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The role of social role strain, psychological resources and perceiving diabetes as a priority with self-care in women with type 2 diabetes mellitus

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Abstract

Background The burden of Type 2 Diabetes Mellitus (T2DM) has increased globally and a significant number of Malaysian women are being affected by this disease. Self-care plays a vital role in improving glycemic control and preventing complications. However, women with diabetes face barriers to practising good self-care. This study aimed to determine factors associated with self-care in women with T2DM: *social role strain, psychological resources (problem-focused coping and social support) and perception of diabetes as a priority.*

Methods A cross-sectional study was conducted among women with T2DM between January and April 2023 in a public primary care clinic in Seremban, Malaysia. The study instrument consists of the Summary of Diabetes Self-care Activities (SDSCA), scale for Measuring Role Strain in Women with Diabetes, problem-focused coping from brief COPE, Multidimensional Scale of Perceived Social Support (MSPSS) and an item to assess the perception of diabetes as a priority.

Results A total of 346 women participated in the study (mean age = 60.67, SD = 10.12). Most were elderly (60.4%), Indian (48.3%), had low education (80.6%) and from lower income (70.8%). The mean score for self-care was 2.81 (SD 0.80) days, indicating a suboptimal level. Multiple linear regression analysis revealed that higher income (β = 0.82, [95% CI 0.04, 1.59], p = 0.039), problem-focused coping (β = 0.47, [95% CI 0.03, 0.06], p < 0.001), and perceiving diabetes as a priority (β = 0.04, [95% CI 0.004, 0.09], p = 0.031) were positively associated with self-care. Meanwhile, older age (β = -0.02, [95% CI -0.03, -0.01], p < 0.001), low education (β = -0.25, [95% CI -0.03, -0.01], p = 0.007) and social role strain (β = -0.02, [95% CI -0.03, -0.01], p = 0.003) were negatively associated.

Conclusions Our findings highlighted that women with a higher social role strain, older age and low education have poor self-care. In contrast, those with higher income, utilising problem-focused coping and prioritising diabetes, exhibit better self-care. Interventions for women with T2DM should focus on assisting them to alleviate their social role strain and develop their coping skills. Additionally, involving family in the intervention would help women prioritise self-care.

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Keywords Women, T2DM, Diabetes, Self-care, Social role, Coping, Priority, Social support, Strain, Woman

Introduction

Type 2 Diabetes Mellitus (T2DM) is a chronic metabolic progressive disease and has become the 9th leading cause of death worldwide [1]. The burden of diabetes has increased dramatically from 537 million people living with diabetes in 2021 to possibly reaching 643 million by 2030 and 783 million by 2045 [2]. In Malaysia, the prevalence of T2DM has increased from 13.4% in 2014 to 18.4% in 2019 [3] and in 2021, raised to 20% [2]. Our local data revealed that women are highly affected compared to men, with 57% and only 30.7% of patients with T2DM could achieve good glycemic control [4], signifying that a substantial number of patients are at risk of complications and poor quality of life [5]. Compared to men, women with diabetes have a higher risk of developing macrovascular complications and risk of death due to heart disease [5] and suffer lower quality of life [6, 7].

One crucial step to achieving optimum glycaemic control is implementing self-care in the patient's daily life [8, 9]. There are many essential aspects of self-care: adherence to medications, adopting a healthy eating pattern, engaging in regular exercise, self-monitoring of blood glucose, foot-care practices, and problem-solving skills in coping and managing diabetes [8]. Research has investigated diabetes self-care among various populations worldwide [10–16]. These studies have reported that selfcare differs between men and women with T2DM. While some studies showed that women are in a better position [11, 12, 14], others provided an opposite finding [13, 15, 16].

