likely to report adherence to DM self-management practices (Hakkarainen et al., 2017; McCarthy et al., 2021). A good level of practice of DM self-management in the workplace was associated with many positive employment outcomes, such as efficient performance, reduced absenteeism (Hakkarainen et al., 2017), less fatigue and stronger motivation (Weijman et al., 2005). In addition, disclosure could facilitate the adults' attendance of DM educational programmes and provide them with opportunities to talk about their diabetes-related frustrations and difficulties and, where possible, assist in the development of peer-support networks for young adults with diabetes (Balfe et al., 2014). Individuals who believe it is the employer's obligation to provide flexible employment circumstances and who feel respected by their supervisors or managers are more likely to reveal they have diabetes, and increased sick leave was associated with non-disclosure (McCarthy et al., 2021).

Despite its importance, little is known about the influence of DM disclosure on diabetes self-management and the relationship with employment outcomes in employed adults. In the context of the increase in diabetes in the Saudi population and considering the influence of the workplace environment, this study aimed to explore the conditions of employed Saudi diabetic adults. There are only a few quantitative studies about DM disclosure and self-management in Saudi literature. The goal of this study was to reduce the deficit by adding new knowledge and insight about DM management in the workplace. Particularly, this study aimed to investigate the influence of DM disclosure on the cognitive, physical ability and DM self-management in employed adults in Saudi Arabia.

Problem or Issue

The impact of disclosure of being a diabetic on the self-management and employment outcomes of individuals is little understood.

What is Already Known

The workplace has been identified as an essential factor that could influence the way in which diabetic adults manage their diabetes.

What this Paper Adds

Reduce the knowledge deficit through new knowledge and insight about diabetes management in the workplace. Particularly, investigate the influence of diabetes disclosure on the cognitive, physical ability and diabetes self-management of diabetic employed adults in Saudi Arabia.

2 | METHOD

2.1 | Setting

This descriptive correlational cross-sectional study was conducted at a large tertiary teaching hospital in Riyadh, operated by the

Ministry of National Guard – Health Affairs. This hospital provides healthcare services to the National Guard Military personnel, hospital employees and their families. It also serves as a referral hospital for complicated patient cases from all parts of the country.

2.2 | Sample and sampling technique

The study included employed Saudi adults with DM who were willing to participate. Using a convenient sampling technique, participants were recruited from the waiting areas of the diabetic clinics. The study's purpose and approach were explained to the participants before they decided to participate. The sample size was calculated using sample size calculation software (Raosoft). With an estimated population of 300 employed adult with diabetes who are visiting clinics at the targeted hospital, a confidence interval of 90% and an alpha of 0.05, the target sample size was 250 participants.

2.3 | Data collection

The data were gathered with a self-report questionnaire. It contained two scales: the Checklist Individual Strength (CIS) and the Perceived Diabetes Self-Management Scale (PDSMS) with a total of 28 items. The CIS measures subjective fatigue and related behavioural aspects (Vercoulen et al., 1994). The CIS includes 20 statements rated on a 7-point Likert scale. The statements refer to four aspects: (1) subjective fatigue, (2) reduced motivation, (3) reduced activity and (4) reduced concentration. The CIS is validated in a clinical setting, as well as for employment, with a reliability score of 0.90. The PDSMS includes 8 items that measure DM self-management (Wallston et al., 2007). Cronbach's alpha of the PDSMS (0.83) was calculated during this study, indicating acceptable internal consistency. The questionnaire also has a set of demographic questions and three direct questions about diabetes disclosure to managers or supervisors, colleagues and the Occupational Health Department. The demographic variables included age, gender, years of employment experience, years with DM, meal intake, employed hours and type of employment (administrative, educational, technical). The questionnaire included both scales, which were translated into Arabic by the research team. Another faculty member translated the Arabic version back into English. This English version was then compared with the original scale to validate the translation. It was also piloted with a group of individuals to ensure accuracy and clarity.

2.4 | Data analysis

The data were entered and analysed using the Statistics Package for the Social Sciences (SPSS) for Windows, version 25 (Armonk, NY: IBM Corp.). Descriptive statistical analysis, including a mean, standard deviation, frequency and percentage, was performed to describe and summarize the sample characteristics. Bivariate analysis was performed to assess the mean differences in the outcomes scores, based on the sample characteristics. Specifically, the *t* test was used with the normally distributed variables, and the Mann–Whitney test was used with the non-normally distributed variables. Spearman's correlation coefficient was calculated to examine the relationship between the participants' perceived self-management scores and the other variable scores, including fatigue, motivation, concentration and physical activity.

2.5 | Ethical considerations

Before conducting the study, the study was approved by the Institutional Review Board (IRB). Approval has obtained on 27 September 2017 (RC17/164/R). Each participant was informed about the purpose of the study before informed consent was obtained. Each participant had the right to withdraw at any time. The participant's privacy and confidentiality were assured, no identifiers were collected, and the data, both hard and soft copies, were stored within the college premises and accessed solely by the research team.

3 | RESULTS

3.1 | Sample characteristics

The sample size of employed DM adults was 146; men constituted 50.7% of the sample. The highest proportion ($N = 59$, 40.4%) was in the 41 to 50 years of age group, followed by 51 to 60 years ($N = 33$, 22.6%) and 31 to 40 years ($N = 31$, 21.2%). The sample worked in different shifts, and the majority worked during a day shift ($N = 113$, 50.7%). Type II diabetes was the most frequent type ($N = 111$, 76.0%), with 35 (24.0%) diagnosed with type I diabetes. In terms of DM disclosure, 80 (54.8%) of the sample disclosed the disease to their managers, 140 (95.9%) to their Health Department and 128 (87.7%) to their co-workers. The group who received support from their managers was 42 (61.8%), 102 (98.1%) received support from their Health Department and 76 (76.8%) from their co-workers. The participants' intention to resign due to their disease was not significant. Table 1 provides more details of the participants' profile.

3.2 | Factors associated with study outcomes

The mean score of the sample's perceived DM self-management was 29.8 ± 4.6 of 40; a higher score indicates higher perceived DM self-management. There was a non-significant relationship between the perceived DM self-management scores and the other variables. The mean score of the level of fatigue was 24.4/56 ($SD = 11.2$), concentration 13.8/35 ($SD = 6.5$), motivation 11.5/28 ($SD = 4.2$) and physical activity 8.3/21 ($SD = 4.6$). There was a significant relationship between disclosure of disease to managers and the fatigue

TABLE 1 Sample characteristics

Items	*N* (%)
Age	
<30	23 (15.8)
31–40	31 (21.2)
41–50	59 (40.4)
51–60	33 (22.6)
Gender	
Male	74 (50.7)
Female	72 (49.3)
Shift type	
Day	113 (50.7)
Night	11 (7.5)
Day/night	22 (49.3)
Work type	
Administrative	71 (48.6)
Non-administrative	75 (51.4)
Diabetes type	
Type I	35 (24.0)
Type II	111 (76.0)
Disclosure to manager	
Yes	80 (54.8)
No	66 (45.2)
Disclosure to health department	
Yes	140 (95.9)
No	6 (4.1)
Disclosure to co-workers	
Yes	128 (87.7)
No	18 (12.3)
Support from manager	
Yes	42 (61.8)
No	18 (12.3)
Support from health department	
Yes	102 (98.1)
No	2 (1.4)
Support from co-workers	
Yes	76 (76.8)
No	23 (23.2)
Intention to resign	
Yes	4 (2.7)
No	142 (97.3)

score ($p < .001$), the concentration score ($p < .001$), the motivation score ($p = .004$) and the physical activity score ($p < .001$). The group who disclosed their disease to managers had worse fatigue scores (28.3 ± 9.7), concentration scores (15.8 ± 6.0), motivation scores (12.4 ± 4.3) and physical activity scores (9.5 ± 4.1). There was also a significant relationship between the motivation scores and being on the day shift ($p = .025$). The group who worked on the day shift scored (11.9 ± 4.3) higher than the group who had rotating shifts (10.1 ± 3.3). The concentration scores were significantly associated with the type of work, and the group employed in administrative positions (14.9 ± 6.9) scored higher than the group employed in other positions (12.7 ± 5.9). Table 2 presents the details of the factors associated with the study outcomes.