Meanwhile, several exploratory studies disclosed that women struggle to self-manage diabetes, particularly in Asian societies [17-19]. These studies highlighted that in a collective society such as Asia, women tend to put other people first compared to their own, even to a certain extent, neglecting their own health. Previous studies have documented that certain factors can affect women's ability to manage diabetes, such as feeling the strain from their social roles, poor social support and coping, and not perceiving diabetes as a health priority [18–21]. It is a fact that women contribute significantly to the global's economy and population's growth. They constantly make efforts to fulfil their role as mothers, wives, daughters, daughters-in-law and dedicated employees [21]. These roles can be overwhelming and when women are diagnosed with diabetes, their struggles become greater as they need to balance between managing diabetes and fulfilling their social roles [17–19, 21]. As a result, some women experienced incredible strain [20, 21] and would not perceive diabetes as a priority as they would instead focus on their social roles [18, 19].

In addition, poor coping skills also contribute to inadequate self-care among women with diabetes [17, 22]. Living with diabetes can be stressful as patients need to manage and implement self-care on a daily basis. Lazarus & Folkman (1984) mentioned several strategies to cope with stress, like managing diabetes, which is problem-focused, emotion-focused or avoidant-focused [23]. When facing any difficulty, women like to vent their frustrations and can sometimes be overwhelmed with their emotions. Hence, it is common for them to adopt the emotion and avoidance-focused type of coping [24], but these coping strategies may not be helpful when implementing self-care [25]. Women with diabetes should choose an effective coping strategy to engage and sustain their self-care [24]. For this reason, problem-focused coping skill is thought to be more important [22], as is evident among men with diabetes [25]. By utilizing problem-focused coping, women can be more focused on handling problems more objectively and taking proactive actions to manage diabetes. So far, it is still not clear whether this type of coping would be beneficial for women with diabetes and should be investigated further.

Another factor that could affect self-care in women is social support [26, 27]. Social support can come in various forms: assistance and protection given to others or informal helping relationships [28]. For women with diabetes, not only do they require emotional support, but having someone to share their burden of self-care would be beneficial [19, 21]. Some women feel motivated to change their diet and adopt an active life if their partner does the same [29]. Currently, there is a scarcity of studies that specifically assess self-care among women with diabetes, especially in the local setting. There is also limited knowledge on whether women are experiencing social role strain, their coping and social support and whether they perceive diabetes as a priority, particularly in the Malaysian context. More importantly, there are indications from past studies in other countries that social role strain, social support and coping skills influence women's ability to manage diabetes. As such, these assumptions need to be verified in the local setting. Therefore, the purpose of this study was to assess self-care in women with T2DM, social role strain, problem-focused coping and their perception whether they priories diabetes as priority. We also aimed to determine which of these are significant factors contributing to self-care. Obtaining such information is essential as it can aid healthcare providers and communities in developing tailored interventions involving families and women with T2DM. By addressing the unique challenges faced by women with T2DM, these

interventions can contribute to more effective diabetes management and the nation's well-being.

Materials and methods

Study design, setting and population

This cross-sectional study was conducted in a public primary care clinic (Seremban Health Clinic, Negeri Sembilan) from January to April 2023. The inclusion criteria for this study were (i) women over 18 years old, (ii) able to read Malay and English and (iii) diagnosed with T2DM for more than a year.

The exclusion criteria were participants who had (i) acute complaints or life-threatening events during the visit to the clinic (ii) cognitive, hearing or vision impairment (iii) psychiatric illness, and (iv) physical disability. The sample size was calculated based on the study objectives of assessing self-care and each factor. The largest sample size obtained was 345, based on the single mean formula using the mean score and standard deviation of social role strain from a previous study [30]. Considering the 10% drop-out rate, 379 samples were required for this study.

Data collection

A systematic sampling method was employed to recruit the participants. All women with T2DM registered at the non-communicable disease unit, Seremban Health Clinic. This clinic receives approximately 800 women with T2DM per month. To achieve the estimated sample size for this study within the study period, women were sampled by selecting every 6th woman starting from a randomly chosen initial point. The identified women were screened first, and once they fulfilled the study criteria, they were invited to participate. All the respondents were given an information sheet and informed consent was obtained if they agreed to participate. A selfadministered questionnaire was then distributed. This study complies with the Declaration of Helsinki and was performed according to ethics committee approval. The detail of study flow is shown in Fig. 1.

Study instrument

The study used a self-administered questionnaire in both Malay and English languages. The questionnaire had seven sections: section A until F. **Section A** assessed the participant's sociodemographic (*age, ethnicity, marital status, educational level, employment status, living arrangement and monthly household income*) and clinical characteristics (*duration of diabetes, types of treatment and presence of co-morbidity*).