The PDSMS scores had a significant negative correlation with the perceived fatigue ($r = -0.278$, $p = .001$), indicating that the higher the perceived fatigue score, the lower the confidence in DM self-management scores. A significant negative correlation between the concentration scores ($r = -.303$, $p < .001$) and physical activity scores ($r = -.188$, $p = .023$) was also observed in terms of the confidence in DM self-management. However, there was a non-significant correlation between motivation and DM self-management ($r = -.072$, $p = .385$). Figures 1-4 illustrate the direction of the correlation for the variables.

4 | DISCUSSION

To date, this is the first study to investigate the influence of DM disclosure on the cognitive, physical ability and DM self-management in employed adults in Saudi Arabia. Diabetes is mainly a self-managed condition, and successful management of the disease in the workplace would rely on an individual's proactive and help-seeking behaviour (Ruston et al., 2013). According to literature, control over one's job is believed to be crucial for the performance of self-management tasks (Heins et al., 1994); however, neglecting self-care is likely to contribute to poor metabolic regulation (Toljamo & Hentinen, 2001). In the current study, the ability to self-manage was not associated with age, gender and other demographic variables, which is consistent with other studies (Wallston et al., 2005). In contrast, another study found that the age and the level of education were related to the frequency of self-management, with being older and having a higher level of education positively associated with DM self-management and compliance with nutritional guidelines (Weijman et al., 2005).

One of the findings of this study is that employees with DM and occupied in an administrative position obtained higher scores in the concentration scale than their counterparts. This could be indicative of the lower workload in an administrative level that requires more concentration compared with other positions. The current study also revealed that employees who worked in a day shift were more motivated than the group with a rotating shift. These findings can be explained through the view that rotational shifts could affect the general health and sleeping pattern of an individual which could affect his work performance and results in a lower productivity rate.

Even though an employee could be concerned that disclosing the DM may result in unfavourable results (Olesen et al., 2017), the current study indicated that the majority disclosed their illness to their managers and co-workers. It is probable that the severity of the diabetic disease and the necessity for medication during working hours may encourage disclosure. However, the disclosure had positive

TABLE 2 Factors associated with study outcomes

	PDSMS[1] Mean±*SD*	Fatigue[2] Mean±*SD*	Concentration[3] Mean±*SD*	Motivation[4] Mean±*SD*	Physical Activity[5] Mean±*SD*
	29.8 ± 4.6	24.4 ± 11.2	13.8 ± 6.5	11.5 ± 4.2	8.3 ± 4.6
Age					
≤40	29.4 ± 4.3	25.1 ± 11.8	13.4 ± 6.6	10.9 ± 3.8	8.4 ± 5.2
>40	29.9 ± 4.7	23.9 ± 10.9	14.1 ± 6.4	11.8 ± 4.4	8.3 ± 4.1
	$t = -.651$, $p = .516$	$t = .620$, $p = .536$	$Z = -.838$, $p = .402$	$Z = -1.466$, $p = .143$	$Z = -.484$, $p = .628$
Gender					
Male	29.9 ± 4.9	25.1 ± 11.4	14.0 ± 6.7	11.8 ± 4.3	8.9 ± 4.8
Female	25.6 ± 4.3	23.7 ± 11.0	13.6 ± 6.3	11.1 ± 4.0	7.7 ± 4.2
	$t = .441$, $p = .660$	$t = .769$, $p = .443$	$Z = -.325$, $p = .745$	$Z = -1.027$, $p = .304$	$Z = -1.513$, $p = .130$
Shift type					
Day	29.9 ± 4.8	25.4 ± 11.1	14.2 ± 6.3	11.9 ± 4.3	8.6 ± 4.4
Rotating	29.2 ± 3.8	21.0 ± 10.9	12.6 ± 7.0	10.1 ± 3.3	7.5 ± 4.9
	$t = .997$, $p = .323$	$t = 1.968$, $p = .052$	$Z = -1.629$, $p = .103$	$Z = -2.23$, $p = .025$*	$Z = -1.724$, $p = .085$
Work type					
Administrative	30.5 ± 4.8	25.6 ± 10.5	14.9 ± 6.9	11.9 ± 4.5	8.7 ± 3.9
Non-admin	29.1 ± 4.3	23.2 ± 11.8	12.7 ± 5.9	11.0 ± 3.8	8.0 ± 5.0
	$t = 1.954$, $p = .053$	$t = 1.262$, $p = .053$	$Z = -2.016$, $p = .044$*	$Z = -1.389$, $p = .165$	$Z = -1.663$, $p = .096$
Diabetes type					
Type I	29.1 ± 5.1	26.0 ± 10.7	13.8 ± 6.5	10.8 ± 3.5	7.7 ± 4.1
Type II	29.9 ± 4.4	23.9 ± 11.4	13.8 ± 6.5	11.7 ± 4.4	8.5 ± 4.7
	$t = -1.052$, $p = .295$	$t = .982$, $p = .328$	$Z = -.028$, $p = .978$	$Z = -1.605$, $p = .287$	$Z = -.769$, $p = .442$
Disclosure to manager					
Yes	29.9 ± 5.3	28.3 ± 9.7	15.8 ± 6.0	12.4 ± 4.3	9.5 ± 4.1
No	29.6 ± 3.5	19.6 ± 11.2	11.4 ± 6.2	10.3 ± 3.7	6.9 ± 4.7
	t = 0.324, $p = .746$	t = 5.087, $p < .001$*	Z = −4.582, $p < .001$*	Z = −2.87, $p = .004$*	$Z = -4.116$, $p < .001$*
Support from manager					
Yes	29.7 ± 5.2	27.7 ± 10.8	14.9 ± 6.3	11.2 ± 4.2	8.6 ± 3.9
No	31.8 ± 5.3	28.2 ± 7.7	15.3 ± 5.9	13.2 ± 4.5	9.6 ± 4.5
	$t = -1.653$, $p = .103$	$t = -.212$, $p = .833$	$Z = -.329$, $p = .742$	Z = −2.05, $p = .040$	$Z = -.824$, $p = .410$