Section B measured self-care activities during the past seven days using the Summary of Diabetes Self-care Activities (SDSCA) scale [31]. The scale consists of 10 items and is categorised into four domains: (a) diet

(4 items) (b) exercise (2 items) (c) self-monitoring blood glucose (2 items) and (d) foot care (2 items). Participants were required to rate how frequently they perform these activities from 0 (none) to 7 days (every day). The total score ranges from 0 to 70, with item number 4 having a reversed score [32]. The mean number of days for each domain and overall self-care were calculated to determine the frequency of diabetes self-care in seven days [32]. This scale was originally in English [32] and had been translated and validated in the Malay language [33].

Section C evaluated social role strain using the Scale for Measuring Role Strain in Women with Diabetes [34]. There are nine items, and the options are on a five-point Likert Scale: 1(strongly disagree) to 5(strongly agree). The overall score ranges from 9 to 45, with a higher score reflecting a higher role strain. The scale was originally in English [34] and needed to be translated and validated into Malay. The translation and validation process begins with a panel of experts (a family medicine specialist and a public health medicine specialist) reviewing the original scale to assess its suitability for the local context. Next, two linguistic experts translated the English version into Malay, producing two translated Malay versions, which were then harmonised. The harmonised Malay version was subsequently translated into English by another two linguistic experts. The translated English version was then compared with the original one. The panel of experts reviewed each step of the forward and backward translations and agreed that the harmonised Malay version has a similar meaning to the original English.

Before the data collection, face validity was conducted among ten women with T2DM to both English and Malay versions of the social role strain scale. All ten women provided feedback that both versions were well understood. Subsequently, a pilot study involving 60 women was performed. Thirty participants answered the Malay version, while another 30 completed the English version (t = 0.88, p value = 0.381). The reliability of both versions was determined using Cronbach's alpha, a measure of internal consistency. Both versions demonstrated good reliability, with a Cronbach's alpha of 0.80 for the Malay version and 0.91 for the English.

Section D assessed social support using the Multidimensional Scale of Perceived Social Support (MSPSS), comprising 12 items [28]. The Malay version of this scale was validated by Ng et al. (2010) [35]. The response for each item is a seven-point Likert scale, ranging from $1(very \ strongly \ disagree)$ to 7 (very strongly agree). The total score is between 12 and 84, with a higher score indicating better social support. Based on the scoring guide, the mean social support score is obtained by calculating the total score and dividing it by 12 (as there are 12 items). This mean score can be categorised into low



Fig. 1 Study flow chart

social support (1 to 2.9), moderate (3 to 5), and high support (5.1 to 7) [28].

Section E contains six items that measure problemfocused coping skills and is a domain from the brief COPE scale [36]. The options are on a four-point Likert scale, ranging from 1(*haven't been doing this at all*) to 4 (*have been doing this a lot*). The overall score ranges from 6 to 24, with higher scores indicating increased use of problem-focused coping strategies in managing diabetes. The Malay version of this scale was validated by Yusoff et al. (2009) [37]. Of note, permission was obtained for all the above English and Malay versions of the questionnaires.

Section F consists of one question asking the participants to rate how much they perceived diabetes as a health priority. The rating is between 1(*not a priority*) and 10 (*an essential priority*). In the last section (**Section G**), the researcher gathered the participant's information on body mass index (BMI) and recent HbA1c (glycaemic control).