Abbreviations: *SD*, standard deviation; t, Student's *t* test; Z, Mann–Whitney test; *p*, *p*-value, *statistical significance at <.05.

[1]higher scores indicating more confidence in self-managing one's diabetes.

[2]Higher scores indicate a higher degree of fatigue.

[3]Higher scores indicate more concentration problems.

[4]Higher scores lower motivation,

[5]Higher scores indicate less activity.

outcomes as the majority reported receiving support from their managers and co-workers. The findings are supported by a Finish study (Hakkarainen et al., 2017), reporting that the good relationship between colleagues and managers could influence an employee's decision whether to disclose or not. Literature revealed that DM disclosure in the workplace was associated with better self-management behaviour at work (Bose, 2013; Sato & Yamazaki, 2012).

In contrast, the current study revealed that the group who disclosed their disease to managers had worse fatigue scores (28.3 ± 9.7), concentration scores (15.8 ± 6.0), motivation scores (12.4 ± 4.3) and physical activity scores (9.5 ± 4.1). According to Ruston et al., (2013) managers had little understanding of the consequences of DM for their employees and the impact of the workplace on the employee's capacity to manage their DM. They also highlighted how the workplace requirements may affect the employees decision-making and habits. In addition, the current study findings illustrating that the employees perceived more support from their co-workers (76%), more than from their managers (61%). In another study, fear of stigmatization was a reason for the employees not to inform their managers of their DM status (Ruston et al., 2013).

Generally, the current findings could be explained, from the researcher's point of view, that the majority disclosed their condition