participants (<i>n</i> =	346)		
Factors		n (%)	Mean (SD)
Age	18–40 years old	13 (3.8)	60.67
	40–49 years old	34 (9.8)	(10.12)
	50–59 years old	90 (26.0)	
	≥60 years old	209 (60.4)	
Ethnic	Malay	81 (23.4)	
	Chinese	91 (26.3)	
	Indian	167 (48.3)	
	Others	7 (2.0)	
Marital status	Single	9 (2.6)	
	Married	230 (66.5)	
	Divorced	20 (5.8)	
	Widowed	87 (25.1)	
Educational level	No formal education	5 (1.4)	
	Primary	95 (27.5)	
	Secondary	179 (51.7)	
	College/University	67 (19.4)	
Employment	Housewife	200 (57.8)	
	Office work	54 (15.6)	
	Self-employed	46 (13.3)	
	Others	46 (13.3)	
Living	Alone	18 (5.2)	
Arrangement	Lives with family/friends	328 (94.8)	
Household	< 5000	245 (70.8)	
Income (MYR)	5000-10,000	98 (28.3)	
categorised by	> 10,000	3 (0.9)	
the Department			
OF Statistics Malaysia 2010			
Duration of Dia-		141 (40.8)	11 25
betes (years)	> 10 years	205 (59 2)	(7.37)
Types of Diabetes	Lifestyle modification	3 (0.9)	. ,
Treatment	Oral hypoglycaemics	231 (66.8)	
	Insulin	9 (2.6)	
	Oral	103 (20.8)	
	hypoglycaemic + Insulin	105 (29.0)	
BMI (ka/m²)	Underweight (< 185)	10 (2 9)	
2(Normal (18 5–22 9)	62 (17 9)	
	Pre-obese (23–27.4)	142 (41 0)	
	Obese (> 27.5)	132 (38 2)	
HbA1c			7.83
			(0.09)

 Table 1
 Sociodemographic and clinical characteristics of the participants (n = 346)

Statistical analysis

All data gathered were analysed using the IBM Statistical Package for the Social Sciences (SPSS) version 27. Categorical and numerical data were described as frequency (n), percentage (%) and mean with SD, respectively. Statistical significance was set at p < 0.05. Simple linear regression was performed to determine the crude β and its corresponding 95% Confidence Interval (CI), followed by multiple linear regression analysis to identify the adjusted β of the final factors associated with diabetes self-care. Backward multiple linear regression was employed due to its parsimonious modeling approach. The model fits reasonably well. There were no interactions among the independent variables. No multicollinearity was detected (variance inflation factors < 10). Model assumptions are fulfilled, (i) linearity was assessed through scatter plots of residuals versus predicted values, (ii) independence was detected by Durbin-Watson test with value 0-4, (iii) normality of residuals was checked inspecting a histogram of residuals and (iv) homoscedasticity was assessed through scatter plots of residuals versus predicted values.

Result

Sociodemographic and clinical characteristics

A total of 414 women were invited, but only 373 agreed to participate in this study, resulting in a response rate of 90%. However, 14 questionnaires were incomplete and 13 did not have HbA1c results. Hence, the final number of questionnaires for analysis was 346. The mean age of the participants was 60.67 (SD 10.12) years. Over half were above 60 years old (60.4%), married (66.5%) and housewives (57.8%). Nearly half were Indian (48.3%) and attained up to a secondary level of education (51.7%). Majority of them lived with family or friends (94.8%) and had a household income of less than RM5000 (70.8%). Most had T2DM for more than ten years (59.2%), with a mean of 11.25 (SD 7.37) years and on oral anti-hyperglycaemic drugs (66.8%). The mean HbA1c was 7.83% (SD 0.09) and 79.2% were overweight (pre-obese and obese) (Table 1).

Diabetes self-care, social role strain, perceived diabetes as a health priority and psychological resources (social support and problem-focused coping)

Table 2 presents the mean score of diabetes self-care, social role strain, perceived diabetes as a health priority, perceived social support and problem-focused coping. The mean number of days for self-care in a week was 2.81 (SD 0.80), indicating that, on average, women performed poorly. Among the self-care activities, adherence to the general dietary plan was 5.11(SD 1.32) days and 4.34 (SD 1.17) days for specific dietary plans. Meanwhile, women performed extremely poorly for self-monitoring blood

Table 2 The mean score of diabetes self-care, social role strain, problem-focused coping, social support and perceived diabetes as a health priority (n = 346)

Factors	n (%)	Mean (SD)
Diabetes Self-care Activities (day in a week)		2.81 (0.80)
General Diet		5.11 (1.32)
Specific Diet		4.34 (1.17)
Exercise		2.96 (1.34)
Self-monitoring blood glucose		0.71 (1.28)
Foot care		0.93 (1.67)
Social Role Strain		21.27 (6.07)
Perceived diabetes as a health priority		7.08 (1.91)
Social Support		5.37 (1.00)
Low	11 (3.2)	
Moderate	119 (34.4)	
High	216 (62.4)	
Problem-focused coping		15.05 (4.97)

glucose and foot care, with the mean scores of 0.71(SD 1.28) and 0.93(SD 1.67), respectively. Regarding exercise, women reported engaging with it on an average of 2.96 (SD 1.34) days.

In view of social role strain, the mean score was 21.27 (SD 6.07), suggesting that women did not experience a high level of social strain. Furthermore, women in this study generally perceived diabetes as a health priority, as shown by the mean score of 7.08 (SD 1.91). For social support, most perceived it as high (62%), while only 3.2% perceived it as low. The mean score of problem-focused coping was 15.05 (SD 4.97).

Factor associated with diabetes self-care

Table 3 shows a simple regression analysis. Factors significantly associated with self-care are age, not married, low education, office work, self-employed, high income and T2DM for more than ten years. Social role strain, perceived diabetes as a health priority, problemfocused coping, and social support also have a significant association.

Table 4 demonstrates multiple linear regression analysis. Older women have a lower self-care of 0.02 [(95% CI -0.026, -0.011), p = < 0.001], similarly those with low education, of 0.27 [(95% CI -0.451, -0.081), p = 0.005]. Furthermore, women experiencing high social role strain tend to have lower self-care [b = 0.02 (95% CI -0.031, -0.007), p = 0.002]. Compared to those with lower income, women with higher income exhibit better self-care, of 0.88 [(95% CI 0.104,1.655), p = 0.026]. Likewise, those perceiving diabetes as a health priority [b = 0.04 (95% CI 0.004, 0.09), p = 0.031]. Meanwhile, problemfocused coping increases women's self-care by 0.05 [(95% CI 0.037, 0.068), p = < 0.001]. The model explains 33% of the variance of the mean diabetes self-care in women with T2DM ($R^2 = 0.33$).

Discussion

The current study is among the initial efforts to investigate the self-care level among women with type 2 diabetes. Our study provides an understanding of self-care practices and aspects contributing to them, particularly in our local context. The results highlighted that women with T2DM practised self-care for only 2.81 days per week. The number is lower than the overall level for Malaysians with T2DM, which is 3.34 days [38]. Besides, data from other populations also demonstrated a higher level of 4.56 days [39]. Our finding is alarming and should be a significant concern, as in Malaysia, a substantial number of patients with T2DM are women [4] and having poor self-care signifies that their glycaemic control is not optimised. They are also at risk for multiple complications and unless urgent measures are taken, these women will suffer from low quality of life and incur enormous costs to their family and healthcare system.

Looking into each aspect of self-care, women showed varying levels of engagement. Self-blood glucose monitoring (SMBG) was the least commonly practised self-care activity, a similar finding in other surveys among women with diabetes [12, 16, 40–42]. A few possible explanations for this result. First, most of our participants belong to the lower income group, and thus, purchasing a glucometer machine and glucose strips may not be within their means. Moreover, this essential equipment is not provided freely to our patients, and not having a glucometer has been found to contribute significantly to poor self-care [43]. Secondly, many of the participants are not on insulin, and thus, they may perceive it as unnecessary to monitor blood glucose at home when they do not need to adjust or self-titrate their medications.

In line with previous findings [12, 42], women in our study have difficulty performing regular foot care and exercise. Regular foot care is a core component of diabetes self-care for preventing the development of foot ulcers and leg amputations [8]. Yet, women performed poorly, indicating a possibility of a knowledge deficit, as this type of self-care requires considerable knowledge [27, 44]. Healthcare providers should realise that women with low education, like our study participants, may have no means to acquire knowledge independently. Perhaps, information on self-care should be made available through various platforms, including social media. Our findings also seem to support the fact that initiating and maintaining physical activity has been a challenging task for patients with diabetes, as it demands time and commitment [29], even for women. Most of our participants are women working either at home or in the office and unable to provide adequate time for exercise, as reported by other studies [12, 42].