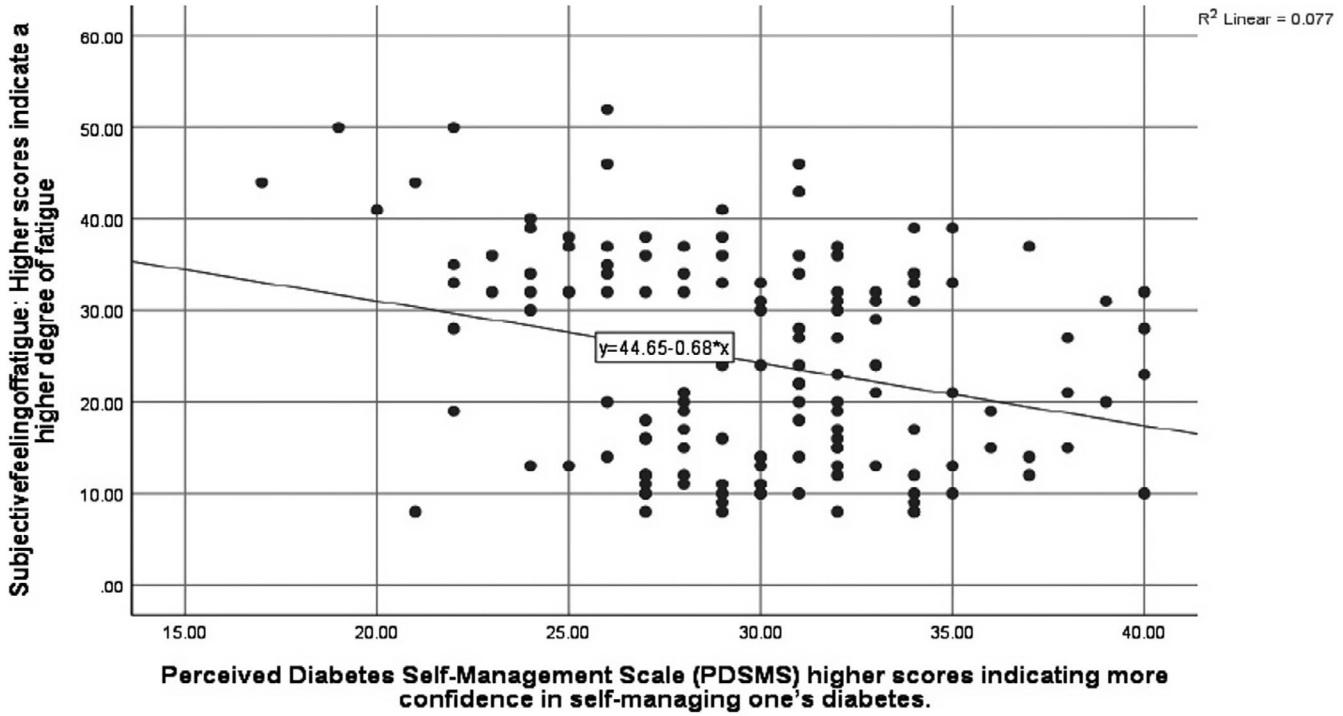

FIGURE 1 Direction of correlation between perceived fatigue and participants' confidence in diabetes self-management PDSMS