Factors		Simple linear regression			
		β	95% CI	t	<i>p</i> -value
Age		-0.029	-0.037, -0.022	-7.41	<0.001*
Ethnic	Malay (reference)				
	Chinese	0.107	-0.132, 0.345	0.88	0.381
	Indian	-0.132	-0.344, 0.079	-1.23	0.219
	Others	0.474	-0.142, 1.089	1.52	0.131
Marital status ¹	Married (reference)				
	Not married	-0.231	-0.408, -0.053	-2.55	0.011*
Educational level ²	High (reference)				
	Low	-0.439	-0.649, -0.230	-4.13	<0.001*
Employment	Housewife (reference)				
	Office work	0.618	0.385, 0.851	5.23	<0.001*
	Self-employed	0.305	0.057, 0.553	2.42	0.016*
	Others	0.244	-0.004, 0.502	1.94	0.054
Living Arrangement	Alone (reference)				
	Lives with family/friends	0.121	-0.261, 0.544	0.62	0.534
Household Income (MYR)	< 5000 (reference)				
	5000-10,000	0.239	0.054, 0.424	2.55	0.011*
	> 10,000	1.332	0.433, 2.230	2.91	0.004*
Duration of diabetes (years)	< 10 (reference)				
	>10	-0.359	-0.527, -0.190	-4.19	<0.001*
Types of Treatment	Lifestyle (reference)				
	Oral hypoglycaemic	0.021	-0.896, 0.937	0.05	0.964
	Insulin	0.322	-0.729, 1.374	0.60	0.547
	Oral hypoglycaemic + Insulin	-0.026	-0.950, 0.898	-0.06	0.956
BMI	Underweight (reference)				
	Normal	0.158	-0.379, 0.695	0.58	0.564
	Pre-obese	0.303	-0.213, 0.818	1.16	0.249
	Obese	0.267	-0.249, 0.784	1.02	0.310
HbA1C (%)		-0.034	-0.083, 0.032	-1.34	0.180
Social Role Strain		-0.031	-0.044, -0.017	-4.42	<0.001*
Perceived diabetes as a health priorit	у	0.126	0.084, 0.169	5.87	<0.001*
Social Support		0.248	0.167, 0.328	6.07	<0.001*
Problem-focused Coping		0.074	0.059, 0.089	9.64	< 0.001*

Table 3 Preliminary factors associated with diabetes self-care

¹Single, divorced, and widowed are categorised as unmarried, ² No formal education, primary and secondary are categorised as lower educational level and college/ university categorised as higher educational level. *Significant at *p* < 0.05. Simple linear regression: (Normality and equal variances assumptions for all variables were met and independent random samples were drawn for the construction of data)

Factors associated with self-care

The current study found five significant factors associated with self-care in women: *income, educational level, age, social role strain, perceived diabetes as a health priority, and problem-focused coping.* Consistent with previous studies [14, 43, 45, 46], our results demonstrated that people with good financial resources, i.e. higher income, tend to be better at diabetes self-care. Individuals with diabetes require sufficient financial resources to purchase a glucometer for monitoring blood glucose and changing their diet [19]. Like other countries, Malaysia is also facing a high cost of living, and obtaining high-fibre food such as oats or even vegetables and fruits is considered beyond the means of people in low-income groups [18], as most of our participants are. Thus, this might also contribute to low dietary adherence, as seen in our study. Apart from income, educational level also plays a key role. Individuals with higher education exhibit better self-care, affirming results from past research [13, 47]. It is acknowledged that managing diabetes requires patients to understand many self-care aspects in detail, including dietary recommendations, types of food with low glycaemic index, intensity and regularity of exercise, proper foot care practices, self-monitoring blood sugar and adjusting insulin [48, 49]. These aspects are not achievable unless they understand and evaluate the health-related information given by the healthcare providers, meaning having adequate health literacy skills [50, 51]. Health literacy and educational status are said to be interrelated concepts, whereby those with higher education tend to have good literacy skills [52]. This could be