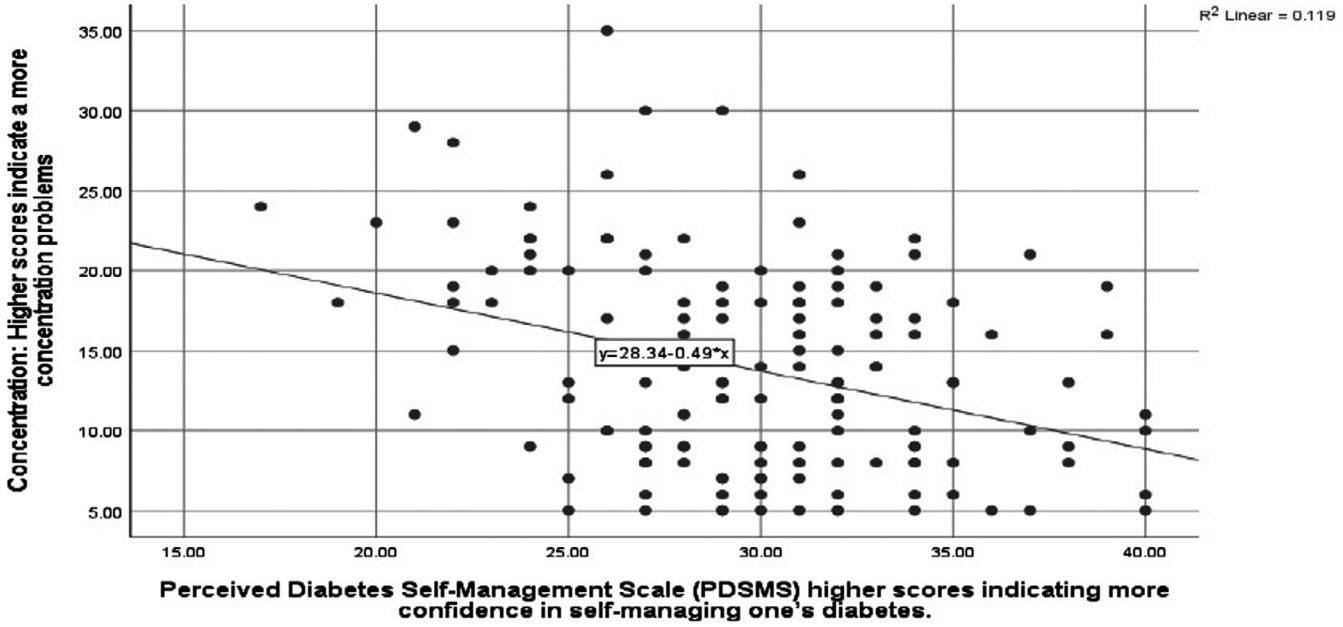

FIGURE 2 Correlation between concentration scores and participants' confidence in diabetes self-management PDSMS

to managers and co-workers because they require special arrangements and consideration, such as using daily injections, a special type of diet and frequent checking of the blood glucose level. Also, adjustable work attendance is required due to multiple visits to the employee clinic due to signs of hyperglycaemic, including increased thirst, increased urination, tiredness or fatigue and blurred vision or hypoglycaemic signs, such as dizziness, slowed speech or thinking and weakness and possibly mental confusion. The employees should be encouraged to disclose their condition to enable them to attend to their self-care management needs and activities.

In accordance with literature indicating that a good level of practice of DM self-management in the workplace was associated with many positive outcomes such as a reduction of fatigue and improved motivation (Weijman et al., 2005). The current study supported the

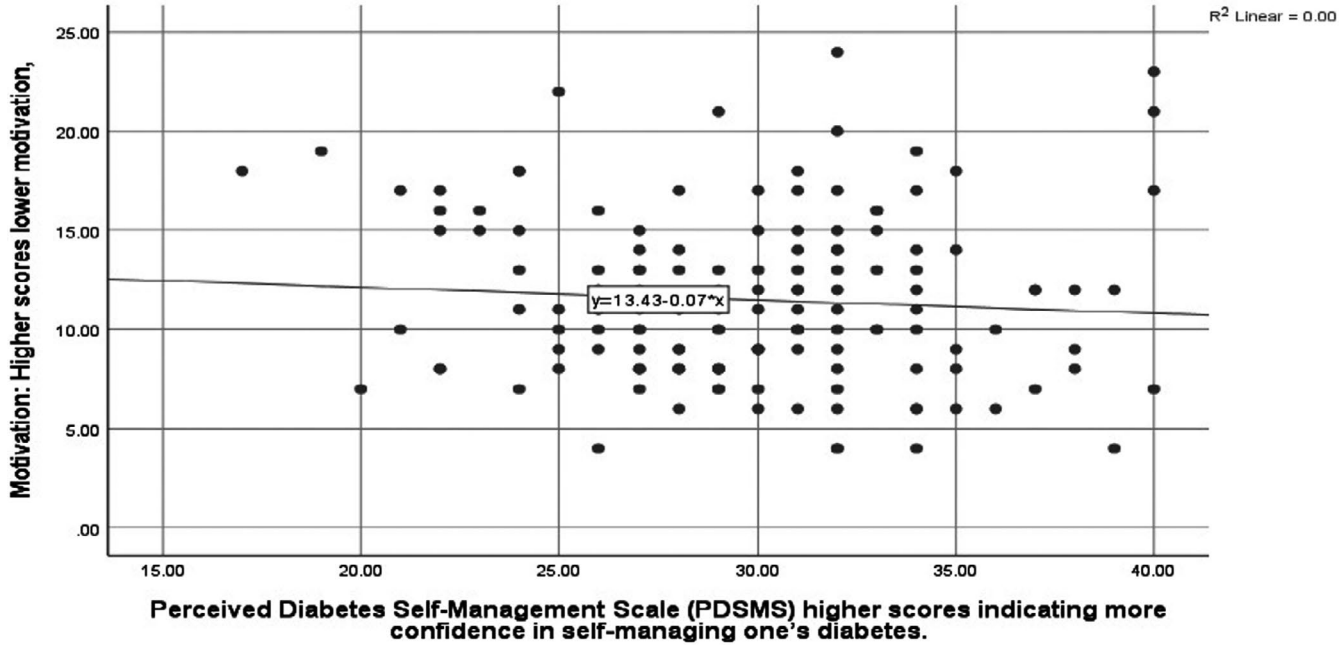

FIGURE 3 Correlation between motivation scores and participants' confidence in diabetes self-management PDSMS

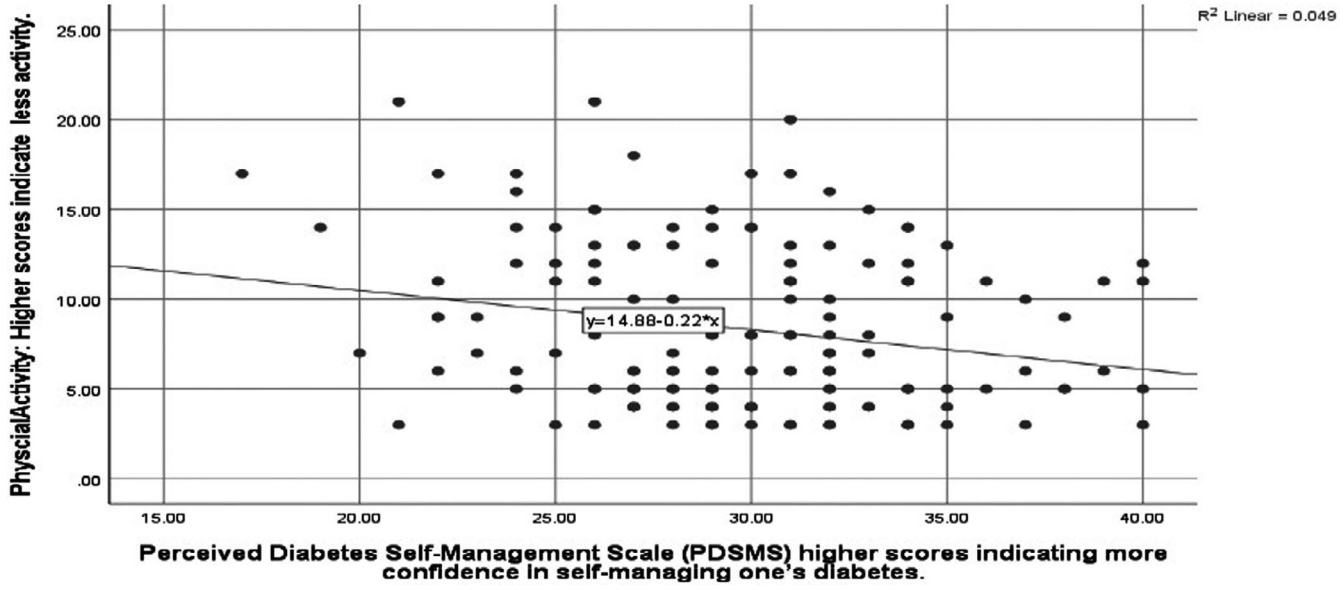

FIGURE 4 Correlation between physical activity scores and participants' confidence in diabetes self-management PDSMS

premise that the participants' confidence in DM self-management was significantly associated with better concentration and physical activity scores.

This study has a number of limitations, including a relatively small sample size in one geographical region. Additional studies with a larger representative sample size are recommended to capture the factors related to DM disclosure and its influence on self-management. A qualitative study with the same target population would provide a deeper understanding of the factors affecting the employee's decision to disclose that would impact their ability to self-management in the workplace.

5 | CONCLUSION

The assessment and description of the influence of DM disclosure on the cognitive, physical ability and DM self-management of employed adults in the workplace are significant. It provides an incentive for management to establish a system of support for affected employees, which will increase the productivity of the employees and promote the achievement of the organizational goals and outcomes. The current study reported significant findings highlighting the importance of increasing awareness about the influence of workplace support on the employees with certain medical conditions such as DM.

The employees who received more support from their co-workers were better able to perform DM self-management and displayed increased concentration, motivation, and activity. It is essential for top management and policymakers to consider implementing support programmes in the workplace and a constant work schedule, rather than a rotating shift. Arrangement for a planned break time will also be beneficial for employees to manage their conditions effectively while at work.

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CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

All data generated during this study are presented in this published article.

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