Table 4 Final factors associated with diabetes self-care

Factors	Multiple linear regression				
	β	95% CI	t	<i>p</i> -value	
Age	-0.018	-0.026, -0.011	-4.87	<0.001*	
Low educational level ²	-0.253	-0.026, -0.011	-2.70	0.007*	
Household Income (MYR) > 10,000	0.816	0.042,1.589	2.07	0.039*	
Social Role Strain	-0.018	-0.030, -0.006	-2.98	0.003*	
Perceived diabetes as a health priority	0.044	0.004, 0.085	2.17	0.031*	
Problem-focused Coping	0.047	0.030, 0.063	5.61	<0.001*	

*Significant at p < 0.05. ¹Single, divorced, and widowed are categorised as unmarried, ² No formal education, primary and secondary are categorised as lower educational level and college/university categorised as higher educational level. Backward multiple linear regression method was applied. The model fits reasonably well. Model assumptions are fulfilled. There were no interactions among the independent variables. No multicollinearity was detected. Adjusted $R^2 = 0.33$

why highly educated people are more likely to do better in self-care.

Another significant factor influencing self-care in women is age. The regression analysis showed that as age increases, the self-care score becomes lower. Our finding seems to replicate the result from a previous local study [53]. This could be because elderly individuals, like more than half of our participants, might be suffering from multiple chronic conditions and physical impairments due to musculoskeletal problems [54]. Hence, certain self-care practices, such as regular exercise, may be challenging for them [26], as reflected in our study result. It is also possible that financial resources are limited for older people once they reach retirement age, contributing to low self-care.

Our final analysis revealed that women with high social role strain tend to practise low self-care. This finding warrants further attention as it points out that women cannot manage diabetes well while being obligated to perform many responsibilities as wives, employees, daughters or other social roles. Patients with diabetes describe that living with this condition is akin to embarking on a difficult journey and they are expected to learn self-care skills and take an active role in managing diabetes [29]. While women are already overwhelmed with their role as the family's caregiver or employee, needing to take another massive role as a diabetic manager would add to their burden [24]. Each role demands time and commitment, and if women could manage their time effectively, they could perform self-care well [24]. According to Summerson-Gibson et al. (2021), one could integrate self-care as a daily routine when managing time effectively [55]. This aspect is where women need guidance, support and problem-solving skills.

Meanwhile, when women are unable to meet the expected role functions, guilt is bound to happen [34] and consequently, they often choose to sacrifice their needs and put less priority on managing diabetes. In a family-oriented society like Malaysia, where people value family ties and opinions, upholding the role of good mother, wife and daughter is important for women. This is also part of the identity of Asian women, and fulfilling these roles can be rewarding and enhance the women's self-esteem [19, 24]. However, when women are overloaded with multiple roles, they are likely to experience strain, resulting in them not prioritising diabetes. When they perceive diabetes as a low priority, they tend to neglect self-care activities [21, 24], as seen in our study.

Furthermore, women could also suffer from social role strain when family members tend to blame them for poor diabetes control [34]. For women, family can be a great source of support, but there have been claims that family members are negatively criticising them for their incompetence [19, 21, 56]. It is worth noting that women feel it is not right to blame them when they cannot comply with the diabetic diet, as they have to prepare the meals according to their family's preference [18, 27]. This conflict and guilt may then induce frustration, leading to diabetes distress [30, 57] and mental illness like depression [34]. Therefore, assisting women in balancing their social roles and managing diabetes is substantial. These issues might be the reasons behind the low level of self-efficacy in women with diabetes, as some scholars have pointed out [10, 19]. Self-efficacy is crucial for good self-care [58], especially in women with diabetes [14]. Our results also demonstrated that the mean score of social role strain is 21.27, which is higher than two similar studies in Taiwan, between 15 and 16 [30, 59]. This issue warrants in-depth exploration, especially from the socio-cultural perspective.

Having a chronic illness such as diabetes could bring significant emotional stress to those suffering as they need to cope with the demands of managing diabetes [18]. Similar to women having gestational diabetes, women with type 2 diabetes require an effective coping strategy to self-manage diabetes [60]. Past research has shown that men and women use different coping strategies, with women focusing more on emotion-type strategies such as venting, humour, and self-distraction [25]. This might be because women tend to worry about diabetes and its complications [18, 19], and utilising emotion-focused coping would help them handle their fear. However, we found that women who employ problem-focused coping have better self-care, indicating that if they adopt this type of coping, they would likely seek to understand and learn about self-care [21] instead of focusing on their emotions. They will make attempts to seek help and proactively take action in managing

diabetes [23]. This type of coping proved to be useful and influenced self-care [25, 60], self-efficacy [61] and glycaemic control [62]. Since managing diabetes has become a lifelong commitment, women must adapt and be willing to find solutions for any problems [56]. Better adaptation and adjustment to diabetes is shown in a person utilising problem-focused coping [63], which is vital to integrating self-care into daily life [19]. It is also worth noting that the mean score of problem-focused coping is not high, similarly reported in other studies among women [62, 64].

In the current study, social support was not a significant factor contributing towards self-care in women despite many perceived high social support from family, friends and significant others. An explanation for this is women possibly need more than emotional support or companionship when managing diabetes. Previous exploratory work highlighted that women would be more motivated when spouses or family members could share the burden of self-care, such as adhering to medications, monitoring blood glucose and adopting a healthy lifestyle [18, 19, 29, 65]. Moreover, women also require financial and information support to implement self-care [19, 66]. On the contrary, there have been reports that social networks, including family members, are barriers to adherence to lifestyle changes [19, 21].

This study has several limitations that should be acknowledged when interpreting the findings. Firstly, the study design was cross-sectional, which limits the ability to establish a causal relationship between the variables under investigation. Future research employing longitudinal designs would be valuable in determining the temporal nature of the relationships. Secondly, the study was conducted at a single outpatient clinic, which may restrict the generalizability of the results to other healthcare settings or populations. Conducting similar studies in different settings and with more diverse participant samples would enhance the external validity of the findings.

Conclusion

The findings of the current study provide valuable insights into barriers to performing self-care in women with diabetes. Based on our study, it is clear that women with diabetes failed to perform self-care regularly. Some reasons attributed to this are (i) having a high social role strain (ii) not perceiving diabetes as a priority (iii) lack of problem-focused coping (iv) low education v)low income and vi) increased age. Therefore, healthcare providers should consider all these aspects when helping women with diabetes. It is imperative that diabetes self-care education for women should include aspects such as social role strain, effective time management, and finding ways to prioritise self-care. For women, self-care education should not only deliver knowledge and self-care skills but handle role conflicts and demands.

Families, communities and employers should be aware of this issue and assist women in balancing their responsibilities and creating an environment that supports diabetes self-care. This can be achieved through education, raising awareness, and providing resources that emphasise the significance of self-care in managing diabetes. Community-wide initiatives, such as the "Empowered Women, Thriving Family" program, can significantly promote women's empowerment in health. Additionally, involving family members in managing women with diabetes can establish a supportive network that contributes to improved self-care practices. Healthcare providers should provide resources to develop coping skills for women to manage diabetes effectively while paying attention to specific groups of people, namely women of older age, lower education and poor income. By addressing these multifaceted aspects, future studies can contribute to developing targeted interventions and strategies that promote optimal self-care practices and enhance the overall well-being of women with diabetes.

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Author contributions

Conceptualisation: UAAA, SMH, ZH Formal analyses: UAAA, SMH, NA Investigation: UAAA, SMH Methodology: UAAA, SMH, NA Supervision: SMH, NA Visualisation: SMH, ZH Writing-original draft: UAAA, SMH Writing-review and editing: SMH, NA.

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Data availability

Data us provided within the manuscript or supplementary information files.

Declarations

Ethics approval and consent to participate

Approval to conduct the study was obtained from the Medical Research and Ethics Committee (MREC) of the Ministry of Health Malaysia (NMRR ID-22-02611-8TX (IIR) and the Medical Research Ethics Committee of Universiti Kebangsaan Malaysia (GGPM-2022-030). Permission was obtained from the Director of Negeri Sembilan State Health Department and the Medical and Health Officer of Seremban District Health Office prior to data collection. All the respondents were given an information sheet, and informed consent was obtained if they agreed to participate.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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